Dissertation

Cultural Competence among Austrian Nurses

Selvedina OSMANCEVIC, BSc MSc

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Dr. Franziska GROßSCHÄDL

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Declaration of Academic Integrity

I hereby declare that this thesis is my own original work and that I have fully acknowledged by name all of those individuals and organisations that have contributed to the research for this thesis. Due acknowledgement has been made in the text to all other material used. No material other than that cited in the reference list has been used. Throughout this thesis and in all related publications I followed the “Guideline of the Medical University of Graz on Good Scientific Practice”.

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Graz, April 2025 Selvedina Osmancevic, m.p.

Disclosures

The current dissertation has been published and submitted as the following articles:

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Co-authors and their Affiliations

Christa Lohrmann, Institute of Nursing Science, Medical University of Graz, Neue Stiftingtalstraße 6, 8010 Graz, Austria

Franziska Großschädl, Institute of Nursing Science, Medical University of Graz, Neue Stiftingtalstraße 6, 8010 Graz, Austria

Daniela Schoberer, Institute of Nursing Science, Medical University of Graz, Neue Stiftingtalstraße 6, 8010 Graz, Austria

Laura Maria Steiner, Ente Ospedaliero Cantonale Ticino, Viale Officina 3, 6500 Bellinzona, Switzerland; University of Applied Sciences of Southern Switzerland SUPSI, via Violino 11, 6928 Manno, Switzerland

Marko Stijic, Institute for Medical Informatics, Statistics and Documentation, Medical University of Graz; University Clinic for Neurology, Clinical Department of Neurogeriatrics, 8010 Graz, Austria

All co-authors have explicitly agreed to the use of their data in this thesis.

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Cultural Competence among Austrian Nurses

Selvedina Osmancevic

Contents

Abbreviations and Definitions

B	Unstandardized regression coefficient
CAS	Cultural Awareness Scale
CCA	Cultural Competence Assessment
CCAI	Cultural Competence Assessment Italian Version
CCATool	Cultural Competence Assessment Tool
CCB	Cultural Competence Behaviour
CCCET	Cultural Competence Clinical Evaluation Tool
CCCS	Critical Cultural Competence Scale
CCCHP	Cross-Cultural Competence instrument of Healthcare Professionals
CCCQ-PRE-R	Clinical Cultural Competency Questionnaire Revised
CCHPA	Cultural Competence Health Practitioner Assessment
CCINC	Cultural Competence Inventory for Nurses in China
CENTRAL	Cochrane Central Register of Controlled Trials
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CINAHL	Cumulative Index of Nursing and Allied Health Literature
COSMIN	COnsensus-based Standards for the selection of health Measurement INstruments
CSES	Cultural Self-Efficacy Scale
CSES-S	Cultural Self-Efficacy Scale Spanish Version
CVI	Content Validity Index
I-CVI	Item- Content Validity Index

GRADE	Grading of Recommendations Assessment, Development and Evaluation
IACC	Individual Assessment of Cultural Competence
IAPCC-R	Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals–Revised
ICC	Interclass correlation coefficient
INCCQK	Iranian Nurses Cultural Competence Questionnaire of Khanbabayi
J-CCCHS	Japanese version of the Caffrey Cultural Competence Health Services
KMO	Kaiser-Meyer-Olkin
K-CCSN	Korean Version of the Cultural Competence Scale for Clinical Nurses
MeSH	Medical Subject Headings
ML	Maximum Likelihood
NCCS	Nurse Cultural Competence Scale
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PROSPERO	Prospective Register of Ongoing Systematic Reviews
RCTs	Randomised Controlled Trials
RMSEA	Root Mean Square Error of Approximation
ROB	Risk of Bias Assessment Tool for Randomized Trials
ROBINS-I	Risk of Bias in Nonrandomized Studies – of Interventions
SEB	Standard error of the coefficient
SMD	Standardized mean differences
SRMR	Standardised Root Mean Square Residual

TSET	Transcultural Self-Efficacy Tool
TLI	Tucker Lewis Index
VIF	Variance Inflation Factors

Chapter 1

General Introduction

Let me introduce you to Hasib.

In the early 1970s, he left his hometown in Bosnia to work as a so-called guest worker in Austria, being part of a wave of labour migration that brought thousands of foreign workers to Western Europe. Like many of his contemporaries, Hasib intended for his stay to be temporary. He worked diligently, often in physically demanding jobs, while saving money in the hope of returning to Bosnia to enjoy a peaceful retirement.

As the years passed, however, Hasib's plans began to change. His family – wife, children, and grandchildren – established deep roots in Austria. Hasib, too, grew attached to the life he had built and found comfort in being close to his loved ones. By the time Hasib reached retirement age, his decision to stay in Austria was clear. Returning to Bosnia was no longer aligned with his reality.

However, Hasib was not able to enjoy long years of healthy retirement but developed dementia a few years later. At one time, Hasib was hospitalised. In the months before, he had lost most of his ability to communicate verbally. Despite his cognitive decline, one thing never left him – his spirituality and his wish to pray. As a practicing Muslim, his commitment to daily prayer was a core element of his cultural and spiritual identity.

Throughout his hospital stay, Hasib made repeated attempts to perform his ritual washing and prayer, gathering his limited strength to rise from his bed. Nursing staff did not understand why Hasib was uneasy and why he was trying to stand up. Concerned for his safety, they quickly intervened, restraining him to prevent him from falling. Their intentions were rooted in a genuine desire to protect him, but their actions disrupted a deeply meaningful aspect of his spiritual routine. What may have appeared to the nursing stuff as agitation or non-compliance was in fact a routine act of faith. They did not understand the importance of daily prayer to Hasib. For him, prayer was not just a practice but rather a source of meaning and comfort amidst the disorientation of his illness and hospitalisation.

This exemplary case shows the importance of recognising the cultural and/or spiritual needs of patients and integrating them into daily nursing prac-

tice. While physical safety and correct medical treatment are important, the failure to assess and address patients' cultural and spiritual needs may lead to misunderstandings or mistreatment. Hasib's story highlights the need for culturally congruent, person-centred care that respects and integrates patients' cultural values and needs.

The World Health Organization (WHO) have affirmed the universal right to health as a fundamental human right (1). Despite this affirmation, significant health inequalities persist globally (1, 2), especially for patients with different cultural backgrounds (1-4). There is evidence of poorer quality of care and lower patient-related outcomes (e.g. quality of life) among patients with different cultural backgrounds (3-7). Some of the reasons for these inequalities are the existence of various barriers, which include the structural and procedural complexities of healthcare systems, legal restrictions to access to specific health services, linguistic and cultural barriers, discrimination, and limited cultural competencies of healthcare professionals (8).

Many countries in Europe, including Austria, are experiencing increasing cultural diversity as a consequence of migration and globalisation. This development is also reflected in healthcare, where patient demographics are becoming more diverse (e.g. in terms of ethnicity, migrant backgrounds, religion, spirituality) (3). In Austria, the cultural diversity within the healthcare system is especially visible in care for older patients with a migrant background. Many of these people are former migrant workers who came to Austria in the 1970s, who are now reaching retirement age (9). In their study, Perchinig and Schaur (2015) analysed the care needs of older people with a migrant background living in Austria. Their study results reveal that older people with a migrant background use fewer institutional healthcare services than the rest of the population. Some of the reasons the authors cited for this were uncertainty about receiving culturally sensitive services, fear of prejudice and discrimination, but also uncertainty about whether their cultural or spiritual needs would be taken into account when receiving nursing care (9).

As a consequence of increasing cultural diversity and documented health inequalities, healthcare professionals are faced with the challenge to pro-

vide high-quality[1] care to patients with different cultural backgrounds and to address their individual needs (e.g. cultural or spiritual) (12, 13). Nurses, like other health care professionals, face challenges when attempting to recognise and address these differences and provide care that meets the individual needs of these patients (12, 14). As the largest group of healthcare professionals, comprising over 50% of the global health workforce (15), nurses spend more time directly caring for patients than any other healthcare professionals (16). Nurses are core staff across nearly all health settings, and particularly in hospitals. They play a vital role in assessing patients, providing care, coordinating and facilitating access to care from other healthcare professionals, and providing patient education and support, along with other responsibilities (17). However, it seems that nurses do not always feel confident when providing care to patients with different cultural backgrounds. A cross-sectional study on European nurses' perceptions of culturally congruent nursing care found that approximately 70.6% of nurses experienced challenges when providing care to patients with cultural backgrounds differing from their own. The main challenges reported were differences in language, spirituality, and lack of cultural knowledge (18). Not only feeling insecure, but also discriminatory perceptions and discriminative behaviour can affect the provision of care. For instance, nurses sometimes apply stereotypes to care-dependent patients with cultural backgrounds differing from their own. They may think that family members usually take care of the patient and conclude that certain care options (e.g. care provision in a long-term care facility) would be rejected due to cultural norms. Consequently, they hesitate to propose these care solutions based on their preconception that these would be dismissed (3).

When the nursing care provided does not meet the patient's expectations or needs, it can lead to misunderstandings, mistreatment, or distrust (3). One study shows that, instead of assessing patients' cultural needs, nurses relied on their assumptions about patients' cultural needs, made on the basis on

[1] According to the WHO, high-quality care is "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge." (p. 31) The quality elements include effectiveness, safety, and person-centredness. In addition, in order to realise the benefits of quality health care, health services should be timely, equitable, integrated, and efficient. This definition indicates that person-centredness embodies a professional approach that focuses care and support services on the individual needs and preferences (10).

the patients' habits and surnames, to plan nursing care interventions (4). The same study, however, shows that when patients were not given opportunities to express their cultural needs, they were discouraged from following nurses' interventions and health-related advice, which led to more healthcare issues (4). In other words, such misconceptions, prejudices, unasked questions, and partial information can lead to inaccurate care diagnoses, unrealistic care goals, and ineffective care measures (19). Therefore, nurses need to recognise and respect the patient's cultural values and beliefs and patients should be given opportunities to express their cultural needs incorporating them into the planning of appropriate, person-centred care[2] (20).

According to McCormack (2006), person-centred care requires the formation of a caring relationship between nurses, patients, and their significant others. This patient-nurse relationship is built on mutual trust, understanding, and the process of sharing collective knowledge (21). Improving the patient-nurse relationship, along with adopting a more culturally sensitive attitude, can positively influence the trust levels between patients and nurses (13, 14, 22). These increased trust levels, in turn, can help patients achieve greater satisfaction with nursing care (5, 23, 24). Specifically, when nurses invest time by explaining procedures, acknowledging patient needs, and engaging patients in shared decision-making, despite their cultural differences, these patients are more likely to experience person-centred care (2).

In order to ensure person-centred nursing care, nurses require specific skills and expertise. In this regard, the nurses' cultural competence is viewed as one of the main skills which enables them to provide culturally congruent[3], person-centred care that respects and integrates patients' cultural values and needs into care (13, 26). The term cultural competence consists of two terms: culture and competence. In the nursing literature, the term culture is defined as the learned paradigm shared by a group (27), while the term competence is defined as the ability to work to obtain the desired outcomes under the influence of diverse conditions of the real world (28). According to Sharifi et al. (2019), nurses' cultural competence is defined as:

[2] Person-centred care is "care that is arranged through a careful analysis of patient experiences and needs, working closely with their coping and preferred objectives." (p.9)(20)

[3] Leininger (2002) defines the term culturally congruent care as care that helps, supports, facilitates, or empowers cognition-based actions or decisions which are congruent with the cultural values, beliefs, and lifestyles of individuals, groups, or organisations (25).

"The dynamic process of acquiring the ability to provide effective, safe, and quality care to the patients through considering their different cultural aspects." (p.6) (26)

Increasing nurses' cultural competence has advantages for the nurses themselves as well as for the patients. Some of these advantages are described in the international literature. For instance, increasing nurses' cultural competence has been shown to strengthen their cultural awareness, enhance their personal and professional values, and increase their feelings of self-respect and empowerment (14). Notable advantages have also been reported for patients. For instance, patient outcomes including patient satisfaction (12) and quality of care (22) have been shown to increase and healthcare inequalities to be reduced (26). Common cultural competence outcomes for nurses and patients are improved relationships and interactions, which lead to stronger patient-nurse trust. Although the importance of cultural competence within person-centred care is being increasingly recognised, inequalities in healthcare, such as poorer healthcare quality and lower health outcomes (e.g. patient satisfaction, health status) among patients with different cultural backgrounds, are still evident (3, 7).

By assessing nurses' cultural competence, it becomes possible to build a foundation for identifying possible improvements in culturally congruent, patient-centred nursing care. Due to the extensive international research on this topic, a huge number of instruments to assess the cultural competence of nurses are available. However, selecting the most suitable tool remains challenging. One of the main reasons for this is that the measurement properties of the existing instruments have not yet been reviewed systematically (29). Performing such a comprehensive overview would allow the identification of the most valid and reliable instruments for nursing practice. Furthermore, assessing cultural competence is essential for evaluating the effectiveness of interventions, promoting self-reflection, and indicating the quality of care (14, 22). Accordingly, in this doctoral thesis, we scrutinise the existing instruments used to assess nurses' cultural competence and their psychometric properties. We also assess the translation, cultural adaptation, and psychometric testing of a recommended instrument into the German language. In the next step, the cultural competence of Austrian nurses working in acute care settings was assessed. In the last step, evidence for nursing cultural competence interventions developed to improve

levels of cultural competence and patient-related outcomes was collected and analysed.

The following section of this chapter presents the conceptual and theoretical framework of this doctoral thesis. Next, in the section entitled research gap, the most significant challenges faced when assessing nurses' cultural competence and effectiveness of cultural competence interventions are described. At the end of the introduction chapter, the aims and outline of this doctoral thesis are presented.

Theoretical framework

The importance of providing culturally congruent care was first recognised nearly four decades ago in the USA by Madeleine Leininger (30). Since that time, numerous theories and models addressing cultural competence have been proposed in the literature (14, 23, 31). In our research, we have concentrated especially on nurses in acute care settings; therefore, we apply a concept developed specifically for nurses. One of the most often used is the concept analysis as described by Sharifi et al. (2019). The theoretical framework for this doctoral thesis is thus based on the concept of nurses' cultural competence according to Sharifi et al. (2019). Cultural competence is acquired as part of an ongoing process, which requires personal effort, effective education, and organisational support in nursing care. The concept of nurses' cultural competence encompasses attributes of cultural awareness, knowledge, sensitivity, skill, proficiency, and dynamicity (26) (see Figure 1).

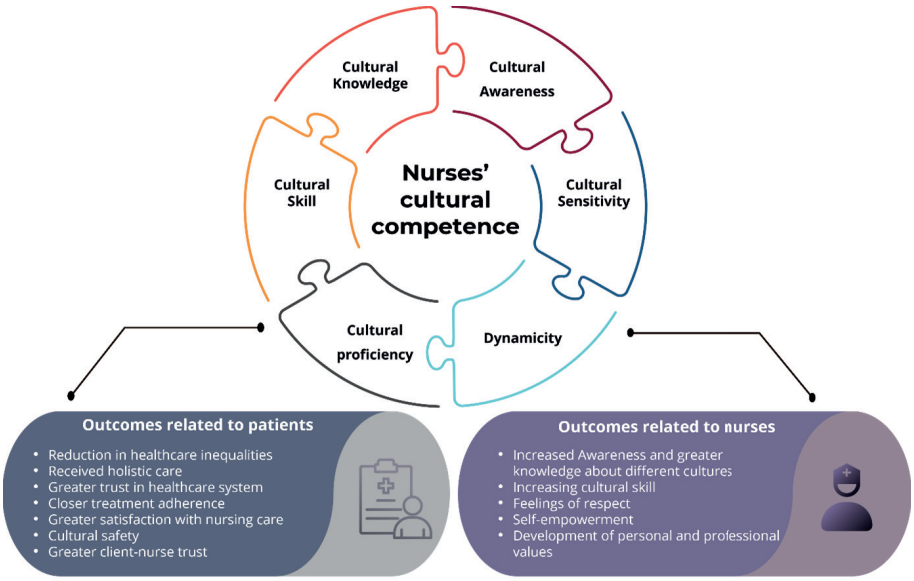

Figure 1 Theoretical framework of doctoral thesis, based on the concept analysis according to Sharifi et al. (2019)

Cultural awareness, cultural knowledge, and cultural skills were identified as the most important elements of cultural competence in most cultural competence frameworks (13, 14, 23, 26). In some models, cultural awareness and cultural knowledge were combined as one element of cultural competence, namely the cognitive element (23). The concept attributes of nurses' cultural competence are described below:

- **Cultural awareness** involves an individual's recognition of the influence of their own cultural background. This awareness helps them critically assess their biases and prejudices, forming a basis for valuing others' beliefs and values. By identifying similarities and differences between one's own culture and those of others, cultural awareness can prevent a person from imposing their cultural norms on individuals from different backgrounds (26). Cultural awareness also involves recognising the existence of documented racism and other forms of discrimination in healthcare delivery (32).

- **Cultural knowledge** refers to an individual's ability to continually acquire information about different cultures. This knowledge includes information learnt by applying conceptual and theoretical frameworks. It also involves integrating information about health-related beliefs, cultural values, the epidemiology of diseases, and the effectiveness of treatments (26).
- **Cultural skill** refers to an individual's ability to communicate effectively with other individuals with different cultural backgrounds. This ability enables a person to consider different beliefs, values, and practices when planning and delivering nursing care (26). Cultural skill includes the performance of cultural assessment[4], which is considered as an essential task in provision of person-centred care (33).
- **Cultural sensitivity** refers to an individual's ability to value, respect, and appreciate cultural diversity, which enables them to better understand how patients' cultural attitudes and beliefs influence their health behaviour and care-seeking patterns. Key characteristics of this sensitivity include the knowledge, attention, understanding, respect, and adaptation of nursing interventions to meet patients' cultural needs (26).
- **Cultural proficiency** refers to an individual's ability to continually acquire and disseminate cultural knowledge by conducting research and applying culturally sensitive therapeutic approaches. It reflects their commitment to continuous learning and adaptation. Demonstrating cultural proficiency involves acquiring new skills and knowledge and sharing these insights by producing articles, educational programmes, and other methods (26).
- **Dynamicity implies** that cultural competence is not a static state but a continuous process through which an individual becomes more culturally competent through their frequent encounters with diverse patients (26).

[4] Cultural assessment is described as a systematic appraisal or examination of cultural beliefs, values, and practices to gather accurate information from the patient, enabling the nurse to develop a treatment plan that is culturally relevant and mutually acceptable for addressing each of a patient's specific care problems.(33)

The need to implement and evaluate appropriate cultural competence interventions (e.g. continuing education) and the importance of these interventions is increasing in all healthcare settings, as such interventions can ensure culturally congruent nursing care. The effectiveness of these interventions may be measured by examining different outcomes, like patient satisfaction or treatment adherence. Sharifi et al. refers to cultural competence outcomes related to both patients and to nurses (26) (see Figure 1). One of the most prominent outcomes related to patients is the reduction of healthcare inequalities (22). Another well-documented outcome cited in the literature is patient satisfaction. Patient satisfaction reflects a patient's assessment of their care experience and is widely recognised as a key indicator of quality care (21). Culturally competent nurses are able to gain a deeper understanding and awareness of different cultures and to enhance their cultural skills. They can provide dignified, patient-centred, and culturally congruent care. This, in turn, strengthens patient trust and fosters mutual respect. Outcomes related to nurses include personal, cognitive, and professional development and effective interactions with patients. Nurses' cultural competencies contribute to their sense of respect and self-empowerment, positively influencing their personal and professional values, relationships, and overall performance (26). The concept of nurses' cultural competence has been thoroughly described in the literature. However, further studies are recommended to determine the effects of nurses' cultural competence on both their own and on patient-related outcomes (26).

Research gaps

An assessment of cultural competence provides indicators of the quality of a healthcare institution and is also frequently used as a method of self-reflection (14, 22, 23). Although many instruments have been developed for the assessment of cultural competence (34-40), selecting the most suitable tool remains challenging. This is mainly because the measurement properties of existing instruments have not yet been reviewed systematically. Furthermore, a detailed overview over the psychometric properties of these instruments is lacking. Such a comprehensive overview would allow researchers to identify the most valid and reliable instruments for nursing practice.

In order to address knowledge gaps and identify opportunities for improvement in person-centred, culturally congruent nursing care, it is essential to first determine the most valid and reliable instruments that can be used to assess nurses' cultural competence (14, 22, 29, 35). Furthermore, an assessment of cultural competence is needed to evaluate the impact of implemented interventions, such as cultural competence educational training programmes. Without a valid and reliable measurement tool, the effectiveness of these interventions on health outcomes cannot be accurately evaluated (13, 22, 29).

There is limited knowledge regarding the cultural competence of nurses in German-speaking countries, as no validated instrument currently exists in German for assessing their cultural competence (41, 42). It is essential to use a psychometrically tested measurement instrument, assess the cultural competence of nurses, as well as identify factors that influence this competence to develop and implement cultural competence interventions. These interventions can be used, in turn, to meet the needs of nurses and strengthen the nursing practice in the field of cultural competence (29, 41, 42).

While some evidence exists that cultural competence interventions such as diversity training can improve nurses' cultural competence (6, 7, 12, 24, 43), a summary of evidence regarding nurses' cultural competence interventions and their effectiveness on patient-related outcomes is lacking. Truong et al. (2014) conducted a meta-review of systematic reviews, citing some evidence that cultural competence interventions can improve patient-related outcomes. However, their conclusions regarding the effectiveness of these interventions were limited due to the lack of methodological rigor and use of validated measurement instruments in the reviewed studies (24). Gallagher and Polanin (2015) evaluated educational programmes aimed at enhancing cultural competence among nurses and nursing students, but did not assess their impact on patient outcomes. They found that implementing programmes may enhance cultural awareness, potentially benefiting patient outcomes (12).

More robust study designs and standardised tools are clearly needed to establish a direct link between training and patient outcomes. In their systematic review on educational interventions designed to develop nurses' cultur-

al competence, Oikarainen et al. (2019) showed a positive impact on nurses' self-assessed cultural competence. However, these authors referenced the significant clinical heterogeneity among the included studies, noting differences in their design, intervention durations, follow-up periods, and measurement instruments. The authors emphasised the need for high-quality studies (e.g. RCTs) to investigate the effectiveness of such cultural competence interventions, and especially of technology-based interventions (e.g. app-based cultural competence training programs) (44).

So far, mostly traditional educational interventions, including lectures (45, 46), group discussions, and case studies (47), have been evaluated in reviews. However, a variety of studies on different educational interventions (e.g. by using simulation pedagogy (48) or mobile app-based training programs (49) have been published in recent years. Therefore, there is a need to summarise recent evidence regarding the effectiveness of nurses' cultural competence (educational) interventions on nurse- and patient-related outcomes.

Aims and outline of the doctoral thesis

Several objectives were addressed in this doctoral thesis. The lack of a comprehensive summary about instruments that can be used to measure nurses' cultural competence led to the first aim, namely to identify and critically appraise the psychometric properties of instruments used to measure nurses' cultural competence. Based on the results of the first study (described in Chapter 3), a second aim was established to choose one of the critically well-evaluated instruments, translate it into the German language, and test the psychometric properties of this German version of the instrument (Chapter 4). Once a valid and reliable instrument was available, a third aim was established to use this instrument to evaluate the cultural competence of Austrian nurses in acute care settings (Chapter 5). The fourth and final aim of this thesis was to identify and synthesise evidence on nursing cultural competence interventions that have been developed to improve nurses' levels of cultural competence and patient-related outcomes (Chapter 6). The specific objectives of the four articles included in this doctoral thesis are outlined below.

Study 1

The aim of the first study was to systematically identify and critically appraise the psychometric properties of instruments used to measure cultural competence of nurses.

Study 2

The main objectives of the second study were to translate and cross-culturally adapt the Cultural Competence Assessment scale in German and to evaluate its psychometric properties (face and content validity, structural validity, and internal consistency reliability).

Study 3

The aim of the third study was to assess the cultural competence of nurses and nursing students working in Austrian acute care settings and to identify influencing factors using the Cultural Competence Assessment scale.

Study 4

The fourth study was conducted to identify and summarise evidence on nurses' cultural competence interventions that have been developed to improve levels of nurses' cultural competence and patient-related outcomes. Specific questions addressed in the review are:

- How effective are nurses' cultural competence interventions in improving nurses' levels of cultural competence?
- How effective are nurses' cultural competence interventions in improving patient-related outcomes (e.g. treatment outcomes, patient satisfaction)?

References

(1) WHO. The health of refugees and migrants in the WHO European Region2023 30.08.2024. Available from: https://www.who.int/europe/news-room/fact-sheets/item/the-health-of-refugees-and-migrants-in-the-who-european-region.

(2) WHO. World report on the health of refugees and migrants2022 05.02.2025. Available from: https://www.who.int/publications/i/item/9789240054462.

(3) Claeys A, Berdai-Chaouni S, Tricas-Sauras S, De Donder L. Barriers and facilitators in providing care for patients with a migration background. J Clin Nurs. 2023;32(5-6):912-25.

(4) Vaismoradi M, Fredriksen Moe C, Ursin G, Ingstad K. Looking through racism in the nurse-patient relationship from the lens of culturally congruent care: A scoping review. J Adv Nurs. 2022;78(9):2665-77.

(5) Betancourt JR, Green AR. Commentary: linking cultural competence training to improved health outcomes: perspectives from the field. Acad Med. 2010;85(4):583-5.

(6) Govere L, Govere EM. How Effective is Cultural Competence Training of Healthcare Providers on Improving Patient Satisfaction of Minority Groups? A Systematic Review of Literature. Worldviews Evid Based Nurs. 2016;13(6):402-10.

(7) Horvat L, Horey D, Romios P, Kis-Rigo J. Cultural competence education for health professionals. Cochrane Database Syst Rev. 2014(5).

(8) Handtke O, Schilgen B, Mösko M. Culturally competent healthcare – A scoping review of strategies implemented in healthcare organizations and a model of culturally competent healthcare provision. PLOS ONE. 2019;14(7).

(9) Perchinig; B, Schaur K. Betreuungs- und Pflegebedarf älterer MigrantInnen: Bedarfsabschätzung und Herausforderungen. Vienna: International Centre for Migration Policy Development; 2015.

(10) WHO. Delivering quality health services: a global imperative for universal health coverage2019 05.02.2025. Available from: https://www.who.int/publications/i/item/9789241513906.

(11) Weißenhofer SS, Anita; Rappold, Elisabeth; Stulik, Barbara; Domittner, Brigitte. Entwicklung einer Arbeitsdefinition für die Qualität professioneller Betreuung und Pflege. Wien; 2023.

(12) Gallagher RW, Polanin JR. A meta-analysis of educational interventions designed to enhance cultural competence in professional nurses and nursing students. Nurse Educ Today. 2015;35(2):333-40.

(13) McFarland M, Wehbe-Alamah H. Transcultural Nursing Concepts, Theories, Research, & Practice. 4th ed. USA: McGraw-Hill Education; 2018.

(14) Shen Z. Cultural competence models and cultural competence assessment instruments in nursing: a literature review. J Transcult Nurs. 2015;26(3):308-21.

(15) Haakenstad Annie , Mackay Caleb , Salpeter Irvine, Knight Megan , Bintz Corinne, Aravkin Aleksandr Y , et al. Measuring the availability of human resources for health and its relationship to universal health coverage for 204 countries and territories from 1990 to 2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet. 2022;399(10341):2129-54.

(16) Ghiyasvandian S, Zakerimoghadam M, Peyravi H. Nurse as a facilitator to professional communication: a qualitative study. Glob J Health Sci. 2014;7(2):294-303.

(17) Jackson D, Aveyard H, Brooke J, Commodore-Mensah Y, Noyes J, Sharps P, et al. International Nurses Day 2024: The economic power of care. J Adv Nurs. 2024;80(6):2153-5.

(18) Červený M, Siaki L, McGee P, Kilíková M. Perception of European nurses of culturally-appropriate health care – a cross-sectional study. Med Og Nauk Zdr. 2019;25(1):27-32.

(19) Domenig D. Transkulturelle und transkategoriale Kompetenz: Lehrbuch zum Umgang mit Vielfalt, Verschiedenheit und Diversity für Pflege-, Sozial- und Gesundheitsberufe: Hogrefe AG; 2021.

(20) Price B. Delivering Person-Centred Care in Nursing. Second Edition ed. London, UK: Learning Matters, SAGE Publications; 2022.

(21) McCormack B, McCance TV. Development of a framework for person-centred nursing. J Adv Nurs. 2006;56(5):472-9.

(22) Jongen C, McCalman J, Bainbridge R. Health workforce cultural competency interventions: a systematic scoping review. BMC Health Serv Res. 2018;18(1):232.

(23) Alizadeh S, Chavan M. Cultural competence dimensions and outcomes: a systematic review of the literature. Health Soc Care Community. 2016;24(6):117-30.

(24) Truong M, Paradies Y, Priest N. Interventions to improve cultural competency in healthcare: a systematic review of reviews. BMC Health Serv Res. 2014;14(1):99.

(25) Leininger M. Culture care theory: a major contribution to advance transcultural nursing and practices. J Transcult Nurs. 2002;13(3):189-92.

(26) Sharifi N, Adib-Hajbagheryb M, Najafic M. Cultural competence in nursing: A concept analysis. Int J Nurs Stud. 2019;99.

(27) Purnell L. The Purnell Model for Cultural Competence. J Transcult Nurs. 2002;13(3):193-6.

(28) Alligood MR. Nursing Theorists and Their Work. 9th ed. Amsterdam: Elsevier; 2017.

(29) Osmancevic S, Schoberer D, Lohrmann C, Großschädl F. Psychometric properties of instruments used to measure the cultural competence of nurses: A systematic review. Int J Nurs Stud. 2021;113:103789.

(30) Leininger MM, McFarland MR, McFarlane M. Transcultural nursing: Citeseer; 1987.

(31) Campinha-Bacote J. The Process of Cultural Competence in the Delivery of Healthcare Services: a model of care. J Transcult Nurs. 2002;13(3):181-4.

(32) Campinha-Bacote J. Coming to Know Cultural Competence: An Evolutionary Process. Int J Hum Caring. (3):42-8.

(33) Campinha-Bacote J. Delivering patient-centered care in the midst of a cultural conflict: the role of cultural competence. Online J Issues Nurs. 2011;16(2):5.

(34) Lin C-J, Lee C-K, Huang M-C. Cultural Competence of Healthcare Providers: A Systematic Review of Assessment Instruments. J Nurs Res. 2017;25(3):174-86.

(35) Loftin C, Hartin V, Branson M, Reyes H. Measures of cultural competence in nurses: an integrative review. ScientificWorldJournal. 2013;2013:289101.

(36) Hadziabdic E, Safipour J, Bachrach-Lindstrom M, Hultsjo S. Swedish version of measuring cultural awareness in nursing students: validity and reliability test. BMC Nurs. 2016;15:25.

(37) Harris-Haywood S, Goode T, Gao Y, Smith K, Bronheim S, Flocke SA, et al. Psychometric evaluation of a cultural competency assessment instrument for health professionals. Med Care. 2014;52(2):e7-e15.

(38) Herrero-Hahn R, Rojas JG, Ospina-Diaz JM, Montoya-Juarez R, Restrepo-Medrano JC, Hueso-Montoro C. Cultural Adaptation and Validation of the Cultural Self-Efficacy Scale for Colombian Nursing Professionals. J Transcult Nurs. 2017;28(2):195-202.

(39) Hietapakka L, Elovainio M, Wesolowska K, Aalto AM, Kaihlanen AM, Sinervo T, et al. Testing the psychometric properties of the Finnish version of the cross-cultural competence instrument of healthcare professionals (CCCHP). BMC Health Serv Res. 2019;19(1):294.

(40) Lin MH, Chang TH, Lee YH, Wang PY, Lin LH, Hsu HC. Developing and validating the nursing cultural competence scale in Taiwan. PLoS ONE. 2019;14(8).

(41) Osmancevic S, Großschädl F, Lohrmann C. Cultural competence among nursing students and nurses working in acute care settings: a cross-sectional study. BMC Health Serv Res. 2023;23(1):105.

(42) Osmancevic S, Großschädl F, Stijic M, Lohrmann C. The German version of the Cultural Competence Assessment (CCA-G): cross-cultural adaptation and validation study in Austrian acute care settings. BMC Nurs. 2022;21(1):77.

(43) Chae D, Kim J, Kim S, Lee J, Park S. Effectiveness of cultural competence educational interventions on health professionals and patient outcomes: A systematic review. Jpn J Nurs Sci. 2020;17(3).

(44) Oikarainen A, Mikkonen K, Kenny A, Tomietto M, Tuomikoski A-M, Meriläinen M, et al. Educational interventions designed to develop nurses' cultural competence: A systematic review. Int J Nurs Stud. 2019;98:75-86.

(45) Berlin A, Nilsson G, Törnkvist L. Research Article: Cultural competence among Swedish child health nurses after specific training: A randomized trial. Nurs Health Sci. 2010;12(3):381-91.

(46) Delgado DA, Ness S, Ferguson K, Engstrom PL, Gannon TM, Gillett C. Cultural competence training for clinical staff: measuring the effect of a one-hour class on cultural competence. J Transcult Nurs. 2013;24(2):204-13.

(47) Sarvarizadeh M, Miri S, Darban F, Farokhzadian J. Innovative cultural care training: the impact of flipped classroom methods on critical cultural competencies in psychiatric nursing: a quasi-experimental study. BMC Nurs. 2024;23(1):340.

(48) Hsu JC, Wang MS, Wang PY, Lian SY, Lin MH. The Effects of the Situated Simulation Program on the Cultural Competence of Hemodialysis Nurses: A Quasi-Experimental Study. Healthcare 2023;11(19).

(49) Sung S, Park H-A. Effect of a mobile app-based cultural competence training program for nurses: A pre- and posttest design. Nurse Educ Today. 2021;99:104795.

Chapter 2

Methods

This chapter provides an overview of the methodologic aspects used for the conducted studies included in this doctoral thesis. Table 1 presents a summary of the aims, designs, settings and samples, data collection methods, and data analysis as described in the individual studies. Detailed information concerning the methodological aspects are found in the articles, which are provided in the following chapters.

Table 1 Overview of the aims, designs, settings, samples, and data collection and analysis

	Aim	Design
Study 1	to systematically identify and critically appraise the psychometric properties of instruments used to measure cultural competence of nurses	Systematic review
Study 2	to translate and cross-culturally adapt the Cultural Competence Assessment scale in German and to evaluate its psychometric properties	Cross-sectional study
Study 3	to assess the cultural competence of nurses and nursing students working in Austrian acute care settings and to identify influencing factors	
Study 4	to identify and summarise the existing evidence on nurses' cultural competence interventions that have been developed to improve levels of cultural competence and patient-related outcomes	Systematic review and meta-analysis

Note: CENTRAL- Cochrane Central Register of Controlled Trials;
COSMIN- COnsensus-based Standards for the selection of health Measurement INstruments;
GRADE- Grading of Recommendations Assessment, Development and Evaluation

strategies used in the included studies

Setting and Sample	Data collection method	Data analysis
44 included articles	Literature search in databases CINAHL, Embase, PsychINFO, PubMed from the point of first date entry in the databases up to November 2019	Methodology quality of included studies was assessed with the COSMIN risk of bias checklist. Certainty of the evidence and summary of findings were performed using the GRADE approach.
Austrian acute care settings Convenience sample of 915 nurses	Self-reported questionnaire via an online survey	Descriptive analysis was performed with the statistical software IBM SPSS Statistics 26, and the confirmatory factor analysis was conducted with the R package Lavaan.
		Descriptive analysis and the multiple linear regression analysis were conducted using the statistical software program IBM SPSS Statistics 26.
17 articles included	Literature search in MEDLINE, Embase, CINAHL, PsychINFO, ERIC and CENTRAL from the point of first data entry in the databases up to September 2023	Meta-analyses of pooled effectiveness were performed using RevMan 5.4.1.

Chapter 3

Psychometric properties of instruments used to measure the cultural competence of nurses: A systematic review

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Abstract

Background

Cultural competence is a key component of culturally congruent nursing care. In order to reduce healthcare inequalities and to identify potentials for improvement in nursing practice, researchers need to be able to assess cultural competence properly. Although many instruments for the assessment of cultural competence have been developed, their measurement properties have not yet been reviewed systematically. Such an overview of existing instruments, however, would allow researchers to identify the most valid and reliable instrument for nursing practice.

Objective

The purpose of conducting this review is to identify and critically appraise the psychometric properties of instruments used to measure the cultural competence of nurses.

Methods

A systematic literature search was performed in November 2019 in the following electronic databases: Cumulative Index of Nursing and Allied Health Literature, Embase, PsycINFO and PubMed. Studies that were conducted to assess any measurement property of instruments used to measure the cultural competence of nurses were included. Two reviewers independently screened the articles and assessed the risk of bias using the COnsensus-based Standards for the selection of health Measurement INstruments checklist. The quality of included instruments was assessed on the basis of the updated criteria for good measurement properties, and the quality of the summarised results was graded based on the principles of Grading of Recommendations Assessment, Development and Evaluation.

Results

In total, 44 studies describing 21 instruments were included in this study. We found that most instruments were tested for at least some forms of validity, but seldom for reliability. The quality of the psychometric properties was evaluated using the criteria for good measurement properties for the following: content validity, structural validity, internal consistency, reliability, measurement error and construct validity. No studies were found in which cross-cultural validity, criterion validity, or the responsiveness of the included instruments were evaluated. The Transcultural Self-Efficacy Tool,

the Cultural Competence Assessment, and the Cultural Competence Health Practitioner Assessment showed sufficient levels of quality for psychometric properties and can be recommended for the assessment of cultural competence in nurses.

Conclusion
Given the broad availability of self-administered instruments to assess cultural competence, the development of new instrument is not recommended. A particular need was identified to conduct further psychometric evaluation studies on existing instruments and to adapt them accordingly, and especially on less frequently evaluated properties, such as reliability, measurement error and responsiveness.

Keywords: Systematic review, Cultural competence, Nurses, Psychometric properties, Instruments

Introduction

Many countries are currently experiencing increasing cultural diversity as a consequence of migration and globalisation. In 2017, the number of international migrants (discounting forcibly displaced populations) reached an estimated 259 million persons, which is 3.4% of the world´s population (1). This increase in cultural diversity is challenging healthcare systems, which need to provide high-quality care to patients of all cultural backgrounds and with different needs (2, 3). However, inequalities have still been identified in healthcare, such as a lower quality of care and lower health outcomes for patients (e.g. patient satisfaction, health status) with cultural backgrounds that differ from non-migrants (4, 5).

In particular, nurses should be encouraged to learn more about the cultural needs of diverse patient population and provide cultural congruent care (2, 5, 6). This is not only because registered nurses represent the largest number of healthcare professionals, representing more than 50% of the health workforce globally (7), but also because they spend more time directly caring for patients than any other healthcare professionals (8). If the care provided does not meet the patient´s expectations and needs or conflicts with aspects of their lives, this can lead to misunderstandings (9), mistreatment, or discrimination (10). To avoid these negative impacts, nurses need to recognise the patient´s cultural value, beliefs and traditions and include these in the planning of adequate patient-centred care. However, this requires skill and expertise (6). The application of the nurses' cultural competence can reduce healthcare inequalities (11), improve healthcare quality (12) and enhance patient outcomes, such as patient satisfaction (5). By providing culturally congruent care, nurses can acquire greater cultural skills and gain the patient's trust and respect (9). Furthermore, improved cultural competence endorses the nurses' relationships and successful interactions with patients (9), increases the nurses' personal and professional values and improves their feelings of self-respect and empowerment (13).

In this regard, the level of cultural competence exhibited by nurses is viewed as an essential factor which enables them to provide effective and culturally congruent care (2). The importance of offering culturally congruent care was recognised four decades ago (14). Since then, researchers have postulated numerous theories and models of cultural competency. The model that

is most frequently used to develop and implement culturally congruent care in healthcare services is Campinha-Bacotes's model of cultural competence, which was developed in 2002 (2, 15). She defined the cultural competence as 'The process in which the health care provider continuously strives to achieve the ability to effectively work within the cultural context of a client (individual, family or community)' (p. 203) (2). This means that cultural competence is a continuous and ongoing process as well as an essential factor that allows nurses to provide effective and culturally responsive care to all clients (2). In their recently published concept analysis, Sharifi et al. (2019) defined the cultural competence of nurses as '*the ability to provide effective, safe, and quality care to patients from different cultures and to consider the different aspects of their cultures in care provision*' (p.6) (11). Cultural awareness, cultural knowledge, cultural sensitivity, cultural skill, cultural proficiency and dynamicity are defining attributes of the concept of cultural competence (11).

In order to reduce healthcare inequalities, to address the lack of knowledge and to identify potentials for improvement in nursing practice, researchers need to identify the most appropriate way to assess nurses' cultural competence. Furthermore, cultural competence must be assessed to evaluate the impact of implemented interventions, as a method of self-reflection, or to indicate the quality of a healthcare institution (12, 13, 16, 17). Although many instruments have been internationally developed to assess cultural competence (5, 12, 17-19), it is still not easy to choose the most appropriate instrument for a specific purpose. In part, this is because a comprehensive summary of existing instruments and their measurement properties does not exist. A systematic review of measurement properties would effectively reveal which instruments have been tested and help researchers select an appropriate instrument (20). Systematic reviews can provide a comprehensive overview of the measurement properties and support evidence-based recommendations in the selection of the most suitable instrument for a given purpose. These kinds of systematic reviews can also be conducted to identify gaps in knowledge regarding the measurement properties, which can, in turn, be used to design new studies on measurement properties (21).

Some reviews have shown that at least 35 instruments can be used to assess cultural competence among healthcare professionals (13, 19, 22-24). However, these reviews included different professional groups (22-24) and were

not conducted to report the quality of the psychometric properties of the instruments (13, 22, 24). Loftin et. al (2013) performed a integrative review on the measures of cultural competence in nurses, but neither evaluated the methodological quality of the included studies nor assessed the psychometric properties of included instruments (19). Although previous reviews (13, 19, 22-24) exist, these did not place a sole focus on the evaluation of psychometric properties. No in-depth evaluation has been conducted of all available reliability and validity data for existing instruments used to measure the cultural competence of nurses, including the assessment of the methodological quality of studies and the quality of measurement properties of instruments.

Consequently, this review was conducted to systematically identify and critically appraise the psychometric properties of instruments used to measure cultural competence of nurses.

Methods

This systematic review was conducted by following the COnsensus-based Standards for the selection of health Measurement INstruments guidelines (COSMIN) (21) and the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement (25). To assess the methodological quality of included studies, we used the COSMIN risk of bias checklist (21). To assess the psychometric properties of the included instruments, we used the updated criteria for good measurement properties, based on those described by Tarwee at al. (2007) (20). Finally, the evidence was summarized per psychometric property per instrument, and the quality of evidence was graded by using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach (21). The protocol was registered a priori in PROSPERO (registration number: CRD42020168015).

Literature Search

A systematic literature search was performed in November 2019 in the following electronic databases: the Cumulative Index of Nursing and Allied Health Literature (CINAHL), Embase, PsycINFO and PubMed. The search was limited to publications in the English and German languages. No timeframe

was set, as recommended by the COSMIN guidelines (21). In addition, the references of the included studies and identified reviews were examined, and a manual search was performed with the Google Scholar web search engine using the keywords (cultural competence; nurses; instruments; psychometric properties) in German and English.

To perform a highly sensitive search, we applied a search strategy that used Medical Subject Headings (MeSH) and keywords in three domains: (i) construct of interest – cultural competence, (ii) target population – nurses, nursing students, nursing assistants, and nurse teachers and (iii) type of measurement – instruments (Table 1). A special search filter developed for PubMed was used to identify studies on the measurement properties, and this filter was adapted for use when searching all the other databases (Supplementary File 1) (26).

Table 1 Search strategy.

# construct search	• Cultur* AND (diversity OR self-efficacy OR awareness OR knowledge OR skill OR sensitivity OR competenc*) • "Cultural Competency"[Mesh] • "Cultural Diversity"[Mesh]
# population search	• Nurs* • "Nurses"[Mesh] • "Nursing Staff" [Mesh]
# instrument search	• Scale • Tool • Measure* • Instrument • Questionnaire • Assessment

Study eligibility criteria

For inclusion in this systematic review the study had to be an original study to involve the evaluation of psychometric properties of an instrument used to measure cultural competence among nurses, nursing assistants, nursing students or nursing teachers.

Studies presenting the development of an instrument to measure cultural competence were also included. We included studies on psychometric properties of instruments that measured one or more attributes of cultural competence. Studies were included irrespective of setting and country.

Studies on German were included, since the authors of this review are native German speakers. This made it possible to expand the search breadth.

Studies that used the instruments as part of validation studies of other instruments (measuring other/similar constructs) were excluded. Systematic reviews and studies were also excluded if cultural competence was only included as part of a broader measure.

Study selection

The systematic database search was performed by the first author. The search hits were inserted in EndNote, and duplicates were removed. Two reviewers independently screened the titles and abstract for inclusion. Potentially relevant full texts were screened independently by the same two reviewers by applying the inclusion criteria. If a disagreement arose at any stage of the review, this was solved through discussion until a consensus was achieved.

Assessment of methodological quality and assessment of measurement properties

To assess the methodological quality of studies and the measurement properties of instrument, we used the methodological framework developed by the COSMIN (21). The COSMIN methodology directs the focus toward patient-reported outcome measures, but can also be used for other types of measurement instruments (21). After relevant studies are selected, the COSMIN guidelines for systematic reviews recommends assessing the studies and extracting the data in a specific order.

In a first step, the COSMIN Risk of Bias checklist (21) was used to assess the methodological quality of the measurement properties of the single studies. The ten boxes of the COSMIN Risk of Bias checklist consist of: 1) instrument development, 2) content validity, 3) structural validity, 4) internal consistency, 5) cross-cultural validity, 6) reliability (test-retest, inter-rater,

intra-rater), 7) measurement error, 8) criterion validity, 9) hypothesis testing and 10) responsiveness.

Instrument development

The instrument development box assesses different standards for evaluating a) the quality of instrument design to ensure relevance and b) the quality of a cognitive interview study or pilot test performed to evaluate the comprehensibility and comprehensiveness of an instrument (27).

Content validity

Content validity is defined as the degree to which the content of an instrument is an adequate reflection of the construct to be measured (28). Three aspects of content validity should be assessed: a) relevance, b) comprehensiveness, and c) comprehensibility (27).

Structural validity

Structural validity is defined as the degree to which the scores of an instrument is an adequate reflection of the dimensionality of the construct to be measured (28) and is usually assessed by performing a factor analysis (21).

Internal consistency

Internal consistency is defined as the degree of the *interrelatedness* among the items (28) and is usually assessed by applying Cronbach´s alpha (21).

Cross-cultural validity

Cross-cultural validity refers to the degree to which the performance of the items on a translated or culturally adapted instrument are an adequate reflection of the performance of the items of the original version of the instrument (28). To assess this psychometric property, data must be collected from at least two different groups, by assessing whether the scale is measurement invariant or whether or not differential item functioning occurs. Measurement invariance refer to whether respondents from different groups respond similarly to a particular item (21).

Reliability

Reliability is defined as the proportion of the total variance in the measurements which is due to 'true' differences between patients (28). The preferred reliability statistic depends on the type of response options (i.e. the preferred statistical method is the interclass correlation coefficient for continuous scores, the Cohen's kappa for dichotomous scores or nominal scores, and weighted kappa for ordinal scales) (21).

Measurement error

Measurement error is defined as *the systematic and random error of a patient's score that is not attributed to true changes in the construct to be measured* (28). The preferred statistics for measurement error in studies, based on classical test theory, are the standard error of measurement, the limits of agreement, and the smallest detectable change (21).

Criterion validity

Criterion validity is defined as *the degree to which the scores of an instrument are an adequate reflection of a 'gold standard'* (28). The review team should determine what reasonable 'gold standards' are for the construct to be measured. When both the assessed instrument and the gold standard have continuous scores, correlation is the preferred statistical method. When the instrument scores are continuous and scores on the gold standard are dichotomous, the area under the receiver operating characteristic (ROC) is the preferred method (21).

Construct validity

Hypothesis testing for construct validity refers to the degree to which the scores of an instrument are consistent with hypotheses (for instance, with regard to internal relationships, relationships to scores of other instruments, or differences between relevant groups) based on the assumption that the instrument (patient reported outcome measurement) validly measures the construct to be measured (28). To evaluate a construct validity comparison with other outcome measurement instruments (convergent validity) or perform a comparison between subgroups (discriminative or known-groups validity), correlations are the preferred statistical method (21).

Responsiveness

Responsiveness is defined *as the ability of an instrument to detect change over time in the construct to be measured* (28). Responsiveness is considered to be a separate psychometric property from validity, because it refers to the validity of a change score. The design requirements for assessing responsiveness differ depending on the approach taken: a) criterion approach (i.e. comparison to a gold standard), b) construct approach A (i.e. hypothesis testing; comparison with other outcome measurement instruments), c) construct approach B (i.e. hypothesis testing: comparison between subgroups), and d) construct approach C (i.e. hypotheses testing: before and after intervention) (21).

To evaluate the methodological quality of included study, the assessed measurement properties were first determined and the relevant boxes were selected. Each standard was rated on a four-point rating scale as 'very good', 'adequate', 'doubtful', or 'inadequate' (21). To determine the overall quality rating for each included study, the worst score counts principle was applied, i.e. the lowest rating on an item from any one box was considered the overall score for that box. To evaluate content validity, the instrument development study, the quality and result of additional content validity studies and a subjective content rating of the instrument by the reviewers were taken into account. If evidence that the content validity of an instrument was inadequate was found, this instrument was not further considered in the systematic review (21).

In a second step, the quality of the measurement properties on each study was assessed by applying updated criteria for good measurement properties, based on those described by Tarwee at al. (2007) (20). This assessment was performed to determine whether the respective measurement property of instrument was sufficient (+), insufficient (−), or indeterminate (?) (21). To evaluate the results of studies on the basis of construct validity and responsiveness, a priori hypothesis based on the results was formulated by the review team:

- Correlations with instruments used to measure the same construct should be ≥ 0.50

- Correlations with instruments used to measure related, but not the same, construct should range between 0.30 - 0.50
- Correlations with instruments used to measure unrelated constructs should be < 0.30
- Meaningful differences between relevant (sub)groups (e.g. nursing students vs. nurses) were identified

Each step in assessment of methodological quality and assessment of measurement properties was performed independently by two reviewers, and the final results were reached through consensus.

Evidence synthesis

Synthesis of evidence of psychometric properties for each instrument was conducted according to the COSMIN methodology (21). The key characteristics of studies and included instruments are summarised in two tables (Table 2 and Table 3). The overall result of applying the COSMIN Risk of Bias checklist to examine the measurement properties included in the relevant studies was used for the evidence synthesis. To assess content validity, the results of the development study, content validity study and the review rating were rated on the basis of ten criteria (five for relevance, one for comprehensiveness and four for comprehensibility) (27). Each criterion could be rated as sufficient (+), insufficient (-), inconsistent (±), or indeterminate (?). Subsequently, the results of all studies that included a specific instrument and the reviewer's ratings were summarised qualitatively. An overall sufficient (+), insufficient (-), indeterminate (?), or inconsistent (±) rating was provided for the relevance, comprehensiveness and comprehensibility of each instrument (27). To summarize the results of construct validity, the results of all studies should be taken together, and the researcher should decide whether 75% of the results are in accordance with the hypotheses (21).

In the next step, the summarised evidence was graded using the modified Grading of Recommendations Assessment, Development and Evaluation (GRADE) quality of evidence method (21). If concerns arose regarding the trustworthiness of a result, the quality of the evidence of the summarised results was downgraded for each measurement property per instrument. To assess content validity, the evidence quality could be downgraded due to a

risk of bias (i.e. the methodological quality of the studies), inconsistency (i.e. unexplained inconsistency of results across studies) and indirectness (i.e. evidence from different populations than the target population) within the results. To assess the other measurement properties, the risk of bias, imprecision (i.e. total sample size of the available studies), inconsistency and indirectness of the study were taken into account. The quality of evidence was subjectively judged as either high, moderate, low, or very low (21). The starting point is the assumption that the summarized result is of high quality. The quality of evidence can be downgraded by one to three levels, when a reason for downgrading is given (i.e. inconsistency). The COSMIN methodology recommends the inclusion of all qualitatively appraised studies, also these with inadequate quality. When including results from inadequate studies, researchers should consider downgrading the quality of evidence because of the risk of bias. If the result is based on only one study with an extremely serious risk of bias, the quality of evidence can be downgraded to very low quality of evidence (21).

Results

Studies selection

The applied search strategy could be used to identify 3233 studies. After removing duplicates, the remaining 2401 articles were screened by abstract and title for their relevance. The remaining 58 full-text studies that were identified as relevant were assessed for their eligibility. Studies were omitted if they did not include instrument testing (eight studies), the instrument did not measure the construct of interest (eight studies), or the study population was inappropriate (five studies). The remaining 37 studies identified from the database search and an additional seven studies identified from reference screening including 21 instruments, which were subsequently included in this systematic review. The PRISMA flow diagram is presented in Figure 1 (25)

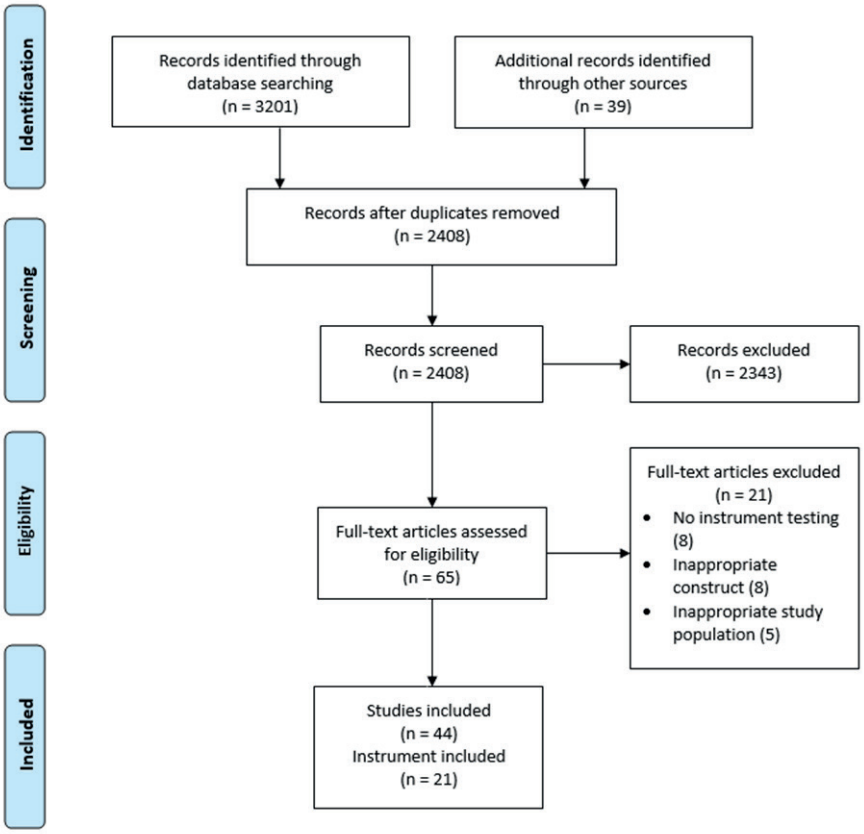

Figure 1 PRISMA flow chart of study selection.

Study characteristics

Most studies were conducted in the USA (14, 29-42). Nine studies were conducted in Europe (43-51). In nine studies, repeated measurement was the study design used (30, 32, 45, 51-56), while all other studies had a cross-sectional design. The sample size varied greatly across studies, ranging from 28 to 7494 participants (51, 57). The study settings were mostly hospitals or universities, but a few studies were conducted in community healthcare centres (14, 29, 51) and hospice settings (30, 42). The characteristics of the included studies are displayed in Table 2.

Instrument characteristics

Twenty-one instruments used to measure cultural competence of nurses were examined in 44 studies. Two instruments were modified versions of already included instruments. All of the instruments were self-administered by the target population. The most frequently examined instrument was the Cultural Awareness Scale (37, 39-41, 43, 46, 58), following by the Cultural Self-Efficacy Scale (14, 29, 48, 59, 60) and the Transcultural Self-Efficacy Tool (32-34, 50, 61). The characteristics of identified instruments are displayed in Table 3.

Table 2 Characteristics of included studies in alphabetical order.

Reference	Instrument	Study Design	Sample characteristics		
			N	**Age years Mean** (± *SD*)	**Female %**
Aboshaiqah et al. 2017	Individual Assessment of cultural competence	Repeated measurement	584	-	94.2
Almutairi & Dahinten 2017a	Critical Cultural Competence Scale	Cross-sectional	170	43.6 (± 11.7)	91.3
Almutairi & Dahinten 2017b	Critical Cultural Competence Scale	Cross-sectional	170	43.6 (± 11.7)	91.3
Basalan &Temel 2017	Cultural Awareness Scale	Cross-sectional	197	21 (± 1.62)	70
Bernal & Froman 1987	Cultural Self-Efficacy Scale	Cross-sectional	190	42.7	-
Bernal & Froman 1993	Cultural Self-Efficacy Scale	Cross-sectional	206	41.2 (± 9.6)	-
Cai et al. 2017	Cultural Competence Inventory for Nurses in China	Cross-sectional	510	31.28 (± 7.82)	98.43
Caricati et al. 2015	Cultural Competence Assessment -Italian Version	Cross-sectional	289	-	80
Chae & Lee 2014	Korean Version of the Cultural Competence Scale for Clinical Nurses	Cross-sectional	456	31 (± 6.14)	-

	Instrument administration			
	Distribution of scores Mean (± *SD*)	**Setting**	**Language of instrument (Country)**	**Measurement properties**
	Pre-test 3.15 (± 0321) Post-test 3.17 (± 0.329)	Hospital	English (Saudi Arabia)	Content validity Internal consistency Reliability
	5.27 (± 0.50)	Hospital	English (Canada)	Structural validity Internal consistency
	5.27 (± 0.50)	Hospital	English (Canada)	Internal consistency Construct validity
	4.30 (± 0.80)	Nursing school	Turkish	Content validity Structural validity internal consistency
	2.7 (± 1.2)	Community health care centres	English (USA)	Content validity Internal consistency Construct validity
	3.24 (± 1.10)	Public health agencies	English (USA)	Structural validity Internal consistency Construct validity
	2.78 – 4.04 (± 0.57 1.25)	Hospital	Mandarin	Content validity Structural validity Internal consistency Construct validity
	4.22 (± 0.96)	Health care centres	Italian	Structural validity Internal consistency Construct validity
	4.80 (± 0.72)	Hospital	Korean	Content validity Structural validity Internal consistency Construct validity

Chae & Park 2018	Korean Version of the Cultural Competence Scale for Clinical Nurses	Cross-sectional	365	31.04 (± 7.50)	97.5
Chae et al. 2018	Korean version of the Cultural Competence Assessment	Cross-sectional	161	29.57 (± 4.75)	-
Chang, Yang & Kuo 2013	Cultural Sensitivity	Repeated measurement	230	40.72 (± 8.51)	100
Choi et al. 2015	Korean Version of the Cultural Awareness Scale	Cross-sectional	515	-	96.1
Cruz et al. 2016	Nurse Cultural Capacity Scale - Arabic version	Repeated measurement	200	20.89 (± 1.33)	52.5
Cruz et al. 2018	Nurse Cultural Capacity Scale - Spanish version	Repeated measurement	502	23.18 (± 3.36)	82.3
Doorenbos et al. 2005 2005	Cultural Competence Assessment	Repeated measurement	456	43.5 (± 11.55)	-
Gol, Dorosti & Montazer 2019	Iranian Nurses Cultural Competence Questionnaire of Khanbabayi	Cross-sectional	350	-	-
Gozum, Tuzcu & Kirca 2015	Turkish	Repeated measurement	235	30.03 (± 6.43)	98.1

	4.31 (± 0.83)	Hospital	Korean	Content validity Structural validity Internal consistency Construct validity
	4.45 (± 0.65)	Hospital	Korean	Structural validity Internal consistency Construct validity
	1.96 (± 0.48)	Health care centres	Chinese	Content validity Internal consistency reliability
	-	Nursing school	Korean	Structural validity Internal consistency Construct validity
	3.41 (± 1.13)	University	Arabic	Structural validity Internal consistency Reliability Construct validity
	3.49 (± 1.09)	University	Spanish (Chile)	Content validity Structural validity Internal consistency Reliability Construct validity
	-	Hospice Hospital	English (USA)	Structural validity Internal consistency Reliability Construct validity
	-	Medical Research Centre and hospital	Farsi	Content validity Structural validity Internal consistency Reliability Measurement error
	3.76 (± 0.97)	Hospital	Turkish	Content validity Structural validity Internal consistency Reliability Construct validity

Hadziabdic et al. 2016	Version of the Nurse Cultural	Cross-sectional	158	27.23 (± 5.6)	84
Hagman 2006	Competence Scale	Cross-sectional	398	41.07 (± 9.97)	94
Halabi & de Beer 2018	Cultural Awareness Scale	Cross-sectional	205	21.68 (± 1.85)	100
Haywood et al. 2014	Cultural Self-Efficacy Scale	Cross-sectional	2504	-	86.9
Herrero-Hahn et al. 2017	Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals - Arabic version	Cross-sectional	190	36.4 (± 9.91)	83.7
Hietapakka et al. 2019	Cultural Competence Health Practitioner Assessment	Cross-sectional	759	35.4 (± 9.1)	91
Jeffreys & Smodlaka 1996	Cultural Self-Efficacy Scale	Repeated measurement	74	-	-
Jeffreys & Smodlaka 1998	Cross-Cultural Competence instrument of Healthcare Professionals	Cross-sectional	1260	-	86
Jeffreys & Smodlaka 1999	Transcultural Self-Efficacy Tool	Cross-sectional	566	-	-
Jeffreys & Dogan 2010	Transcultural Self-Efficacy Tool	Cross-sectional	272	-	78.8
Jeffreys & Dogan 2013	Transcultural Self-Efficacy Tool	Cross-sectional	161	-	-

	-	University	Swedish	Content validity Structural validity Internal consistency
	3.90 (± 0.95)	All settings	Spanish (Mexico)	Internal consistency Construct validity
	-	Nursing college	Arabic	Internal consistency Construct validity
	-	-	English (USA)	Content validity Structural validity Internal consistency Construct validity
	-	All settings	Spanish (Colombia)	Content validity Structural validity Internal consistency
	-	All settings	Finnish	Structural validity Internal consistency Construct validity
	-	University	English (USA)	Content validity Internal consistency reliability
	-	University	English (USA)	Structural validity Internal consistency
	7.43 (± 1.53)	University	English (USA)	Internal consistency Construct validity
	6.46 (± 1.72)	University	English (USA)	Structural validity Internal consistency
	-	University and clinical setting	English (USA)	Content validity Internal consistency

Jimenez et al. 2006	Transcultural Self-Efficacy Tool	Cross-sectional	113	Students 21 (± 3.5) Nurses 39 (± 9.5)	-
Krainovich-Miller 2008	Cultural Competence Clinical Evaluation Tool	Cross-sectional	236	-	88.1
Li et al. 2016	Cultural Self-Efficacy Scale – Spanish Version	Cross-sectional	1276	-	95.6
Lin et al. 2019	Cultural Awareness Scale	Repeated measurement	246	32.30 (± 9.63)	98.8
Mareno, Hart & VanBrackle 2013	Transcultural Self-Efficacy Tool	Cross-sectional	374	48 (± 11.6)	91.7
McElroy et al. 2016	Nurse Cultural Competence Scale	Cross-sectional	335	-	-
Noji et al. 2017	Clinical Cultural Competency Questionnaire - Revised	Cross-sectional	7494	32.63 (± 9.37)	91.3
Oh, Lee & Schepp 2015	Cultural Awareness Scale	Cross-sectional	495	-	88.3
Olt et al. 2010	Japanese version of the Caffrey Cultural Competence Health Services	Cross-sectional	334	-	-
Perng & Watson 2012	Cultural Awareness Scale – Korean version	Cross-sectional	169	33.32 (± 5.50)	

	Students 2.9 (± 0.54) Nurses 3.1 (± 0.65)	Hospital, primary health care centres university	Spanish (Spain)	Internal consistency Construct validity
	-	University	English (USA)	Internal consistency reliability
	7.4 (± 1.55)	General hospital	Chinese	Structural validity Internal consistency Construct validity
	2 (± 1)	Hospital	Chinese	Content validity Structural validity Internal consistency Reliability Measurement error Construct validity
	-	Various settings	English (USA)	Structural validity Internal consistency
	3.9 (± 0.34)	Medical centre	English (USA)	Internal consistency Construct validity
	1.85 (± 0.52)	Hospital	Japanese	Structural validity Internal consistency Construct validity
	4.34 (± 0.61)	University	Korean	Structural validity Internal consistency Construct validity
	-	University and hospital	Swedish	Content validity Structural validity Internal consistency
	2.87 (± 0.68)	University	Chinese	Structural validity

Rew et al. 2003	Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals - Revised	Cross-sectional	190	-	88.42
Rew et al. 2014	Nurse Cultural Competence Scale	Cross-sectional	150	23.37 (± 7.19)	98
Sarafis et al. 2014	Cultural Awareness Scale	Cross-sectional	338	-	89.3
Schim et al. 2003	Cultural Awareness Scale	Cross-sectional	113	45 (± 10.25)	-
Vasiliou, Kouta & Raftopoulos 2013	Transcultural Self-Efficacy Tool	Repeated measurement	28	35.67 (± 6.96)	92.9
Sarafis et al. 2014	Cultural Awareness Scale	Cross-sectional	338	-	89.3
Schim et al. 2003	Cultural Awareness Scale	Cross-sectional	113	45 (± 10.25)	-
Vasiliou, Kouta & Raftopoulos 2013	Transcultural Self-Efficacy Tool	Repeated measurement	28	35.67 (± 6.96)	92.9

"- " indicates that the information was not reported in the study.

	5.32 (±0 .53)	University	English (USA)	Content validity Structural validity Internal consistency Construct validity
	5.56 (± 0.8)	University	English (USA)	Structural validity Internal consistency Construct validity
	7.29 (± 1.62)	Hospital and university	Greek	Structural validity Internal consistency Construct validity
	-	Hospice setting	English (USA)	Structural validity Internal consistency Construct validity
	-	Community sector	Greek	Internal consistency reliability
	7.29 (± 1.62)	Hospital and university	Greek	Structural validity Internal consistency Construct validity
	-	Hospice setting	English (USA)	Structural validity Internal consistency Construct validity
	-	Community sector	Greek	Internal consistency reliability

Table 3 Characteristics of included instruments according to the number of psychometric tests.

Instrument	Reference(s)	Construct(s)	Target population
Cultural Self-Efficacy Scale	Bernal & Froman 1987 Bernal & Froman 1993 Hagman 2006 Jimenez et al. 2006 Herrero-Hahn et al. 2017	Cultural Self-Efficacy	Nurses
Transcultural Self-Efficacy Tool	Jeffreys & Smodlaka 1996 Jeffreys & Smodlaka 1998 Jeffreys & Smodlaka 1999 Sarafis et al. 2014 Li et al. 2016	Transcultural self-efficacy	Nursing students
Cultural Awareness Scale	Rew et al. 2003 Krainovich-Miller et al. 2008 Hadziabdic et al. 2016 Oh, Lee & Schepp 2015	Cultural Awareness	Nursing Students Nurses Nursing Assistants
Modified Cultural Awareness Scale	Rew et al. 2014 Choi et al. 2015 McElroy et al. 2016 Basalan & Temel 2017	Cultural Awareness	Nursing Students
Nurse Cultural Competence Scale	Perng & Watson 2012 Gozum, Tuzcu & Kirca 2015 Cruz et al. 2016 (Arabic Version) Cruz et al. 2018 (Spanish Version)	Cultural Competence	Nursing students
Cultural Competence Assessment	Schim et al. 2003 Doorenbos et al. 2005	Cultural Competence	Hospice providers (majority nursing discipline)

Subscales, number of items	Response options	Theoretical Background
3 subscales (knowledge of cultural concepts, knowledge of cultural patterns, abilities in performing the functions of transcultural nursing) 26 items	5-point Likert scale	Bandura's Self-Efficacy Theory
3 subscales (cognitive, practical, affective) 83 items	10-point rating scale	Bandura's Self-Efficacy Theory
5 subscales (general educational experiences, cognitive awareness, research issue, behaviours or comfort with interaction, patient care or clinical practice) 36 (35) Items	7-point Likert Scale	Literature Review
4 subscales (general educational experiences, cognitive awareness, behaviours/comfort with interaction, patient care/ clinical practice) 26 items	7-point Likert Scale	Literature Review
Unidimensional scale 20 items	5-point Likert Scale	Literature Review
2 subscales (awareness and sensitivity, competence behaviours) 25 items	5-point Likert scale	Cultural Competence model of Doorenbos & Schim

Modified Cultural Competence Assessment	Caricati et al. 2015 (Italian Version) Chae et al. 2018 (Korean Version)	Cultural Competence	Nurses
Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals - Revised	Olt et al. 2010 Halabi & deBeer 2018	Cultural Competence	Nurses Nursing students
Korean Version of the Cultural Competence Scale for Clinical Nurses	Chae & Lee 2014 Chae & Park 2018	Cultural competence	Clinical nurses
Critical Cultural Competence Scale	Almutairi & Dahinten 2017a Almutairi & Dahinten 2017b	Cultural Competence	Nurses
Cultural Competence Clinical Evaluation Tool	Jeffreys & Dogan 2013	Cultural Competence	Nursing students/ teachers
Cultural Competence Inventory for Nurses in China	Cai et al. 2017	Cultural competence	Nurses and nursing students
Cultural Sensitivity	Chang et al. 2013	Cultural Sensitivity	Community health nurses
Iranian Nurses Cultural Competence Questionnaire of Khanbabayi	Gol et al. 2019	Cultural Competence	Nurses

	4 subscales (cultural awareness, sensitivity, seeking information and active behaviour) 26 (16) items	6-point Likert-scale	Cultural Competence model of Doorenbos & Schim
	5 subscales (cultural desire/ awareness/ skill/ knowledge/ encounter) 25 Items	4-point Likert Scale	Campinha-Bacote's Model of Cultural Competence
	4 Subscales (cultural sensitivity, knowledge, skills, awareness) 33 items (Sort Form 14 items)	7-point Likert scale	Cultural Competence Model of Papadopoulos
	4 Subscales (critical awareness, knowledge, skills, empowerment) 43 Item	7-point Likert-Scale	Almutaiti's Model of Critical Cultural Competence
	3 subscales (cognitive, practical, affective) 83 items	10-point rating scale	Jeffreys Cultural Competence and Confidence model
	5 subscales (cultural awareness, skill, understanding, knowledge, respect) 29 items	5-point Likert scale	Literature Review
	5 subscales (interaction engagement, respect for cultural difference, interaction confidence, interaction attentiveness) 25 Items	Interquartile range 0 - 70	-
	3 subscales (learning and teaching, awareness and knowledge, skill) 20 items	5-point Likert scale	-

Cultural Competence Health Practitioner Assessment	Haywood et al. 2014	Cultural Competence	Health professionals
Cross-Cultural Competence instrument of Healthcare Professionals	Hietapkka et al. 2019	Cross-cultural competence	Health professionals
Nursing Cultural Competence Scale	Lin et al. 2019	Cultural Competence	Nurses
Clinical Cultural Competency Questionnaire Revised	Mareno et al. 2013	Cultural Competency	Nurses
Cultural Competence Assessment Tool	Vasiliou et al. 2013	Cultural Competence	Community nurses
Individual Assessment of Cultural Competence	Aboshaiqah et al. 2017	Cultural Competence	Nurses
Japanese version of the Caffrey Cultural Competence Health Services	Noji et al. 2017	Cultural Competence	Nurses

"- " indicates that the information was not reported in the study

	3 subscales (knowledge, adapting practice, promoting health) 67 items	4-point Likert scale	Literature Review
	4 subscales (motivation/ curiosity, attitudes, skill, emotions/empathy)	5-point Likert scale	-
	4 subscales (cultural awareness ability, cultural action ability, cultural resources application ability, self-learning cultural ability) 19 items	5-point Liker scale	-
	5 subscales (knowledge, skills, comfort in patient/family encounters, awareness, desire) 56 items	5-point Likert-scale	Campinha-Bacote's Model of Cultural Competence
	4 subscales (cultural awareness/ knowledge/ sensitivity/ practice) 40 items	-	The Papadopoulos, Tilki & Taylor Model for Developing Cultural Competence
	Unidimensional scale 11 items	4-point Likert-Scale	-
	5 subscales (knowledge, comfort/proximal, comfort/ distal, awareness, aware/ national policies) 28 items	5-point Likert-scale	Wells Model of development of cultural competence

Methodological quality of included studies

Structural validity, internal consistency and construct validity were the most frequently assessed psychometric properties in the included studies. Since no gold standard for assessment of cultural competence exists, the criterion validity was not evaluated. While authors of several studies (24, 43, 44, 46-50, 54, 55, 57-63) translated the instrument and then performed analyses of measurement properties, the translated instrument was not cross-culturally validated using an analysis of measurement invariance. Therefore, it was not possible to evaluate the cross-cultural validity by applying to the COSMIN methodology (21). The result of using the COSMIN Risk of Bias checklist to assess the instrument development and content validity can be found in *Supplementary File 2*. The results of ratings for other measurement properties are presented in *Supplementary File 3*.

Ten of the included studies presented information on instrument development (40, 42, 56, 62, 64-68). One study received an inadequate score due to the fact that a cognitive interview or other pilot tests was lacking (68); this study was consequently not further considered in the assessment of psychometric properties. The remaining nine studies were assigned a doubtful score. Content validity was assessed for 14 instruments in 22 studies (14, 31, 32, 36, 40, 42, 43, 45, 46, 49, 52-56, 60-62, 65, 66, 68, 69) by asking professionals about their relevance. The target population was asked to evaluate the comprehensibility of the instrument in four studies (42, 46, 49, 69). The content validity of two studies was adequate (31, 32), while it was doubtful in the remaining 20 studies.

Explorative and Confirmatory Factor Analysis methods were the most common statistical methods used in these studies to determine structural validity. Structural validity was assessed using these methods in 30/44 studies (14, 29-38, 40-51, 53-63, 65, 66, 68-71). One study used the Item-Response-Theory (31). The structural validity was rated as very good in eleven studies (38, 44, 45, 49, 56, 57, 61, 62, 68-70); in twelve, as adequate (29, 30, 33, 43, 47, 54, 55, 58, 60, 65-67); and in seven, as inadequate (36, 40-42, 46, 50, 71). The internal consistency was assessed in 43 of 44 studies using Cronbach's α, as a means to measure split-half reliability, or performing other item-total correlations. One study did not include an assessment of internal consistency (71), and internal consistency and structural validity were not

rated in two studies (64, 72), because the instrument is based on formative model and could not be rated using the COSMIN methodology. Consequently, these two studies were not included in evidence synthesis. In three studies, the internal consistency was not assessed on each unidimensional subscale, resulting in an inadequate rating of internal consistency (48, 60, 63).

Reliability was assessed in 12 studies using the test-retest methodology, whereby a time interval of about two weeks was considered to be appropriate (23, 30, 32, 37, 45, 51-55, 66, 68). The reliability was rated as doubtful or inadequate in five studies, because the time interval was not appropriate or not stated (51-53, 68), and no correlation coefficient (Interclass correlation coefficient (ICC) or Pearson or Spearman correlation coefficient) was reported (51-53). The measurement error was assessed in two studies (56, 68) and was rated as inadequate in one study, due to the use of an inappropriate time interval (68).

Hypothesis testing for construct validity was assessed in 26/44 studies, by comparing with other outcome measurement instrument (convergent validity) (30, 44, 47, 48, 56, 62, 64, 69, 70) or comparing between subgroups (discriminative or know-groups validity) (14, 29-31, 34, 39-42, 45, 48, 50, 54, 55, 57-59, 61, 63, 65, 66, 69, 70). The known-groups validity was rated as doubtful because important characteristics were missing for the subgroups (14, 29, 70) or statistical method was not appropriate (65). The convergent validity was rated as doubtful in one study (62), because the measurement properties of the comparative instrument were not reported, and the statistical method used was inappropriate. None of the included studies included an evaluation of responsiveness.

Quality of psychometric properties

Nine of all included instruments were tested in multiple studies, as identified in this systematic review and the remaining instruments in only one study. Measurement properties of this instruments were summarised and evaluated, assessed on the basis of criteria for good measurement properties, and the quality of evidence was graded using a modified GRADE approach. The results of the evidence synthesis are presented in Table 4.

Cultural Awareness Scale: Moderate quality of evidence for indeterminate content validity was found. Low quality of evidence was determined for

inconsistent structural validity. Two studies (40, 58) reported sufficient and one study (46) reported insufficient structural validity. This inconsistency may be explained by the different cultural study populations involved in the studies. High quality for inconsistent internal consistency was found, since the criteria for sufficient structural validity were not met. Low quality of evidence (duo to low sample size for calculating ICC; only 20 students) was found for insufficient reliability (ICC < 0.70).

Modified Cultural Awareness Scale: Low quality of evidence for inconsistent content validity was found, and the inconsistency could not be resolved. When the original scale was used, a five-factor structure was not supported, and further factor analysis was recommended (37). In the modified Cultural Awareness Scale, a four-factor solution was found but the low quality of evidence still showed inconsistent structural validity. The modified Cultural Awareness Scale showed high quality of evidence for sufficient internal consistency and construct validity.

Transcultural Self-Efficacy Tool: The Transcultural Self-Efficacy Tool results showed moderate quality of evidence for indeterminate content validity. Low quality of evidence (duo to small number on participants for test-retest measures) was found in one study with doubtful quality ratings for insufficient reliability. The structural validity and internal consistency were assigned sufficient ratings (with moderate to high quality of evidence). Moderate quality of evidence was found for inconsistent construct validity. This inconsistence can be resolved be considering the inclusion of different populations in the two included studies. In one study, researchers hypothesised that first-semester students would have lower self-efficacy perceptions than fourth-semester students, hypothesis that was confirmed (34). In other study, researchers hypothesised that nurses would score higher than nursing students (50), a hypothesis that was not confirmed.

Cultural Self-Efficacy Scale: Low quality of evidence (duo to doubtful ratings of method and imprecision) was found for content validity. The Cultural Self-Efficacy Scale results showed moderate quality of evidence for indeterminate structural validity. Cronbach's alpha for each of unidimensional subscale was reported in one of the five studies in which internal consistency was evaluated, resulting in very low quality of evidence for sufficient

internal consistency. Two of the four hypotheses were confirmed, resulting in moderate quality of evidence for inconsistent construct validity.

Nurse Cultural Competence Scale: Low quality of evidence was found for inconsistent content validity. The unidimensional Nurse Cultural Competence Scale results showed moderate quality of evidence for indeterminate structural validity. A high quality of evidence was found for sufficient internal consistency, reliability and construct validity.

Cultural Competence Assessment: Moderate quality of evidence was found for sufficient content validity. Low quality of evidence showed sufficient reliability, because only one study was performed with an inadequate methodological rating (duo to small sample size) to evaluate the reliability of Cultural Competence Assessment. Hypotheses testing for convergent and known-groups validity was confirmed, resulting in a moderate quality of evidence for sufficient construct validity.

Modified Cultural Competence Assessment: The Cultural Competence Assessment was translated and modified into Italian (44) and into Korean (70). A moderate quality of evidence existed for insufficient structural validity and internal consistency. A high quality of evidence was identified for sufficient construct validity, confirming three of the four hypotheses.

IAPCC Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised: Two studies were carried out to evaluate the measurement properties of Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals–Revised, which was originally developed by Campinha-Bacote in 2002 (2). Low quality of evidence was found for inconsistent content validity, insufficient structural validity and insufficient internal consistency.

Korean Version of the Cultural Competence Scale for Clinical Nurses: Low quality of evidence was found for inconsistent content validity (duo to doubtful ratings of method and imprecision). Moderate evidence for sufficient internal consistency was shown in Korean Version of the Cultural Competence Scale for Clinical Nurses, whereby the short version of this instrument (69) had lower Cronbach's alpha scores.

Table 4 Summary of findings.

	Summarised results	Overall rating	Quality of evidence
Cultural Awareness Scale			
Content Validity	Relevance ± Comprehensiveness ? Comprehensibility ±	?	moderate [a]
Structural Validity	Multidimensional scale (5 subscales)	±	low [a]
Internal consistency	Cronbach´s alpha ranging from .49 to .94	±	high
Reliability	ICC 0.36 – 0.76	-	low [c]
Construct validity	Hypothesis confirmed	+	high
Modified Cultural Awareness Scale			
Content Validity	Relevance + Comprehensiveness ± Comprehensibility ±	±	low [a, b]
Structural Validity	Multidimensional scale (4 subscales)	±	low [a, b, c]
Internal consistency	Cronbach´s alpha ranging from .70 to .99	+	high
Construct validity	Hypothesis confirmed	+	high
Transcultural Self-Efficacy Tool			
Content Validity	Relevance + Comprehensiveness ? Comprehensibility ?	?	moderate [a]
Structural Validity	Multidimensional scale (3 subscales)	+	moderate [c]
Internal consistency	Cronbach´s alpha ranging from .87 to .95	+	high
Reliability	ICC 0.63 – 0.75	-	low [c]
Construct validity	One of two hypotheses confirmed	±	moderate [d]

Cultural Self-Efficacy Scale			
Content Validity	Relevance ? Comprehensiveness ? Comprehensibility ?	?	low [a, d]
Structural Validity	Not all information for sufficient rating reported	?	moderate [d]
Internal consistency	Cronbach´s alpha ranging from .86 to .90	+	very low [a, d]
Construct validity	Two of four hypotheses confirmed	±	moderate [b, d]
Nurse Cultural Competence Scale			
Content Validity	Relevance + Comprehensiveness ? Comprehensibility ±	±	low [a, b]
Structural Validity	Unidimensional scale	?	moderate [a]
Internal consistency	Cronbach´s alpha .96	+	high
Reliability	ICC ranging between .85 .90	+	high
Construct validity	All hypothesis confirmed	+	high
Cultural Competence Assessment			
Content Validity	Relevance + Comprehensiveness ± Comprehensibility +	+	moderate [a]
Structural Validity	Multidimensional scale (2 subscales)	?	moderate [a]
Internal consistency	Cronbach´s alpha ranging from .86 to .93	+	high
Reliability	ICC ranging from .82 to .87	+	low [a, c]
Construct validity	Hypothesis confirmed	+	moderate [a]
Modified Cultural Competence Assessment			
Structural Validity	Multidimensional scale (4 subscales)	-	moderate [d]
Internal consistency	Criteria for sufficient structural validity not met	-	moderate [d]
Construct validity	Three of four hypothesis confirmed	+	high

Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised			
Content Validity	Relevance + Comprehensiveness ? Comprehensibility -	±	low [a, b]
Structural Validity	Multidimensional scale (5 subscales)	-	low [b, d]
Internal consistency	Cronbach's alpha ranging from -.01 to .89	-	low [a, d]
Korean Version of the Cultural Competence Scale for Clinical Nurses			
Content Validity	Relevance ± comprehensiveness ± comprehensibility ±	±	low [a, b]
Structural Validity	Multidimensional scale (5 subscales)	?	high
Internal consistency	Cronbach's alpha ranging from .74 to .93	+	moderate [b]
Construct validity	Hypotheses confirmed	+	moderate [a]
Nursing Cultural Competence Scale			
Content Validity	Relevance + Comprehensiveness + Comprehensibility +	+	moderate [a]
Structural Validity	Exploratory and confirmatory factor analysis	+	high
Internal consistency	Cronbach's alpha ranging from .82 to .86	+	high
Reliability	ICC .53 - .61	-	high
Construct validity	Hypothesis confirmed	+	high
Cultural Competence Clinical Evaluation Tool			
Content Validity	Relevance + Comprehensiveness + Comprehensibility +	+	high
Internal consistency	Criteria for sufficient structural validity not met	?	

Cultural Competence Inventory for Nurses in China			
Content Validity	Relevance + Comprehensiveness ? Comprehensibility ±	±	low [a, b]
Structural Validity	Multidimensional scale (5 subscales)	+	high
Internal consistency	Cronbach's alpha ranging from .79 to .92	+	high
Reliability	ICC .86	+	high
Construct validity	Hypothesis confirmed	+	moderate [a]
Cultural Competence Health Practitioner Assessment			
Content Validity	Relevance + Comprehensiveness ? Comprehensibility +	+	moderate [a]
Structural Validity	Multidimensional scale (3 subscales and 67 items)	+	high
Internal consistency	Cronbach's alpha ranging from .88 to .92	+	high
Construct validity	Hypothesis confirmed	+	high
Cross-Cultural Competence instrument of Healthcare Professionals			
Structural Validity	Multidimensional scale (4 subscales)	-	moderate [d]
Internal consistency	Cronbach's alpha ranging from .79 to .86	-	moderate [d]
Construct validity	Hypothesis confirmed	+	moderate [d]
Cultural sensitivity			
Content Validity	Relevance ± Comprehensiveness ? Comprehensibility -	±	low [a, b]
Internal consistency	Criteria for sufficient structural validity not met	-	
Reliability	ICC not reported	-	very low [a, c]

Clinical Cultural Competency Questionnaire Revised			
Structural Validity	Multidimensional scale (4 subscales)	?	moderate [d]
Internal consistency	Cronbach's alpha not reported on each subscale	+	low [a, d]
Cultural Competence Assessment Tool			
Internal consistency	Cronbach's alpha not reported on each subscale	+	
Reliability	Spearman correlation coefficient ranging from .62 to .83	-	very low [a, c]
Individual Assessment of Cultural Competence			
Internal consistency	Cronbach's alpha .76	-	
Reliability	Correlation coefficient not reported	-	low [a]
Japanese version of the Caffrey Cultural Competence Health Services			
Structural Validity	Multidimensional scale (5 subscales)	-	high
Internal consistency	Cronbach's alpha not reported on each subscale	?	high
Construct validity	Hypothesis confirmed	+	moderate [a]

Abbreviation: "+" sufficient result; "-" insufficient result; "±" inconsistent; "?" indeterminate; "[a]" downgrading for Risk of Bias; "[b]" downgrading for inconsistency; "[c]" downgrading for imprecision; "[d]" downgrading for indirectness. ICC - Interclass Correlation Coefficient

Table 4 provides an overview of the findings and the instruments that were tested in only one study, as identified in this systematic review. Some of the measurement properties for this are highlighted below.

Summary of evidence for Nursing Cultural Competence Scale showed moderate quality of evidence for sufficient content validity. High quality of evidence was found for sufficient structural validity, internal consistency and construct validity and high quality of evidence for insufficient reliability (56). Moderate quality of evidence was found for the sufficient content validity of Cultural Competence Clinical Evaluation Tool. The quality of evidence for the indeterminate internal consistency was not graded, because studies on structural validity are lacking (36). The Cultural Competence Inventory for Nurses in China showed low quality of evidence for inconsistent content validity and high quality evidence for sufficient structural validity, internal consistency and reliability (66). In a study by Harris-Haywood et al. (2014), the Cultural Competence Health Practitioner Assessment was tested in a sample of 2504 healthcare professionals, including 1846 nurses. The results showed moderate quality of evidence for sufficient content validity and high quality of evidence for sufficient structural validity, internal consistency and construct validity (67). The Finnish version of the Cross-Cultural Competence instrument of Healthcare Professionals showed moderate quality of evidence for insufficient structural validity and internal consistency and sufficient construct validity (47). Very low quality of evidence was found for insufficient reliability in Cultural Sensitivity Instrument, due to the low sample size used for the test-retest measure and inadequate rating for method. Low quality of evidence was found for inconsistent content validity. The quality of evidence for the insufficient internal consistency of Cultural Sensitivity Instrument was not graded, because studies on structural validity are lacking (53). The Clinical Cultural Competency Questionnaire Revised showed moderate quality of evidence for indeterminate structural validity and low quality of evidence for sufficient internal consistency (38). The Cultural Competence Assessment Tool showed very low quality of evidence for insufficient reliability, due to the low sample size in the study and serious methodological flaws (51). Insufficient internal consistency for the unidimensional scale of Individual Assessment of Cultural Competence was not graded, because studies on structural validity are lacking. Low quality of evidence (due to very serious methodological flaws) was found for insufficient reliability in this study (52). The Japanese version of the Caffrey Cultural

Competence Health Services was tested in one study with 7494 nurses and showed high quality of evidence for insufficient structural validity and indeterminate internal consistency. Moderate quality was found for sufficient construct validity (57).

Discussion

This review was conducted to systematically examine studies on measurement properties of instruments used to measure the cultural competence of nurses, to investigate the methodological quality of these studies, to evaluate the quality of psychometric properties and to grade the existing evidence. We included 44 studies and 21 instruments. The most frequently tested instruments were the Cultural Awareness Scale, the Transcultural Self-Efficacy Tool, the Cultural Self-Efficacy Scale, and the Cultural Competence Assessment. We found that the most instruments have been tested for at least some form of validity, but seldom for reliability. The quality of the psychometric properties evaluated using the criteria for good measurement properties (21) included the following: content validity, structural validity, internal consistency, reliability, measurement error and construct validity. No studies were found in which the cross-cultural validity, criterion validity, or responsiveness of included instruments were tested (or these could not be evaluated using the COSMIN methodology). With regard to the COSMIN scoring system, the overall methodological quality per measurement property is obtained by applying a "worst counts score" rule (21, 27). This leads to the conclusion, that a measurement property that was scored as high for all items assessed except for one, and where this one item is rated as doubtful or inadequate, will be assigned a *doubtful* or *inadequate* for the overall measurement property.

Content validity is considered the most important measurement property to consider when selecting an instrument (27). In this systematic review, none of included studies could be given very good or adequate ratings for the methodological quality of content validity (see *Supplementary File 2*). The reason for this finding is that, if the COSMIN methodology is used, the relevance, comprehensiveness and comprehensibility are assigned the same weight when evaluating content validity (27). In most studies, the target group or expert group were not asked about comprehensiveness, resulting

in doubtful ratings for content validity. Although all the instruments were scored as doubtful or inadequate according to the methodological ratings, the evaluation conducted by applying the criteria for good measurement property (27) showed moderate quality of evidence for sufficient content validity when Cultural Competence Clinical Evaluation Tool (36) and Cultural Competence Health Practitioner Assessment (31) were used. One should consider that these two instruments have been tested in only one study included in this systematic review, however with high sample sizes. Cultural Competence Assessment was tested in multiple studies (30, 42, 44, 70) and showed a moderate quality of evidence for sufficient content validity.

The included instruments vary in terms of their complexity regarding items and factors covered. When searching for an instrument, a clear definition of the construct is needed (27). Since no standardised definition of cultural competence exists, the included instruments measure different factors for cultural competence. These factors are usually derived from theories or models on cultural competence (2) or from concept analysis where cultural awareness, cultural knowledge, cultural sensitivity, cultural skill, cultural proficiency and dynamicity are defined as attributes of a construct of cultural competence (11). The first four attributes were mostly found as subscales in the included instruments. According to the attributes referred to in the concept analysis, as well as references in other reviews to cultural competence (13, 19, 22-24), the keywords ’diversity’, ’self-efficacy’, ’awareness’, ’knowledge’, ’skill’, and ’sensitivity’ were used to find instruments that could be used to measure nurses’ cultural competence. The results of the quality assessment of these instruments and their measurement properties show that not all of the identified instruments can be used to measure cultural competence appropriately, because they measure only some attributes of cultural competence. First, the Cultural Awareness Scale, which was the most frequently tested instrument identified in this systematic review, was developed to assess cultural awareness in nursing students; for this reason, it should not be used to assess cultural competence. Second, the Cultural Sensitivity scale has only been used to measure cultural sensitivity among community health nurses. Furthermore, two of the included instruments were unidimensional, with 20 items included in the Nurse Cultural Competence Scale and 11 items included in the Individual Assessment of Cultural Competence. The Nurse Cultural Competence Scale was tested in four studies (45, 54, 55, 71) with low quality of evidence for inconsistent content

validity and moderate quality for indeterminate structural validity. The Individual Assessment of Cultural Competence was tested in one study (52) with low quality of evidence (due to very serious methodological flaws) for insufficient reliability. Based on the quality of evidence on measurement properties for these two instruments and considering the previous discussion about the multidimensionality of scales used to measure cultural competence, we do not recommend using these two instruments to assess cultural competence in nurses. In conclusion, instruments which have been developed to assess only one of the stated attributes can only offer incomplete measures of cultural competence.

Although the titles of some of the included instruments suggest that only one specific attribute is being measured, one should consider the measured factors in depth. For example, the name of the Transcultural Self-Efficacy Scale may indicate that only cultural self-efficacy is being measured, but this scale can be applied to measure self-efficacy with regard to the cultural knowledge, awareness, acceptance and appreciation (35). Transcultural Self-Efficacy Scale could be used to assess cultural competence in nursing students, but further reliability testing is needed.

Although the construct of interest is clearly defined when searching for an appropriate instrument, one should be aware of whether the instrument development study was performed in the target population and whether other studies were carried out to perform psychometric testing of instrument on the target population (27). Instruments developed for use with nursing students may not be appropriate for use with nurses if the items are based on the student's experiences during their studies or clinical placement. Some instruments have been specially developed to measure cultural competence in nursing students, including the Transcultural Self-Efficacy Scale, the Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised, the Nurse Cultural Competence Scale and the Cultural Competence Clinical Evaluation Tool. Of these instruments, the results of this systematic review indicate that only Transcultural Self-Efficacy Scale can be recommended.

Given the variety of instruments currently available, understanding the quality of evidence for their measurement properties is essential to make

an informed selection of the most appropriate tool and properly assess the cultural competence in the population of interest.

Strengths and Limitations

To our knowledge, no systematic review on the cultural competence of nurses has previously provided a detailed assessment of the methodical quality of the available studies and their results on the basis of psychometric properties recommended in the COSMIN guidelines (21). One strength of this review is the detailed and systematic electronic search strategy used, which was based on application of the COSMIN filter (26). Another notable strength is the use of the most up-to-date methodology (21, 27), whereby quality assessments were performed by using both the COSMIN checklist and applying the quality criteria for good psychometric properties. In addition, the summarised evidence was graded using the modified GRADE approach (21). Unlike previous reviews on the measurement properties of instruments used to measure cultural competence (22-24), this systematic review focused on nurses and nursing patients, which underlies the importance of focusing on specific population.

The review was limited to studies published in the English and German languages. As a result, good quality instruments developed in other languages or studies on measurement properties of the included studies in other language were not included. Another potential limitation is that the evidence synthesis lumped together studies from different languages (about instruments) and countries and included instruments with (slightly) different cultural competence constructs.

Conclusion

Given the large availability of instruments, the development of new self-administered instrument is not recommended. Our findings indicate that researchers need to conduct further psychometric evaluation studies on existing instruments, and especially on less frequently evaluated properties, such as measurement error and responsiveness. The Transcultural Self-Efficacy Scale could be used to assess cultural competence in nursing students, but further reliability testing is needed. To assess the cultural competence

in nurses, the Cultural Competence Assessment and the Cultural Competence Health Practitioner Assessment could be recommended. Based on our results, the Cultural Competence Health Practitioner Assessment was considered to be the most appropriate instrument for the evaluation of cultural competence. However, one should consider that this instrument was tested in only one study (with sample of 2504 health professionals) and may be time-consuming, since the instrument consists of 67 items (31). Regarding the feasibility aspect, the brief time needed to complete the 25 items on the Cultural Competence Assessment should be highlighted (30, 42). As many instruments are used in different countries and cultural settings, the cross-cultural validity of these instruments should be tested more often.

The decision to use one instrument rather than another should be made on the basis of the study purpose, construct of interest with regard to defining factors and the specific study population.

As other studies on the measurement of cultural competence have reported (12, 13) more instruments on patient-reported cultural competence of nurses are needed.

References

(1) United Nations DoEaSA, Population Division (2017). International Migration Report 2017: Highlights2017 14.08.2020. Available from: https://desapublications.un.org/publications/world-population-prospects-2017-revision.

(2) Campinha-Bacote J. The Process of Cultural Competence in the Delivery of Healthcare Services: a model of care. J Transcult Nurs. 2002;13(3).

(3) Gallagher RW, Polanin JR. A meta-analysis of educational interventions designed to enhance cultural competence in professional nurses and nursing students. Nurse Educ Today. 2015;35(2):333-40.

(4) Degrie L, Gastmans C, Mahieu L, Dierckx de Casterle B, Denier Y. How do ethnic minority patients experience the intercultural care encounter in hospitals? a systematic review of qualitative research. BMC Med Ethics. 2017;18(1):2.

(5) Rechel B, Mladovsky P, Ingleby D, Mackenbach JP, McKee M. Migration and health in an increasingly diverse Europe. The Lancet. 2013;381(9873):1235-45.

(6) Ingram RR. Using Campinha-Bacote's process of cultural competence model to examine the relationship between health literacy and cultural competence. J Adv Nurs. 2011;68(3):695-704.

(7) WHO. Global strategic directions for strengthening nursing and midwifery 2016-2020. 2016.

(8) Ghiyasvandian S, Zakerimoghadam M, Peyravi H. Nurse as a facilitator to professional communication: a qualitative study. Glob J Health Sci. 2014;7(2):294-303.

(9) Kim-Godwin YS, Clarke PN, Barton L. A model for the delivery of culturally competent community care. J Adv Nurs. 2001;35(6):918-25.

(10) Allen J. Improving cross-cultural care and antiracism in nursing education: a literature review. Nurse Educ Today. 2010;30(4):314-20.

(11) Sharifi N, Adib-Hajbagheryb M, Najafic M. Cultural competence in nursing: A concept analysis. Int J Nurs Stud. 2019;99.

(12) Jongen C, McCalman J, Bainbridge R. Health workforce cultural competency interventions: a systematic scoping review. BMC Health Serv Res. 2018;18(1):232.

(13) Shen Z. Cultural competence models and cultural competence assessment instruments in nursing: a literature review. J Transcult Nurs. 2015;26(3):308-21.

(14) Bernal H, Froman R. The confidence of community health nurses in caring for ethnically diverse populations. Image J Nurs Sch. 1987;19(4):201-3.

(15) Giger JN, Davidhizar R. The Giger and Davidhizar Transcultural Assessment Model. J Transcult Nurs. 2002;13(3):200-1.

(16) Switzer GE, Scholle SH, Johnson BA, Kelleher KJ. The Client Cultural Competence Inventory: An Instrument for Assessing Cultural Competence in Behavioral Managed Care Organizations. J Child Fam Stud. 1998;7(4):483-91.

(17) Jongen CS, McCalman J, Bainbridge RG. The Implementation and Evaluation of Health Promotion Services and Programs to Improve Cultural Competency: A Systematic Scoping Review. Front Public Health. 2017;5:24.

(18) Kaihlanen AM, Hietapakka L, Heponiemi T. Increasing cultural awareness: qualitative study of nurses' perceptions about cultural competence training. BMC Nurs. 2019;18:38.

(19) Loftin C, Hartin V, Branson M, Reyes H. Measures of cultural competence in nurses: an integrative review. ScientificWorldJournal. 2013;2013:289101.

(20) Terwee CB, Bot SDM, de Boer MR, Windt vd, M. DAW, Knol DL, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol. 2007;60(1):34-42.

(21) Prinsen CAC, Mokkink LB, Bouter LM, Alonso J, Patrick DL, de Vet HCW, et al. COSMIN guideline for systematic reviews of patient-reported outcome measures. Qual Life Res. 2018;27(5):1147-57.

(22) Alizadeh S, Chavan M. Cultural competence dimensions and outcomes: a systematic review of the literature. Health Soc Care Community. 2016;24(6):e117-e30.

(23) Lin C-J, Lee C-K, Huang M-C. Cultural Competence of Healthcare Providers. A Systematic Review of Assessment Instruments. J Nurs Res. 2017;25(3).

(24) Gozu A, Beach MC, Price EG, Gary TL, Robinson K, Palacio A, et al. Self-Administered Instruments to Measure Cultural Competence of Health Professionals: A Systematic Review. Teach Learn Med. 2007;19(2):180-90.

(25) Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLOS Medicine. 2009;6(7):e1000097.

(26) Terwee CB, Jansma EP, Riphagen, II, de Vet HC. Development of a methodological PubMed search filter for finding studies on measurement properties of measurement instruments. Qual Life Res. 2009;18(8):1115-23.

(27) Terwee CB, Prinsen CAC, Chiarotto A, Westerman MJ, Patrick DL, Alonso J, et al. COSMIN methodology for evaluating the content validity of patient-reported outcome measures: a Delphi study. Qual Life Res. 2018;27(5):1159-70.

(28) Mokkink LB, Prinsen CAC, Bouter LM, Vet HCWd, Terwee CB. The COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) and how to select an outcome measurement instrument Braz J Phys Ther. 2016;20:105-13.

(29) Bernal H, Froman R. Influences on the Cultural Self-Efficacy of Community Health Nurses. J Transcult Nurs. 1993;4(2):24-31.

(30) Doorenbos AZ, Schim SM, Benkert R, Borse NN. Psychometric evaluation of the cultural competence assessment instrument among healthcare providers. Nurs Res. 2005;54(5):324-31.

(31) Harris-Haywood S, Goode T, Gao Y, Smith K, Bronheim S, Flocke SA, et al. Psychometric evaluation of a cultural competency assessment instrument for health professionals. Medical Care. 2014;52(2):e7-e15.

(32) Jeffreys MR, Smodlaka I. Steps of the instrument design process. An illustrative approach for nurse educators. Nurse Educ. 1996;21(6):47-52.

(33) Jeffreys MR, Smodlaka I. Exploring the factorial composition of the transcultural self-efficacy tool. Int J Nurs Stud. 1998;35(4):217-25.

(34) Jeffreys MR, Smodlaka I. Construct validation of the Transcultural Self-Efficacy Tool. J Nurs Educ. 1999;38(5):222-7.

(35) Jeffreys MR, Dogan E. Factor analysis of the Transcultural Self-Efficacy Tool (TSET). J Nurs Meas. 2010;18(2):120-39.

(36) Jeffreys MR, Dogan E. Evaluating Cultural Competence in the Clinical Practicum. Nurs Educ Perspect. 2013;34(2):88-94.

(37) Krainovich-Miller B, Yost JM, Norman RG, Auerhahn C, Dobal M, Rosedale M, et al. Measuring cultural awareness of nursing students: a first step toward cultural competency. J Transcult Nurs. 2008;19(3):250-8.

(38) Mareno N, Hart PL, VanBrackle L. Psychometric Validation of the Revised Clinical Cultural Competency Questionnaire. J Nurs Meas. 2013;21(3):426-36.

(39) McElroy J, Smith-Miller CA, Madigan CK, Li Y. Cultural Awareness Among Nursing Staff at an Academic Medical Center. J Nurs Adm. 2016;46(3):146-53.

(40) Rew L, Becker H, Cookston J, Khosropour S, Martinez S. Measuring cultural awareness in nursing students. J Nurs Educ. 2003;42(6):249-57.

(41) Rew L, Becker H, Chontichachalalauk J, Lee HY. Cultural Diversity Among Nursing Students: Reanalysis of the Cultural Awareness Scale. J Nurs Educ. 2014;53(2):71-6.

(42) Schim SM, Doorenbos AZ, Miller J, Benkert R. Development of a Cultural Competence Assessment instrument. J Nurs Meas. 2003;11(1):29-40.

(43) Başalan F, Bayık Temel A. Cultural awareness scale: Psychometric properties of the Turkish version. Collegian. 2017;24(5):499-504.

(44) Caricati L, Dicembrino RB, Gionti L, Petre L, Ungurean L. Cultural Competence Assessment Instrument: Initial Italian validation and proposed refinement. Acta Biomed. 2015;86(2):142-9.

(45) Gozum S, Tuzcu A, Kirca N. Validity and Reliability of the Turkish Version of the Nurse Cultural Competence Scale. J Transcult Nurs. 2016;27(5):487-95.

(46) Hadziabdic E, Safipour J, Bachrach-Lindstrom M, Hultsjo S. Swedish version of measuring cultural awareness in nursing students: validity and reliability test. BMC Nurs. 2016;15:25.

(47) Hietapakka L, Elovainio M, Wesolowska K, Aalto AM, Kaihlanen AM, Sinervo T, et al. Testing the psychometric properties of the Finnish version of the cross-cultural competence instrument of healthcare professionals (CCCHP). BMC Health Serv Res. 2019;19(1):294.

(48) Jimenez JAV, Contreras JLM, Shellman J, Gonzalez M, Bernal H. The Level of Cultural Self-Efficacy Among a Sample of Spanish Nurses in Southeastern Spain. J Transcult Nurs. 2006;17(2):164-70.

(49) Olt H, Jirwe M, Gustavsson P, Emami A. Psychometric evaluation of the Swedish adaptation of the Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals--Revised (IAPCC-R). J Transcult Nurs. 2010;21(1):55-64.

(50) Sarafis P, Michael I, Chara T, Maria M. Reliability and Validity of the Transcultural Self-Efficacy Tool Questionnaire (Greek Version). J Nurs Meas. 2014;22(2):E41-51.

(51) Vasiliou M, Kouta C, Raftopoulos V. The Use of the Cultural Competence Assessment Tool (Ccatool) In Community Nurses: The Pilot Study and Test-Retest Reliability. Int J Caring Sci. 2013;6(1):44-52.

(52) Aboshaiqah AE, Tumala RB, Almutairi AF, Atallah M. Enhancing culturally competent nursing care in Saudi Arabia J Cult Divers. 2017;24(1):20-6.

(53) Chang HY, Yang YM, Kuo YL. Cultural sensitivity and related factors among community health nurses. J Nurs Res. 2013;21(1):67-73.

(54) Cruz JP, Colet PC, Bashtawi MA, Mesde JH, Cruz CP. Psychometric evaluation of the Cultural Capacity Scale Arabic version for nursing students. Contemp Nurse. 2017;53(1):13-22.

(55) Cruz JP, Machuca Contreras FA, Ortiz Lopez JE, Zapata Aqueveque CA, Vitorino LM. Psychometric assessment of the cultural capacity scale Spanish version in Chilean nursing students. Int Nurs Rev. 2018;65(2):262-9.

(56) Lin MH, Chang TH, Lee YH, Wang PY, Lin LH, Hsu HC. Developing and validating the Nursing Cultural Competence Scale in Taiwan. PLoS One. 2019;14(8):e0220944.

(57) Noji A, Mochizuki Y, Nosaki A, Glaser D, Gonzales L, Mizobe A, et al. Evaluating cultural competence among Japanese clinical nurses: Analyses of a translated scale. Int J Nurs Pract. 2017;23.

(58) Oh H, Lee JA, Schepp KG. Translation and evaluation of the Cultural Awareness Scale for Korean nursing students. Int J Nurs Educ Scholarsh. 2015;12.

(59) Hagman LW. Cultural self-efficacy of licensed registered nurses in New Mexico. J Cult Divers. 2006;13(2):105-12.

(60) Herrero-Hahn R, Montoya-Juárez R, Hueso-Montoro C, Rojas JG, Restrepo-Medrano JC, Ospina-Díaz JM. Cultural Adaptation and Validation of the Cultural Self-Efficacy Scale for Colombian Nursing Professionals. J Transcult Nurs. 2017;28(2):195-202.

(61) Juan L, Zhuang H, Yong L, Rong Z. Perceived Transcultural Self-Efficacy of Nurses in General Hospitals in Guangzhou, China. Nurs Res. 2016;65(5):371-9.

(62) Choi H, Suh E, Park C, Park J, Fernandez E. Reliability and Validity of a Korean Version of the Cultural Awareness Scale (K-CAS). Korean J Adult Nurs. 2015;27:472-9.

(63) Halabi JO, de Beer J. Exploring the cultural competence of undergraduate nursing students in Saudi Arabia. Nurse Educ Today. 2018;62:9-15.

(64) Almutairi AF, Dahinten VS. Factor Structure of Almutairi's Critical Cultural Competence Scale. Adm Sci. 2017;7(2):13.

(65) Chae DH, Lee CY. Development and psychometric evaluation of the Korean version of the cultural competence scale for clinical nurses. Asian Nurs Res. 2014;8(4):305-12.

(66) Cai D, Kunaviktikul W, Klunklin A, Sripusanapan A, Avant PK. Developing a cultural competence inventory for nurses in China. Int Nurs Rev. 2017;64(2):205-14.

(67) Harris-Haywood S, Goode T, Gao Y, Smith K, Bronheim S, Flocke SA, et al. Psychometric evaluation of a cultural competency assessment instrument for health professionals. Med Care. 2014;52(2):e7-e15.

(68) Gol MK, Dorosti A, Montazer M. Design and psychometrics cultural competence questionnaire for health promotion of Iranian nurses. J Educ Health Promot. 2019;8:155.

(69) Chae D, Park Y. Development and Cross-Validation of the Short Form of the Cultural Competence Scale for Nurses. Asian Nurs Res 2018;12(1):69-76.

(70) Chae D, Kang KH, Benkert R, Doorenbos AZ. Evaluation of the psychometric properties of the Korean version of the Cultural Competence Assessment. Jpn J Nurs Sci. 2018;15(1):56-66.

(71) Perng S-J, Watson R. Construct validation of the Nurse Cultural Competence Scale: A hierarchy of abilities. J Clin Nurs. 2012;21(11-12):1678-84.

(72) Almutairi AF, Dahinten VS. Construct Validity of Almutairi's Critical Cultural Competence Scale. West J Nurs Res. 2017;39(6):784-802.

Supplementary file 1

Search filter developed to identify studies on the measurement properties

Search (((((((("Cultural Competency"[Majr]) OR "Cultural Diversity"[Majr])) OR (((competenc*[Title/Abstract] OR diversity[Title/Abstract] OR sensitivity[Title/Abstract] OR self-efficacy[Title/Abstract] OR awareness[Title/Abstract] OR knowledge[Title/Abstract] OR skill[Title/Abstract])) AND cultur*[Title/Abstract]))) AND ((nurs*[Title/Abstract]) OR "Nursing Staff"[Majr])) AND (instrument or scale or tool or assessment or questionnaire or measure*)) AND (((instrumentation[sh] OR methods[sh] OR "Validation Studies"[pt] OR "Comparative Study"[pt] OR "psychometrics"[MeSH] OR psychometr*[tiab] OR clinimetr*[tw] OR clinometr*[tw] OR "outcome assessment (health care)"[MeSH] OR "outcome assessment"[tiab] OR "outcome measure*"[tw] OR "observer variation"[MeSH] OR "observer variation"[tiab] OR "Health Status Indicators"[Mesh] OR "reproducibility of results"[MeSH] OR reproducib*[tiab] OR "discriminant analysis"[MeSH] OR reliab*[tiab] OR unreliab*[tiab] OR valid*[tiab] OR "coefficient of variation"[tiab] OR coefficient[tiab] OR homogeneity[tiab] OR homogeneous[tiab] OR "internal consistency"[tiab] OR (cronbach*[tiab] AND (alpha[tiab] OR alphas[tiab])) OR (item[tiab] AND (correlation*[tiab] OR selection*[tiab] OR reduction*[tiab])) OR agreement[tw] OR precision[tw] OR imprecision[tw] OR "precise values"[tw] OR test-retest[tiab] OR (test[tiab] AND retest[tiab]) OR (reliab*[tiab] AND (test[tiab] OR retest[tiab])) OR stability[tiab] OR interrater[tiab] OR inter-rater[tiab] OR intrarater[tiab] OR intra-rater[tiab] OR intertester[tiab] OR inter-tester[tiab] OR intratester[tiab] OR intra-tester[tiab] OR interobserver[tiab] OR inter-observer[tiab] OR intraobserver[tiab] OR intra-observer[tiab] OR intertechnician[tiab] OR inter-technician[tiab] OR intratechnician[tiab] OR intra-technician[tiab] OR interexaminer[tiab] OR inter-examiner[tiab] OR intraexaminer[tiab] OR intra-examiner[tiab] OR interassay[tiab] OR inter-assay[tiab] OR intraassay[tiab] OR intra-assay[tiab] OR interindividual[tiab] OR inter-individual[tiab] OR intraindividual[tiab] OR intra-individual[tiab] OR interparticipant[tiab] OR inter-participant[tiab] OR intraparticipant[tiab] OR intra-participant[tiab] OR kappa[tiab] OR kappa's[tiab] OR kappas[tiab] OR repeatab*[tw] OR ((replicab*[tw] OR repeated[tw]) AND (measure[tw] OR measures[tw] OR findings[tw] OR result[tw] OR results[tw] OR test[tw] OR tests[tw])) OR generaliza*[tiab] OR generalisa*[tiab] OR concordance[tiab] OR (intraclass[tiab] AND correlation*[tiab])

OR discriminative[tiab] OR "known group"[tiab] OR "factor analysis"[tiab] OR "factor analyses"[tiab] OR "factor structure"[tiab] OR "factor structures"[tiab] OR dimension*[tiab] OR subscale*[tiab] OR (multitrait[tiab] AND scaling[tiab] AND (analysis[tiab] OR analyses[tiab])) OR "item discriminant"[tiab] OR "interscale correlation*"[tiab] OR error[tiab] OR errors[tiab] OR "individual variability"[tiab] OR "interval variability"[tiab] OR "rate variability"[tiab] OR (variability[tiab] AND (analysis[tiab] OR values[tiab])) OR (uncertainty[tiab] AND (measurement[tiab] OR measuring[tiab])) OR "standard error of measurement"[tiab] OR sensitiv*[tiab] OR responsive*[tiab] OR (limit[tiab] AND detection[tiab]) OR "minimal detectable concentration"[tiab] OR interpretab*[tiab] OR ((minimal[tiab] OR minimally[tiab] OR clinical[tiab] OR clinically[tiab]) AND (important[tiab] OR significant[tiab] OR detectable[tiab]) AND (change[tiab] OR difference[tiab])) OR (small*[tiab] AND (real[tiab] OR detectable[tiab]) AND (change[tiab] OR difference[tiab])) OR "meaningful change"[tiab] OR "ceiling effect"[tiab] OR "floor effect"[tiab] OR "Item response model"[tiab] OR IRT[tiab] OR Rasch[tiab] OR "Differential item functioning"[tiab] OR DIF[tiab] OR "computer adaptive testing"[tiab] OR "item bank"[tiab] OR "cross-cultural equivalence"[tiab])))))) NOT ((("addresses"[Publication Type] OR "biography"[Publication Type] OR "case reports"[Publication Type] OR "comment"[Publication Type] OR "directory"[Publication Type] OR "editorial"[Publication Type] OR "festschrift"[Publication Type] OR "interview"[Publication Type] OR "lectures"[Publication Type] OR "legal cases"[Publication Type] OR "legislation"[Publication Type] OR "letter"[Publication Type] OR "news"[Publication Type] OR "newspaper article"[Publication Type] OR "patient education handout"[Publication Type] OR "popular works"[Publication Type] OR "congresses"[Publication Type] OR "consensus development conference"[Publication Type] OR "consensus development conference, nih"[Publication Type] OR "practice guideline"[Publication Type]) NOT ("animals"[MeSH Terms] NOT "humans"[MeSH Terms])) Filters: Abstract; English; German

Supplementary file 2

Ratings on instrument development and content validity assessed with COSMIN Risk of Bias checklist

	Reference	Instrument Development			Content Validity	Comments
		Design	Cognitive interview/ pilot test	Total Instrument development		
TSET	Jeffreys & Smodlaka 1996	D	D	D	A	PROM Development: Important methodological flaws in the design and pilot test of the study noted
	Li et al. 2016	-	-	-	D	Important methodological flaws in relevance and comprehensiveness noted
CCCET	Jeffreys & Dogan 2013	-	-	-	D	Small sample size
CAS	Rew et al. 2003	D	D	D	D	Important methodological flaws in the design and content validity of the study noted
	Hadziabdic et al. 2016	-	-	-	D	not clear if at least two researchers were involved in data analysis
Modified CAS	Choi et al. 2015	D	D	D	D	Important methodological flaws in the design, pilot test and content validity of the study noted
	Basalan & Temel 2017	-	-	-	D	Small sample size

CCA	Schim et al. 2003	D	D	D	D	Important methodological flaws in the design, pilot test and content validity of the study noted
K-CCSN	Chae & Lee 2014	D	D	D	D	Important methodological flaws in the design, pilot test and content validity of the study noted
	Chae & Park 2018	-	-	-	D	Important methodological flaws in relevance and comprehensibility noted
NCCS**	Lin et al. 2019	D	D	D	D	Important methodological flaws in the design, pilot test and content validity of the study noted
CCS	Gozum et al. 2015	-	-	-	D	Small sample size
	Cruz et al. 2016	-	-	-	D	Important methodological flaws in relevance noted
	Cruz et al. 2018	-	-	-	D	Important methodological flaws in relevance noted
CCINC	Cai et al. 2017	D	D	D	D	Important methodological flaws in the design, pilot test and content validity of the study noted
CCCS	Almutairi & Dahinten 2017a	D	D	D	-	Important methodological flaws in the design and pilot test of the study noted

CCHPA	Haywood et al. 2014	A	D	D	A	Pilot Test: not clear if the nurses were asked about the comprehensibility and comprehensiveness
INCCQK*	Gol et al. 2019	D	I	I	D	PROM Development: no cognitive interview or other pilot test
CSES	Bernal & Froman 1987	-	-	-	D	Not clear which method was used to analyse the data
	Herrero-Hahn et al. 2017				D	Not clear if at least two researchers were involved in the analysis
IAPPC-R	Olt et al. 2010	-	-	-	D	Important methodological flaws in relevance and comprehensibility noted
Cultural Sensitivity	Chang et al. 2013	-	-	-	D	Important methodological flaws in relevance noted
IACC*	Aboshaiqah et al. 2017	-	-	-	D	Important methodological flaws in relevance noted

Full titles of instruments: Individual Assessment of Cultural Competence (IACC), Cultural Self-Efficacy Scale (CSES), Cultural Self-Efficacy Scale Spanish Version (CSES-S), Transcultural Self-Efficacy Tool (TSET), Cultural Awareness Scale (CAS), Nurse Cultural Capacity Scale (NCCS), Cultural Competence Assessment (CCA), Cultural Competence Assessment Italian Version (CCAI), Iranian Nurses Cultural Competence Questionnaire of Khanbabayi (INCCQK), Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals–Revised (IAPCC-R), Korean Version of the Cultural Competence Scale for Clinical Nurses (K-CCSN), Critical Cultural Competence Scale (CCCS), Cultural Competence Clinical Evaluation Tool (CCCET), Cultural Competence Inventory for Nurses in China (CCINC), Cultural Competence Health Practitioner Assessment (CCHPA), Cross-Cultural Competence instrument of Healthcare Professionals (CCCHP), Nurse Cultural Competence Scale (NCCS), Clinical Cultural Competency Questionnaire Revised (CCCQ-PRE-R), Cultural Competence Assessment Tool (CCATool), Japanese version of the Caffrey Cultural Competence Health Services (J-CCCHS).

“ * “ Abbreviation for the title of the instrument was not cited in the original study but created by the review team for better presentation.

“ ** “ NCCS by Lin et al. 2019.

Supplementary file 3

Ratings on other measurement properties assessed with COSMIN Risk of Bias checklist

Instrument	Reference	Structural validity	Internal consistency	Reliability	Measure-ment error	Construct validity		Comments
						Convergent validity	Known groups validity	
CSES	Bernal & Froman 1987	-	I	-	-	-	D	Internal consistency: statistic not reported for each subscale separately Construct validity: important characteristics of subgroups missing
	Bernal & Froman 1993	A	I	-	-	-	D	Internal consistency: statistic not reported for each subscale separately Construct validity: important characteristics of subgroups missing
	Hagman 2006	-	V	-	-	-	A	
	Jimenez et al. 2006	-	I	-	-	A	A	Internal consistency: statistic not reported for each subscale separately

	Herrero-Hahn et al. 2017	A	I	-	-	-	-	Internal consistency: statistic not reported for each subscale separately
TSET	Jeffreys & Smodlaka 1996	-	V	D	-	-	-	Reliability: small sample size
	Jeffreys & Smodlaka 1998	A	V	-	-	-	-	
	Jeffreys & Smodlaka 1999	-	V	-	-	-	A	
	Jeffreys & Dogan 2010	I	V	-	-	-	-	Structural validity: small sample size
	Sarafis et al. 2014	I	V	-	-	-	A	Structural validity: small sample size
	Li et al. 2016	V	V	-	-	-	A	
CAS	Rew et al. 2003	I	V	-	-	-	A	Strucutral validity: no exploratory or confirmatory analysis performed; small sample size

	Krainovich-Miller et al. 2008	-	V	A	-	-	-	
	Oh et al. 2015	A	V	-	-	-	A	
	Hadziabdic et al. 2016	I	V	-	-	-	-	Structural validity: small sample size
Modified CAS	Rew et al. 2014	I	V	-	-	-	A	Structural validity: small sample size
	McElroy et al. 2016	-	V	-	-	-	A	
	Basalan & Temel 2017	A	V	-	-	-	-	
	Choi et al. 2015	V	V	-	-	D	-	Construct validity: measurement properties of comparator instrument not reported; statistical method not appropriate
NCCS	Perng & Watson 2012	I	-	-	-	-	-	Structural validity: small sample size
	Gozum et al. 2015	V	V	A	-	-	A	

	Cruz et al. 2016	A	V	A	-	-	A	
	Cruz et al. 2018	A	V	A	-	-	A	
CCA	Schim et al. 2003	I	V	-	-	A	A	Structural validity: small sample size
	Doorenbos et al. 2005	A	V	A	-	-	A	
Modified CCA	Caricati et al. 2015	V	V	-	-	A	-	
	Chae et al. 2018	V	V	-	-	A	D	Construct validity: important characteristics of subgroups missing
IAPCC-R	Olt et al. 2010	V	V	-	-	-	-	
	Halabi & deBeer 2018	-	I	-	-	-	A	Internal consistency: statistic not reported for each subscale separately
K-CCSN	Chae & Lee 2014	A	V	-	-	-	D	Construct validity: statistical method not appropriate
	Chae & Park 2018	V	V	-	-	V	V	

CCCS	Almutaiti & Dahinten 2017a	-	-	-	-	-	-	Structural validity and Internal consistency: Not rated according to the COSMIN methodology as the tool is based on a formative model
	Almutairi & Dahinten 2017b	-	-	-	-	-	A	Structural validity: Not rated according to the COSMIN methodology as the tool is based on a formative model
CCCET	Jeffreys & Dogan 2013	-	V	-	-	-	-	
CCINC	Cai et al. 2017	A	V	A	-	-	D	Construct validity: statistical method not appropriate
Cultural Sensitivity	Chang et al. 2013	-	V	I	-	-	-	Reliability: time interval not appropriate; ICC not reported
IACCQK*	Gol et al. 2019	V	V	I	I	-	-	Reliability: time interval not appropriate Measurement error: time interval not appropriate

CCHPA	Haywood et al. 2014	A	V	-	-	-	V	
CCCHP	Hietapkka et al. 2019	A	V	-	-	A	-	
NCCS	Lin et al. 2019	V	V	A	A	A	-	
CCCQ-PRE-R	Mareno et al. 2013	V	I	-	-	-	-	Internal consistency: statistic not reported for each subscale separately
CCATool	Vasiliou et al. 2013	-	V	D	-	-	-	Reliability: time interval not appropriate; interclass correlation coefficient not reported
IACC*	Aboshaiqah et al. 2017	-	A	I	-	-	-	Reliability: time interval not appropriate; interclass correlation coefficient not reported
J-CCCHS	Noji et al. 2017	V	V	-	-	-	D	Construct validity: statistical method not appropriate

Full titles of instruments: Individual Assessment of Cultural Competence (IACC), Cultural Self-Efficacy Scale (CSES), Cultural Self-Efficacy Scale Spanish Version (CSES-S), Transcultural Self-Efficacy Tool (TSET), Cultural Awareness Scale (CAS), Nurse Cultural Capacity Scale (NCCS), Cultural Competence Assessment (CCA), Cultural Competence Assessment Italian Version (CCAI), Iranian Nurses Cultural Competence Questionnaire of Khanbabayi (INCCQK), Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals–Revised (IAPCC-R), Korean Version of the Cultural Competence Scale for Clinical Nurses (K-CCSN), Critical Cultural Competence Scale (CCCS), Cultural Competence Clinical Evaluation Tool (CCCET), Cultural Competence Inventory for Nurses in China (CCINC), Cultural Competence Health Practitioner Assessment

(CCHPA), Cross-Cultural Competence instrument of Healthcare Professionals (CCCHP), Nurse Cultural Competence Scale (NCCS), Clinical Cultural Competency Questionnaire Revised (CCCQ-PRE-R), Cultural Competence Assessment Tool (CCATool), Japanese version of the Caffrey Cultural Competence Health Services (J-CCCHS).

“ * “ Abbreviation for the title of the instrument was not cited in the original study but created by the review team for better presentation.

“ ** “ NCCS by Lin et al. 2019

Chapter 4

The German Version of the Cultural Competence Assessment (CCA-G): cross-cultural adaptation and validation study in Austrian acute care settings

This chapter was published as:

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Abstract

Background

Adapting practices to respond sensitively to increasingly culturally diverse patients can be challenging. Therefore, cultural competence among nurses needs to be assessed to evaluate their current cultural competence and the need for interventions to improve daily nursing practice. Little is known about cultural competence of nurses in German-speaking countries, including Austria, as there is currently no validated tool in German to assess cultural competence in nurses. The aims of this study were to translate and cross-culturally adapt the Cultural Competence Assessment scale in German and to evaluate its psychometric properties.

Methods

This is a methodology study with a cross-sectional design. Conducting a convenience sampling, Austrian nurses working in the direct care of patients in acute care settings were invited to participate in this study. Data collection was conducted in March 2021. The translation and cross-cultural adaptation were conducted by following the guidelines of Sousa et al. (J Eval Clin Pract 17:268-74, 2011) and Beaton et al. (Spine 25:3186-91, 2000). The face and content validity, structural validity, and internal consistency reliability of the Cultural Competence Assessment scale, which consists of 25 items, was evaluated. Data were analysed using content validity index, confirmatory factor analyses as well as McDonald's Omega. Descriptive statistics were computed with the statistical software IBM SPSS Statistics 26, while the confirmatory factor analysis was conducted with the R package Lavaan.

Results

Overall, 915 nurses completed the questionnaire. Twenty items had an acceptable item content validity index. Using confirmatory factor analyses, a two-factor model with 14 items yielded a good fit ($X^2/df = 3.16$; CFI = .923; TLI = .908; RMSEA = .055 (.049-.062) and SRMR = .039). Internal consistency reliability was found to be acceptable, as indicated by a Omega of .87.

Conclusion

The German version of the Cultural Competence Assessment scale (CCA-G) can be recommended for measuring cultural competence behaviour of nurses in acute care settings. The 14-item scale showed strong construct validity

and acceptable internal consistency. Further research using repeated measures could determine the cultural sensitivity and indicate if the tool is applicable in other healthcare settings and for other healthcare professionals.

Keywords: Nurses, Cultural competence, Instrument adaptation, Psychometric testing

Background

In many European countries, cultural diversity is increasing and becoming an important concern for healthcare organisations in order to enhance responsiveness to the healthcare needs of diverse patients. As a result, many countries are implementing more culturally sensitive healthcare systems to increase the quality of care and to avoid discrimination against culturally diverse populations (1). In endeavouring to reach these goals, healthcare organisations are faced with the need for healthcare professionals that are skilled in cultural competency (2). Cultural competence has gained international attention as a strategy to reduce healthcare inequalities (3), improve healthcare quality and enhance patient outcomes (e.g. patient satisfaction) (4). Cultural competence is the dynamic process of acquiring the ability to provide effective, safe and quality care to the patients through considering their different cultural aspects (p. 6) (3).

Nurses in particular should be skilled in cultural competency since they spend most of their working time directly caring for patients with different cultural backgrounds compared to other healthcare professionals with less patient contact (5). Nurses provide care to patients from different cultures and need the ability to understand and respect cultural differences among individuals to provide culturally competent care (3). In other words, culturally competent care is sensitive and meaningful culture-based use of health and care knowledge to coordinate the needs and the usual lifestyles of individuals or groups for acquiring meaningful health and wellbeing or coping with illnesses, disorders, and death (6).

Cerveny et al. (2019) evaluated the nurses´ perception of difficulties in providing culturally competent care across 25 European countries, and found that nurses do not perceive themselves as being adequately prepared to deliver culturally competent care (7). However, adapting practices to respond sensitively to increasingly culturally diverse patients can be challenging. Therefore, the cultural competence among nurses needs to be assessed to evaluate current cultural competence and the need for interventions to improve daily nursing practice. Furthermore, measurement of cultural competence is needed to evaluate the impact of implemented interventions (e.g. cultural competence training) (8, 9). Without a valid and reliable measurement instrument, the effectiveness of cultural competence interventions on

health outcomes cannot be evaluated (10). To find out which instruments are available for the measurement of cultural competence in nurses, we conducted a systematic review of the measurement properties of existing instruments (11). Results of this systematic review showed that various instruments are used, but only a few of them can be recommended for use in daily practice. Most of these instruments cannot be recommended, because some of them can only be used to measure one aspect of cultural competence, as described in recently published studies on the concept of cultural competence (e.g Cultural Sensitivity scale (12), which is used to measure cultural sensitivity among community health nurses), and because they have been insufficiently psychometrically tested (11). One of the instruments that was recommended for use in practice is the Cultural Competence Assessment tool (CCA). The CCA has been tested in several international studies (10, 12-15), showed sufficient validity and reliability and has been used successfully in several studies (16-18).

Conceptual framework

One basic issue that needs to be addressed when considering the instruments used to measure cultural competence is the range of factors to be measured. According to a previously published systematic review of measurement properties, the instruments vary in terms of their complexity regarding the items and factors covered (11). The factors describing cultural competence are usually derived from theories, models, or a concept analysis of cultural competence. The CCA was developed by Doorenbos and Schim (2003) based on their cultural competence model (15). The CCA is a self-report questionnaire, which includes two subscales, cultural awareness and sensitivity (CAS) with 11 items and cultural competence behaviours (CCB) with 14 items. The cultural awareness and sensitivity subscale refers to the professionals' knowledge about differences and similarities of cultural expression. The cultural competence behaviours subscale refers to determining behaviours that are affected by experiences made with culturally diverse people, the level of cultural awareness and the degree of sensitivity toward the self and others (15). The CCA was developed in the USA in English and then translated and modified into the Italian (13), Korean (14), Spanish (15), and Slovak (19) languages. As originally developed, exploratory factor analysis suggests that two factors with 25 items best fit the data (10, 16). A more

recent psychometric evaluation of the translated instrument resulted in the identification of four factors with 25 items (13, 15) or two factors with 16 items (14). An examination of the test-retest reliability showed an adequate correlation of .85 (p = .002), and Cronbach's alphas of .75, .91, and .89 for the Cultural Awareness and Sensitivity subscale, the Cultural Competence Behaviours subscale, and the total scale, respectively (10).

The items are rated on a 7-point Likert scale for the CAS subscale (1 = strongly disagree to 7 = strongly agree) and the CCB subscale (1 = never to 7 = always). Both subscales have an additional answer option, 'no opinion' (on the CCA) and 'not sure' (on the CCB subscale), which do not include a score. Four items on the CAS subscale are negatively phrased and are reverse scored for data analysis. Therefore, the scores can range from 25 to 125 with high scores indicating higher levels of cultural competence. With 25 items, the scale is easy to fill in and takes approximately 10 minutes to complete.

Little is known about the cultural competence of nurses in German-speaking countries, including Austria, as no currently validated tool is available in German to assess this cultural competence.

Aims

This study was carried out to translate and cross-culturally adapt the Cultural Competence Assessment scale in German and to evaluate its psychometric properties (face and content validity, structural validity, internal consistency).

Methods

Design

This is a methodology study with a cross-sectional design. The cross-cultural adaptation and psychometric evaluation of CCA involved a systematic process including six steps and took place in two phases: 1) translation and cross-cultural adaptation and 2) psychometric evaluation (19, 20).

Sample and data collection

Data collection was conducted in March 2021. For evaluation of the psychometric properties of the CCA-G, Austrian nurses and nursing students in the final year of their Bachelor's Degree Programme in Nursing working directly in the care of patients in acute care settings were invited to participate in this study. In Austria, the university, general, geriatric, psychiatric and rehab hospitals are considered as acute care settings. We chose the acute care setting for comparability, since the instrument has only been tested in acute care settings thus far. An email invitation explaining the purpose of the study was sent to the directors of nursing staff in acute care settings. They were politely requested to send the email invitation online to their nursing staff or students in the final year of their Bachelor in Nursing study. Information about the study was also communicated via social media channels (e.g. Facebook) to reach as many potential participants as possible. Participants were informed that their participation is voluntary and that they can refuse to participate or may withdraw from the study at any time. Written informed consent was obtained from all the participants. The questionnaire was filled out online via LimeSurvey. In addition to the CCA-G, participants' baseline demographics (e.g. age, sex) were collected anonymously for the psychometric survey. To fill out the whole questionnaire, participants needed approximately 10 minutes.

Translation, adaptation and psychometric testing process

During translation and adaption of an instrument, validation analyses need to be conducted to ensure that the instrument is equivalent to the original instrument and that results are comparable with other population groups (19). The CCA was translated according to the translation and cross-cultural adaptation guideline from Sousa et al. (2011) (20) and Beaton et al. (2000) (19).

Step 1: Forward translation: After obtaining authorisation to use the CCA from the developer (Professor Ardith Z. Doorenbos), the original CCA in English was forward translated into German by two independent translators (bilingual), whose mother language was German. The first translator was experienced with the construct of cultural competence. The second translator

was knowledgeable about the cultural and linguistic nuances of the target language, but unaware about the construct of the instrument.

Step 2: Synthesis of the Translations: Two translated versions were prepared by both translators and the research team. In this step ambiguities and discrepancies in words, sentences and meanings were discussed within the research team and consensus on one version of the forward translated instrument was reached.

Step 3: Back Translation: Subsequently, the German version of the CCA was back translated into English by two independent translators (native speakers), again with distinct backgrounds. Both translators were blind to the original instrument.

Step 4: Synthesis of the two back translated versions: The instructions, items and response format of the two back translations were compared with the instructions, items and response format of the original instrument regarding format, wording and grammatical structure of the sentences, similarity in meaning and relevance by a research group. The research group included the four translators for forward and back translations and the authors. In this step, a pre-final version of the CCA-German version was derived through consensus within the research group.

Step 5: Expert panel and preliminary testing: An expert panel (n=7) including experts from different fields (nursing researcher (n=1), nursing teacher (n=1), psychologist (n=1), experts in questionnaire development (n=2) and nurses (n=2)) evaluated the clarity of instructions, of the response format and of the items. The expert panel was also used to assess the content validity by calculating the content validity index (CVI).

Preliminary testing was conducted with a convenience sample of 25 nurses, which rated the instructions and items on a 4-point Likert scale (clear, somewhat clear, somewhat unclear and unclear). Furthermore, expert panel and pilot sample were also asked if the instrument looks as though it is an adequate reflection of the construct to be measured (face validity).

Step 6: Psychometric Testing of the CCA-G: Following pilot testing, the CCA-G was adapted according to the results from the expert panel and the pilot test. The adapted CCA-G was tested for its psychometric properties with the target group of nurses. Psychometric analysis focused on testing of

construct (using the confirmatory factor analysis), content validity (content validity index), and internal consistency reliability (McDonald´s Omega). Confirmatory factor analysis (CFA) is a preferable approach for assessing the construct validity if a priori hypotheses about dimensions of the construct are available (21). To conduct the CFA, about 1,000 subjects are needed (22). In a CFA, fit parameters are used to test whether the data fit the hypothesised factor structure. In addition, it is possible to test whether the proposed model is better than alternative models (21). As the original English version of the scale consists of two factors (15), and the translated scales of four factors (12, 14) or two factors with decreased number of items (13), the CFA method was selected as an appropriate analysis method for testing the study's assumptions.

Data analysis

Descriptive statistics were computed utilizing the statistical software IBM SPSS Statistics 26 (23) while confirmatory factor analysis was conducted using R (24) and the package Lavaan (25). The questionnaire was filled out online, and there were no missing data as all questions were mandatory. The item-level content validity index (I-CVI) was used to examine the content validity. Experts on the panel were asked to rate the relevance of each using the 4-point Likert scale (1 = not relevant; 2 = somewhat relevant; 3 = quite relevant; 4 = highly relevant). For each item, the Item CVI was then computed as the proportion in agreement (number of experts giving a rating of 3 or 4, divided by the number of experts).

An I-CVI value of .78 or higher is appropriate (26). Items with an I-CVI value of less than 0.78 should be revised or eliminated (26). For testing of construct, validity confirmatory factor analysis (CFA) using R package Lavaan was performed. We evaluated the goodness-of-fit using the x2/df ratio, comparative fit index (CFI), Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA) and the standardised root mean square residual (SRMR). The CFA has been performed using the maximum likelihood (ML) estimation method. The model fit is considered good if the CFI is close to 0.95 or higher, the TLI is close to 0.95 or higher, the RMSEA is close to 0.06 or lower, and the SRMR is close to 0.08 or lower (27). To test the reliability of the scale, the internal consistency of a second-level factor, McDonald´s Omega (≥ .80), was calculated (28). To test whether differences could be

detected between the mean score and age, gender, working experience and profession, we performed an analysis of variance (ANOVA). The statistical significance was determined to be $p < .05$.

Results

Overall, 1,190 nurses participated in this study. Out of the 915 nurses who completed the questionnaire, most of them were female (80.6%) with a mean age of 43 (±11). The majority of the nurses had already worked for over ten years in nursing practice. An overview of the characteristics of the participants is given in Table 1.

Table 1 General characteristics of the study participants

Variable	Total Sample *N* = 915
Age in years (Mean (*SD*))	43 (10.934)
Sex	
Female	80.6%
Male	17.1%
No indication	2.3%
Education	
In education	7.1%
Nurse	59.9%
Nurse with additional qualifications	33.0%
Years of professional experience	
< 5 years	14.8%
5 – 10 years	14.4%
> 10 years	70.8%

SD standard deviation

Phase 1: Translation and cross-cultural adaptation

The translated CCA-G was assessed for content validity by an expert panel. Two of the 25 items had an I-CVI of .71 (Aspects relating to cultural diversity need to be surveyed for each individual and each group; and I document adaptations that I make for clients when providing direct nursing services) and were deleted from further testing. In the next step, the CCA-G was adapted according to recommendations from the expert panel. As a result,

we changed the word individuals to clients and health services to nursing care services. Because of difficulties with the meaning of the word race in German-speaking countries, instead we used the word ethnicity in the first item. Two of the items considered cultural aspect in individual, group and organisation, but after interviews with the expert panel and discussion with the research group, the word organisation was deleted. In the original questionnaire, items were rated on a 7-point Likert scale and in line with the results from the expert panel, we reduced it to a 5-point Likert scale. Following adaptation according to the recommendations of the expert panel, the preliminary test was conducted with 25 nurses. Results from the pilot testing showed that three of the items were not understandable (Ethnicity is the most important factor in determining a person's cultural background; I include a cultural assessment when I evaluate individuals; and I document cultural assessments when I provide client services) and were excluded from further testing. Once the final adaptation was completed, the back translated CCA-G was sent to the instrument's developer. She agreed that the CCA-G was accurately translated and can be used in acute care settings. An additional figure file shows the process of translation and cross-cultural adaptation in more detail [see Additional File 1].

Phase 2: Psychometric testing

Construct validity

After phase one, five items were deleted and 20 items were used for psychometric testing. Next, confirmatory factor analysis was conducted. As responding to each item was compulsory, no missing data were obtained. The CFA was performed using a one-factor model, a two-factor model and a three-factor model (Table 2).

Table 2 Results of factor analysis testing

Factor structure	X^2/df (*p*)	CFI	TLI	RMSEA (90% CI)	SRMR
One factor (17 items)	7.71 ($p < .000$)	.761	.726	.092 (.087 - .098)	.067
Two factor (17 items)	7.52 ($p < .000$)	.802	.772	.084 (.079 - .090)	.059
Three factors (17 items)	4.28 ($p < .000$)	.880	.859	.066 (.061 - .072)	.053
Two factors (16 items) [a]	6.52 ($p < .000$)	.802	.772	.084 (.079 - .090)	.059
Two factors (14 items)	**3.16 ($p < .000$)**	**.923**	**.908**	**.055 (.049 - .062)**	**.039**

[a] Korean Version

The model fit indicated that the two-factor model with 14 items provided an acceptable fit (X^2/df = 3.16; CFI = .923; TLI = .908; RMSEA = .055 (.049 - .062) and SRMR = .039). Table 3 gives an overview of the items in English and German and their descriptive statistics.

Table 3 Overview of the Items and their descriptive statistics

Item	English items	Mean *(SD)*	Skewness	Kurtosis	German items
CA 2	Spiritual and religious beliefs are important aspects of many cultural groups.	4.23 (.79)	-1.08	1.52	Spirituelle und religiöse Überzeugungen sind wichtige Aspekte vieler kultureller Gruppen.
CA 3	Individuals can identify with more than one cultural group.	4.05 (.95)	-.89	.41	Einzelne Personen können sich mit mehr als einer kulturellen Gruppe identifizieren.
CA 4	I believe that everyone, regardless of their cultural heritage, should be treated with respect.	4.92 (.38)	-6.35	48.61	Ich glaube, dass jede Person, unabhängig von der kulturellen Herkunft, mit Respekt behandelt werden sollte.
CA 5	I understand that people from different cultures can define the concept of “healthcare” in different ways.	4.47 (.80)	-1.70	2.96	Ich verstehe, dass Personen aus verschiedenen Kulturen das Konzept der „Gesundheitsversorgung“ auf unterschiedliche Weise definieren können.
CA 6	I think that my knowledge about different cultural groups can help me in my work with individuals, families and groups.	4.44 (.78)	-1.54	2.65	Ich denke, dass mein Wissen über verschiedene kulturelle Gruppen in meiner Arbeit mit Personen, Familien oder Gruppen mich unterstützen kann.

CCB 7	I seek information about cultural needs when I meet new people at my work or educational institution.	3.02 (1.08)	-.21	-.61	Ich suche nach Informationen zu kulturellen Bedürfnissen, wenn ich mit neuen Personen in meiner Arbeit oder Ausbildungsstätte in Kontakt trete.
CCB 8	I have access to textbooks and other materials that help me learn more about people from different cultures.	2.53 (1.27)	.35	-.96	Ich habe Lehrbücher und andere Quellen zur Verfügung, die mir helfen, über Personen aus verschiedenen Kulturen zu lernen.
CCB 11	I ask people to tell me about their expectations regarding nursing care services.	3.36 (1.16)	-.42	-.61	Ich bitte Personen, mir von ihren Erwartungen an die pflegerischen Leistungen zu erzählen.
CCB 12	I avoid using generalisations to apply stereotypes to groups of people.	4.14 (.78)	-.92	1.29	Ich vermeide es, Verallgemeinerungen zu verwenden, um Gruppen von Personen zu stereotypisieren.
CCB 13	I recognize potential barriers to healthcare services that different people might encounter.	3.64 (.69)	-.55	1.01	Ich erkenne potenzielle Barrieren in Bezug auf pflegerische Leistungen, auf die verschiedene Personen stoßen könnten.
CCB 14	I remove barriers regarding nursing services affecting people from different cultural backgrounds, when I identify them.	3.86 (.84)	-.56	.35	Ich beseitige Barrieren in Bezug auf die pflegerischen Leistungen von Personen aus verschiedenen Kulturen, wenn ich diese erkenne.

CCB 15	I remove barriers for people from different cultures, when they tell me about them.	3.84 (.84)	-.59	.55	Ich beseitige Barrieren, wenn mir Personen aus unterschiedlichen Kulturen davon erzählen.
CCB 16	I gladly accept feedback from clients on how I relate to people from different cultures.	4.33 (.85)	-1.45	2.35	Ich nehme Rückmeldungen von Klient*innen, wie ich mit Personen aus unterschiedlichen Kulturen umgehe, gerne an.
CCB 17	I find possibilities to adapt my nursing services to fit the cultural preferences of individuals and groups.	3.60 (.85)	-.69	.739	Ich finde Möglichkeiten, meine pflegerischen Leistungen an kulturellen Vorlieben einzelner Personen und Gruppen anzupassen.

As presented in Figure 1, all of the 14 remaining items significantly loaded onto the factors and the item loadings ranged from .304 to .709.

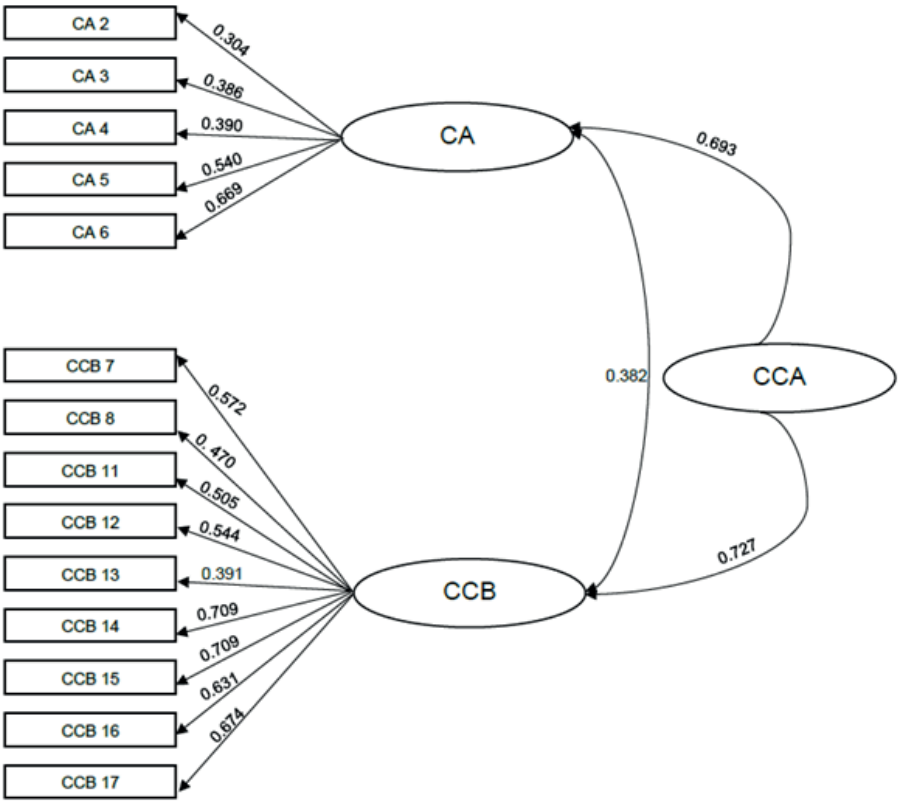


Figure 1 Two-factor CFA model

Internal consistency

The two-factor model obtained an acceptable internal consistency for the entire scale (Omega .87). The Omega for the second-level factor CA was .81 and for CCB, it was .76.

Analysis of variance

The results of the ANOVA show that the means are similar among the gender categories (Table 4). The Welch Test for Unequal Variances showed that

means of cultural competence are different in the three groups of gender (F (2,49) = 5.896; p = .044). However, the Games-Howell nonparametric post-hoc test results revealed no statistical difference between the gender categories. We then tested for significant differences between the age groups. The Welch Test results show that significant differences between the groups exist (F (3,478) = 7.962; p < .000) and, specifically, a difference between the age group of 54 – 64 and the other three groups (p < .000). No differences were found between variances in profession (F (2,168) = 2.648; p = .081) and working experience (F (2,234) = 1.39; p = .240).

Table 4 Descriptive statistics among mean score of gender, profession, working experience and age groups

	N	Mean	*SD*	*E*	95% CI		Min.	Max.
					Min. limit	Max. limit		
Gender								
Female	735	54.76	6.24	.23	54.31	55.21	33.00	68.00
Male	156	53.47	8.01	.64	52.21	54.74	25.00	67.00
No indication	21	50.62	10.16	2.22	45.99	55.24	32.00	70.00
Profession								
In education	64	53.81	7.15	.89	52,03	55.59	35.00	66.00
Nurse	542	54.16	6.54	.28	53,61	54.71	27.00	70.00
Nurse with additional qualifications	299	55.19	6.81	.39	54.42	55.97	25.00	68.00
Working experience								
< 5 years	132	55.26	6.38	.55	54.16	56.36	34.00	68.00
5 – 10 years	129	53.91	7.01	.62	52.69	55.13	27.00	68.00
> 10 years	632	54.43	6.71	.27	53.91	54.96	25.00	70.00
Age groups*								
21 - 31 years	189	53.94	6.52	.47	53.00	54.87	34.00	68.00
32 - 42 years	230	53.23	7.17	.47	52.30	54.17	27.00	68.00
43 - 53 years	299	54.41	6.74	.39	53.64	55.18	25.00	70.00
54 - 64 years	192	56.31	5.92	.43	55.47	57.15	37.00	67.00

SD Standard Deviation; E standard Error; CI Confidence Interval; * p < .05;

Discussion

Duo to a growing culturally and ethnically diverse population in Austria, the cultural competence of nurses has become an important competence in daily nursing practice. The aim of this study was to translate, adapt and psychometrically test the Cultural Competence Assessment (CCA) scale to provide a CCA-German version. Cultural competence is a complex concept that involves self-awareness and awareness of others, relationship development and skilful application of knowledge and skills (15). To test the construct validity, confirmatory factor analysis was chosen as this is a highly recommended type of analysis used for translating or adapting an existing questionnaire (21). Previous studies on CCA confirmed two factors (CAS and CCB) through EFA (10, 15) and CFA (13). However, in this study, the original two-factor model (10) or two-factor model including 16 items as seen in the Korean version (13) did not fit the model. In contrast to other studies testing the CCA, we deleted five items regarding cultural assessment during the face and content validity testing within an expert group and pilot test. This can be explained through the fact that cultural assessment is not part of nursing assessment in acute healthcare settings in Austria and therefore these items could not be answered correctly. In original scale the cultural awareness and sensitivity subscale consists of cultural awareness and sensitivity items, whereby items on cultural sensitivity were negatively worded and difficult to answer. Negatively worded items on a scale are used to avoid agreement bias. However, these items are not always appropriate as they are difficult to answer and may lead to confusion on the part of participants (21). Given that concern, we deleted the negatively scored items. Similar to the Korean Version we were able to improve the model fit by deleting negatively worded items (13). Following deletion of negatively scored items and items with low loadings, the two-factor CCA- G with 14 items produced a good model fit. To support construct validity, an analysis of variance was applied to test the interrelations among the cultural competence means and socio-demographic variables. The results show significant differences between the age groups, and especially between the age group of 54 – 64 as compared to other three younger age groups. One possible explanation for this difference is that nurses over 54 years of age are influenced by the length of their professional practice and experience in the care of patients with different cultural backgrounds.

The internal consistency of the entire scale as well as for the cultural awareness subscale was good. For the cultural competence behaviour subscale, the internal consistency was lower but still acceptable. The cultural competence behaviour subscale was a clear and a strong factor (10), as indicated by consistently strong factor loadings for items on this subscale. We removed the word sensitivity from this subscale as all *sensitivity* items were deleted.

Given the fact that the German version of the CCA includes only 14 items in two factors and the fact that the CFA was not tested with the same number of items as the original CCA, it should be considered whether this scale can still be used to assess cultural competence or possibly only cultural competence behaviour as an attribute of cultural competence. Cultural competence behaviour is the ability of an individual to demonstrate certain behaviour in practice and can be used to measure the observable outcomes of diversity experience, increased awareness and refinement of sensitivity (10).

In a recently published concept analysis, Sharifi et al. (2019) defined cultural awareness, cultural knowledge, cultural sensitivity, cultural skill, cultural proficiency and dynamicity as defining attributes of the concept of cultural competence (3). Shen (2015) found that sensitivity, awareness, knowledge and skill are the key elements of cultural competence, and constitute the domains or subscales in the majority of assessment instruments and cultural competence models (8). Many existing questionnaires, however, measure only one or only certain attributes of cultural competence (e.g. awareness, knowledge, skill, or sensitivity), and are thus not recommended as they can only offer incomplete measures of cultural competence (11). Although the original CCA scale is based on the cultural competence model, which consists of four attributes (cultural diversity, cultural awareness, cultural sensitivity and cultural competence behaviours) (15), the German version of this scale should rather be used to measure cultural competence behaviour. Cultural competence has been consistently recognised as a dynamic, continuous and developing process (3, 8). As a part of the cultural competence construct, behaviour can contribute to this ongoing process.

Strengths and limitations

This study has several methodological strengths. During the adaptation and preliminary testing, we included a large number of experts in different phases of testing. Additionally, the construct validity was validated using CFA, which is known to be a complex form of analysis (26). The study sample was large - for the psychometric testing we were able to use the results from 915 fully completed questionnaires.

This study is limited by the convenience sample and the fact that it consisted only of nurses who worked in acute care settings. Further studies including nurses from different healthcare settings are necessary. Another limitation of this study is the fact that we collected our data in two different ways, i.e. via an invitation sent out by e-mail to the directors of nursing staff in acute care settings and via a link shared on social media. The link to the online questionnaire was the same in both cases. Potential differences depending on the data collection could arise, since it was not possible to stratify the sample. Because > 80% of the study sample consisted of female participants, the results may not be generalizable. However, the analysis of variance results did not reveal any statistical difference in the cultural competence means between gender groups. Results of factor analysis testing showed that three items on the cultural awareness subscale had item loadings lower than .40. Cultural competence behaviour is based on the results of contact experience with culturally diverse patients and improvement of awareness. Since cultural awareness leads to the nurses´ capability to engage in cultural competence behaviour, we recognize the theoretical importance of these three items and retained them in the CCA-G despite lower item loadings.

Like other instruments used to assess cultural competence, the CCA-G is also limited by the fact that it is a self-report method of evaluation. Self-report instruments are subjective and, due to the effect of the social-desirability bias, participants may give a socially appropriate answer that does not reflect their true beliefs. The additional use of qualitative methods to evaluate the nurses´ cultural competence would be valuable.

Conclusion

Currently, there is no instrument in German, which can be used to assess the cultural competence of nurses. One step towards closing this gap is our instrument, which can be used to assess cultural competence behaviour as an attribute of cultural competence. The 14-item CCA-G showed strong construct validity and acceptable internal consistency. The CCA-G can be applied in surveys and to identify levels of cultural competence behaviour among nurses in German-speaking countries when evaluating nursing competencies. Furthermore, the shortness of this questionnaire makes its application highly feasible in healthcare settings. Further research with repeated measures could determine the CCA-G´s sensitivity and indicate if the tool is applicable in other healthcare settings and for other healthcare professionals. Furthermore, we recommend developing a culture-based instrument in an exploratory mixed-method study, taking a qualitative approach to generate items. Additionally, ongoing research should be conducted to find an instrument that can be used to assess the cultural competence of nurses in German-speaking countries.

References

(1) WHO. Report on the health of refugees and migrants in the WHO European Region. 2018.

(2) Casillas A, Paroz S, Green AR, Wolff H, Weber O, Faucherre F, et al. Cultural competency of health-care providers in a Swiss University Hospital: self-assessed cross-cultural skillfulness in a cross-sectional study. BMC Med Educ. 2014;14:19.

(3) Sharifi N, Adib-Hajbagheryb M, Najafic M. Cultural competence in nursing: A concept analysis. Int J Nurs Stud. 2019;99.

(4) Jongen C, McCalman J, Bainbridge R. Health workforce cultural competency interventions: a systematic scoping review. BMC Health Serv Res. 2018;18(1):232.

(5) Ghiyasvandian S, Zakerimoghadam M, Peyravi H. Nurse as a facilitator to professional communication: a qualitative study. Glob J Health Sci. 2014;7(2):294-303.

(6) Alligood MR. Nursing theories and their work. United States of America: Elsevier; 2014.

(7) Červený M, Siaki L, McGee P, Kilíková M. Perception of European nurses of culturally-appropriate health care - a cross-sectional study. Med Og Nauk Zdr. 2019;25(1):27-32.

(8) Shen Z. Cultural competence models and cultural competence assessment instruments in nursing: a literature review. J Transcult Nurs. 2015;26(3):308-21.

(9) Jongen CS, McCalman J, Bainbridge RG. The Implementation and Evaluation of Health Promotion Services and Programs to Improve Cultural Competency: A Systematic Scoping Review. Front Public Health. 2017;5:24.

(10) Doorenbos AZ, Schim SM, Benkert R, Borse NN. Psychometric evaluation of the cultural competence assessment instrument among healthcare providers. Nurs Res. 2005;54(5):324-31.

(11) Osmancevic S, Schoberer D, Lohrmann C, Großschädl F. Psychometric properties of instruments used to measure the cultural competence of nurses: A systematic review. Int J Nurs Stud. 2021;113:103789.

(12) Caricati L, Dicembrino RB, Gionti L, Petre L, Ungurean L. Cultural Competence Assessment Instrument: Initial Italian validation and proposed refinement. Acta Biomed. 2015;86 Suppl 2:142-9.

(13) Chae D, Kang KH, Benkert R, Doorenbos AZ. Evaluation of the psychometric properties of the Korean version of the Cultural Competence Assessment. Jpn J Nurs Sci. 2018;15(1):56-66.

(14) Raigal-Aran L, Ferré-Grau C, Belzunegui-Eraso A. The Spanish version of the Cultural Competence Assessment (CCA-S): Transcultural validation study and proposed refinement. Nurse Educ Today. 2019;72:47-53.

(15) Schim SM, Doorenbos AZ, Miller J, Benkert R. Development of a Cultural Competence Assessment instrument. J Nurs Meas. 2003;11(1):29-40.

(16) Cicolini G, Della Pelle C, Comparcini D, Tomietto M, Cerratti F, Schim SM, et al. Cultural Competence Among Italian Nurses: A Multicentric Survey. J Nurs Scholarsh. 2015;47(6):536-43.

(17) Schim SM, Doorenbos AZ, Borse NN. Enhancing Cultural Competence Among Hospice Staff. Am J Hosp Palliat Care. 2006;23(5):404-11.

(18) Červený M, Dimunová L, Della Pelle C, Papp K, Siaki LLA, Kilíková M, et al. Self-Reported Cultural Competence of Nurses Providing Nursing Care in Slovakia. J Nurs Scholarsh. 2020;52(6):705-12.

(19) Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine 2000;25(24):3186-91.

(20) Sousa VD, Rojjanasrirat W. Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: a clear and user-friendly guideline. J Eval Clin Pract. 2011;17(2):268-74.

(21) de Vet HCW, Terwee CB, Mokkink LB, Knol DL. Measurement in Medicine: A Practical Guide. Cambridge: Cambridge University Press; 2011.

(22) Prinsen CAC, Mokkink LB, Bouter LM, Alonso J, Patrick DL, de Vet HCW, et al. COSMIN guideline for systematic reviews of patient-reported outcome measures. Qual Life Res. 2018;27(5):1147-57.

(23) IBM Corp. Released. IBM SPSS Statistics for Windows Version 26.0. NY: IBM Corp; 2019.

(24) Team RC. A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. 2021.

(25) Rosseel Y. lavaan: An R Package for Structural Equation Modeling. Journal of Statistical Software. 2012;48(2):1 - 36.

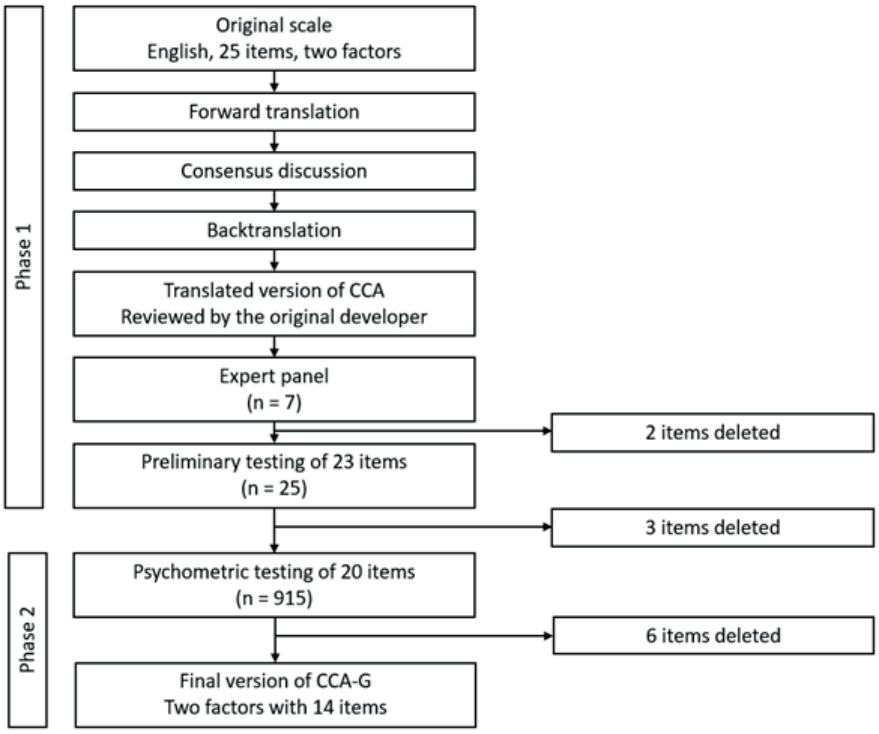
(26) Polit DF, Beck CT. Nursing Research: Generating and Assessing Evidence for Nursing Practice: Wolters Kluwer; 2021.

(27) Hu Lt, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal. 1999;6(1):1-55.

(28) Feißt M, Hennigs A, Heil J, Moosbrugger H, Kelava A, Stolpner I, et al. Refining scores based on patient reported outcomes – statistical and medical perspectives. BMC Med Res Methodol. 2019;19(1):167.

Supplementary File 1

The process of translation and cross-cultural adaptation



Chapter 5

Cultural competence among nursing students and nurses working in acute care settings: a cross-sectional study

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Abstract

Background

The increasing cultural diversity in healthcare in European countries, including Austria, has highlighted the need to enhance nurses' cultural competence. Assessing cultural competence and identifying relevant influencing factors can help to improve culturally competent care. The aim of this study was to assess the cultural competence of nurses and nursing students working in Austrian acute care settings and to identify influencing factors using the Cultural Competence Assessment scale.

Methods

A cross-sectional design was used. Data collection was carried out in March 2021 with nurses and nursing students in the last year of their studies who were working in Austrian acute care settings. Descriptive analysis was applied to display the general characteristics of the study participants and the levels of their overall cultural competence. A multiple linear regression analysis was conducted to analyze the influencing factors of cultural competence.

Results

The nurses' cultural competence level was moderate to high (mean = 3.89; $SD = .48$). Their age, educational level, cultural diversity training and self-perceived cultural competence significantly influenced the level (F (6, 875) = 18.971, $p < .0000$, adj. $R^2 = 1.09$).

Conclusions

Providing culturally competent healthcare services for culturally diverse patients is essential for all healthcare professionals, and especially for nurses who spend the most time with patients. Effective interventions, such as educational training, need to be implemented in order to deliver culturally competent care and potentially reduce disparities in healthcare and improve patient outcomes.

Keywords: Cultural competence, Nurses, Nursing students, Influencing factors, Acute care, Cross-sectional study

Background

The increasing cultural diversity in healthcare in European countries, including Austria, has highlighted the need to enhance nurses' cultural competence (1). Cultural competence has been defined as "the dynamic process of acquiring the ability to provide effective, safe, and quality care to the patients through considering their different cultural aspects" (2). Healthcare professionals need to understand and respect cultural differences and provide culturally competent care to demonstrate such competence (3). Cultural competence has been identified as an important factor in reducing disparities in healthcare and improving patient outcomes (e.g., patient satisfaction) (4). Culturally competent care is sensitive to the cultural implications of this care. It involves the meaningful, culture-based use of health and care knowledge to coordinate the needs of individuals or groups and helps them to acquire good health and well-being or to cope with illnesses, disorders, and death (5). Studies have shown that nurses providing culturally competent nursing care have the potential to improve the quality of care (3, 4), to heighten patient satisfaction, and to challenge racism in healthcare (6), all of which leads to better health outcomes (e.g., treatment adherence) in patients from a diversity of cultural backgrounds (7). Nurses with high levels of cultural competence can establish more effective communication with patients, which, in turn, can help in the development of appropriate treatments (8).

In 2021, 17.1% of the Austrian population was represented by people with a migrant background. The largest migrant group was Germans, followed by Romanians, Hungarians, and Croatians (9). As the number of people with different cultural backgrounds in Austria has increased, the cultural diversity in the Austrian healthcare system has also increased. Despite the demonstrated importance of exhibiting cultural competence in terms of improving patient outcomes and nursing competencies, nurses working in the European countries of Germany, Czech Republic, Hungary, Slovakia, and Poland do not generally perceive themselves as culturally competent (10). Most of the nurses (70.6%) indicated that they faced challenges while providing nursing care for patients with different cultural backgrounds. The main challenges mentioned were differences in language, religion, and a lack of cultural knowledge (10). These findings show that assessments of and improvement in nurses' cultural competence is necessary in Austria. Furthermore, by as-

sessing and identifying various factors that influence cultural competence, researchers and healthcare professionals can design focus interventions (e.g., cultural diversity training programs) to meet the nurses' needs (8). The research on cultural competence in Austrian nurses, however, is still limited. Although some international studies have been carried out to investigate factors that influence cultural competence, these findings cannot be generalized to Austrian nurses due to a lack of evidence (8, 11). In their study, Lin et al. (2021) found that cultural competence education acquired in nursing school has no influence on the cultural competence of registered nurses, but does seem to have an influence on pre-graduate nursing students (11). Another study shows that nurses who are older and have received prior diversity training exhibit significantly higher levels of cultural competence (12). These findings indicate that the assessment of Austrian nurses' cultural competence and the identification of factors that influence this competence can help researchers and healthcare professionals to develop coherent interventions and to improve culturally competent care.

To our knowledge, no study has previously been carried out to assess the cultural competence of Austrian nurses with a psychometrically tested instrument. This study, therefore, was conducted to assess the cultural competence of nurses and nursing students working in Austrian acute care settings and to identify influencing factors.

Methods

Design

This cross-sectional study was conducted in March 2021 in Austrian acute care settings.

Sampling method and data collection

Austrian nurses and nursing students in the last year of their studies who provided direct care for patients in acute care settings were invited to complete the questionnaire. We wanted to reach as many nurses as possible, and since the highest number of nurses work in acute care settings in Austria, we chose this setting for our research project. The researchers initially sent

an invitation via e-mail to the directors of nursing staff in all Austrian acute care institutions and universities of applied sciences, explaining the purpose of the study. The recipients were politely requested to forward the e-mail invitation with the link to the online questionnaire to their nursing staff or nursing students. After two weeks, a reminder was sent out. Data collection was carried out online with LimeSurvey, a free and open source on-line statistical survey web application, in March 2021. We also shared information about the study via Facebook in order to reach as many nurses as possible. The survey enabled the application of the German version of the previously validated Cultural Competence Assessment scale (CCA-G) (13) and the collection of baseline demographics for these nurses and nursing students (age, gender, educational level). In addition, based on a survey of the literature (8, 12, 14, 15), we included specific questions to determine the number of years the nurses/students had worked, if they were multilingual, if they had taken part in a diversity training program, if they had conducted a stay broad, if they had a migrant background, and their self-perceived cultural competence level. Persons of migration background were defined as persons whose parents were both born abroad. We distinguished further between first-generation and second-generation migrants. First-generation migrants are persons born abroad whose parents were also born abroad. Second-generation migrants are nationals born in the respective country whose parents were born abroad (16).

Instrument

To assess the cultural competence level, we used the German version of the previously validated Cultural Competence Assessment scale (CCA-G) (13). The self-reported CCA has been translated and been psychometrically tested in various languages (Italian, Spanish, Korean, and Slovakian). It has been found to be a reliable and valid instrument for the assessment of cultural competence in healthcare (12, 14, 17, 18). The original CCA scale (19) was developed in the USA on the basis of the Cultural Competence Model developed by Schim and Miller. This scale consists of 25 items assigned to two subscales: cultural awareness and sensitivity (CAS) and culturally competent behavior (CCB). Cultural awareness refers to the professionals' knowledge of differ¬ences and similarities between examples of cultural expression. Cultural competence behaviors refer to determining behaviors that are affect-

ed by diversity experiences made with culturally diverse people, cultural awareness, and sensitivity to the self and others (19). The modified CCA-G consists of 14 items assigned to two subscales: cultural awareness and cultural competence behavior. The cultural awareness subscale consists of five items; these can be rated on 5-point Likert scale with answers ranging from totally agree to totally disagree. The cultural competence behavior subscale consists of nine items; these can be rated on a 5-point Likert scale with answers ranging from always to never. Higher scores indicate higher levels of cultural competence. The additional question about self-perceived cultural competence can be rated on a 5-point Likert scale, with answers ranging from very incompetent to very competent. Higher scores indicate higher levels of cultural competence.

Data analysis

Data were analyzed using the statistical software program IBM SPSS Statistics 26 (20). A descriptive analysis was performed to display the general characteristics of the study participants and the levels of their overall cultural competence with respect to the two subscales. Continuous variables were described as mean values and standard deviations, and categorical variables as frequencies and percentages. For the univariate analysis, Spearman's rank correlation coefficient was used to measure the relationship between cultural competence and the continuous variables. The Mann-Whitney *U* test and Kruskal-Wallis test were performed to measure the relationship between cultural competence and categorical variables. The linearity of the continuous variable with respect to the logit of the dependent variable was assessed by applying the Box-Tidwell procedure, which adds an interaction term between the continuous independent variables and their natural logs to the regression equation. The independence of residuals was assessed by applying the Durbin-Watson statistic (range from 0 to 4; a value of approximately two indicates that no correlation exists between the residuals). Studentized residual values were used to detect outliers (values greater than three can be treated as outliers). Multicollinearity was recognized to occur if the variance inflation factors (VIF) were under four. After testing the assumptions for linear regression, a multiple linear regression analysis was conducted using an enter procedure to predict the dependent variable, i.e., the dependence of cultural competence on influencing factors identified

by univariate analysis. Age, educational level, migrant background, multilingual ability, cultural diversity training experience, and self-perceived cultural competence were included as independent variables. Statistical significance was determined as $p < .05$.

Results

Overall, 915 nurses and nursing students completed the questionnaire. Most of these were female (80.6%) with a mean age of 43 (±10.93). Most of the nurses had already worked for more than ten years in nursing practice (70.8%). About one-third of the nurses described themselves as neither culturally competent nor incompetent (29.7%), and only a few nurses felt somewhat culturally incompetent (3.3%) or very incompetent (0.3%). Almost half of the nurses described themselves as culturally competent when providing nursing care (48.4%). An overview of the participants' characteristics is given in Table 1.

Table 1 Characteristics of the study participants

Variable	Total sample *N* = 915
Mean age in years (*SD*)	43 (10.93)
Female (%)	80.6%
Education (%)	
• Nursing student (in an education program)	7.1%
• Nurse	59.9%
• Nurse with additional qualifications	33.0%
• Bachelor's degree	44.6%
• Diploma/Master's degree	55.1%
• PhD	0.4%
Years of professional experience (%)	
• < 10 years	29.2%
• > 10 years	70.8%
Cultural diversity training (%)	48.5%
Multilingualism (%)	54.5%

Migrant background (%)	13.0%
• First generation	64.0%
• Second generation	36.0%
Self-perceived cultural competence (%)	
• Very incompetent	0.3%
• Somewhat incompetent	3.3%
• Neither competent nor incompetent	29.7%
• Somewhat competent	48.4%
• Very competent	18.3%

SD standard deviation

Overall, the nurses' level of cultural competence with regard to their CCA-G scores was moderate (mean = 3.89; *SD* = .48). The nurses´ responses showed that they had a high level of cultural awareness (4.42 ± .45). The highest-rated awareness item was "I believe that everyone, regardless of their cultural heritage, should be treated with respect" (4.92 ± .38). Responses collected regarding the cultural behavior subscale showed that the nurses exhibited a moderate level of culturally competent behaviors (3.59 ± .59). The highest-rated behavior item was "I gladly accept feedback from clients on how I relate to people from different cultures" (4.33 ± .85), and the lowest-rated was "I have access to textbooks and other materials that help me learn more about people from different cultures" (2.53 ± 1.27) (Table 2).

Table 2 Cultural Competence item means of the CCA-G

Cultural Competence items	**Mean *(SD)***
Cultural Awareness	**4.42 (.45)**
Spiritual and religious beliefs are important aspects of many cultural groups.	4.23 (.79)
Individuals can identify with more than one cultural group.	4.05 (.95)
I believe that everyone, regardless of their cultural heritage, should be treated with respect.	4.92 (.38)
I understand that people from different cultures can define the concept of "health care" in different ways.	4.47 (.79)
I think that my knowledge about different cultural groups can help me in my work with individuals, families, and groups.	4.44 (.78)

Cultural Competence Behavior	**3.59 (.59)**
I seek information about cultural needs when I meet new people at my work or educational institution.	3.02 (1.08)
I have access to textbooks and other materials that help me learn more about people from different cultures.	2.53 (1.27)
I ask people to tell me about their expectations regarding nursing care services.	3.36 (1.16)
I avoid using generalizations to apply stereotypes to groups of people.	4.14 (.78)
I recognize potential barriers to healthcare services that different people might encounter.	3.64 (.69)
I remove barriers regarding nursing services affecting people from different cultural backgrounds, when I identify them.	3.86 (.84)
I remove barriers for people from different cultures, when they tell me about them.	3.84 (.84)
I gladly accept feedback from clients on how I relate to people from different cultures.	4.33 (.85)
I find possibilities to adapt my nursing services to fit the cultural preferences of individuals and groups.	3.60 (.85)

SD standard deviation

Factors influencing cultural competence

A multiple regression analysis was conducted to identify which of the factors age, educational level, migrant background, multilingual ability, cultural diversity training experience, and self-perceived cultural competence influenced the cultural competence of nurses. The assumptions of linearity, independence of errors, homoscedasticity, unusual points, and normality of residuals were met. The multiple regression analysis results show that four of these factors (age, educational level, cultural diversity training experience, and self-perceived cultural competence) were identified as factors that influenced cultural competence. These variables statistically significantly influenced cultural competence, F (6, 875) = 18.971, p < .0000, adj. R^2 = 1.09, (Table 3). The regression analysis results show that older nurses who held an undergraduate degree or had completed higher education, participated in a diversity training program, and perceived themselves as somewhat or very culturally competent tended to have higher cultural competence levels.

Table 3 Influencing factors for cultural competence

Independent variables	B	Std. Error	Beta	*p*-value	VIF
(Constant)	48.924	2.331		.000	
Age	.048	.021	.078	.020	1.109
Educational level	.749	.373	.064	.045	1.011
Cultural diversity training experience	-2.000	.449	-.149	.000	1.109
Multilingual ability	-.671	.458	-.050	.144	1.148
Migrant background	-.849	.665	-.043	.202	1.108
Self-perceived cultural competence	1.940	.283	.225	.000	1.072

B = unstandardized regression coefficient; *SEB* = Standard error of the coefficient; *Beta*=standardized coefficient; *CI* = Confident interval; *p*-value = significance level

Discussion

Assessing nurses' cultural competence is of primary importance in countries like Austria, where ethnic and cultural diversity is growing rapidly and, therefore, is being increasingly encountered by professionals working in the healthcare sector. This study provides the first insights into the cultural competence levels of Austrian nurses and nursing students working in acute care settings. Overall, the participants' cultural competence level was moderate to high, and participants showed high levels of cultural awareness (mean = 4.42; *SD* = .45) as well as a moderate level of cultural competence behavior (mean = 3.59; *SD* = .59). Our results are comparable with results from studies performed in two neighboring states, Italy and Slovakia, where the authors used the same instrument to assess cultural competence in nurses (12, 21). Nurses who exhibit high levels of cultural awareness generally have the ability to recognize differ¬ences and similarities of cultural expression, but also to display an open attitude toward and respect for cultural differences. These abilities are essential for achieving cultural competence in practice (19, 22). The implementation of cultural assessment in the workplace, asking patients about their needs and expectations for care, adapting interventions to respect cultural practices, and seeking additional information and resources are all hallmarks of cultural competence (22). The moderate level of cultural competence behavior among nurses identified in this study indicates that Austrian nurses are still restricted in their abilities to assess and address culturally needs in their daily practice.

In our study, the nurses' self-perceived cultural competence levels were higher than those reported by nurses in Italy (21) and Slovakia (12). While in Austria, 66.7% of the participants felt somewhat or very culturally competent, only 62% of Slovakian nurses (12) and 44% of Italian nurses (21) described themselves as somewhat or very culturally competent. However, when these levels are compared with those reported from countries like the United States, where cultural competence has been taught and encouraged in the nursing practice for decades, the self-perceived cultural competence in European countries still seems to be low. The study by Doorenbos et al. (2016) clearly demonstrates this, where 92.7% of the participants reported that they felt either somewhat competent or very competent (23).

Factors influencing cultural competence

Multiple regression analysis results show that age, educational level, previous cultural diversity training experience, and self-perceived cultural competence significantly influenced the level of cultural competence among nurses. The data analysis results show that about a half of the nurses who had participated in cultural diversity training events or programs showed higher scores on the CCA-G. According to the Cultural Competence Model, our results suggest that the more training nurses receive, the more frequently they practice culturally competent behaviors. These findings agree with those from several other studies (8, 11, 19, 23) which found that prior diversity training influenced cultural competence levels, indicating that cultural competence training might help to support nurses when caring for patients with different cultural backgrounds. However, Cicolini et al. (2015) and Cerveni et al. (2020) found that prior diversity training did not influence cultural awareness; instead, their findings indicated that it influenced the cultural competence behavior subscale (12, 21). Developing nurses' cultural competence by offering specific education should be recognized as a priority because nurses work closely with people in increasingly diverse healthcare settings (24). However, much critique has been expressed, particularly about educational training not being up to date and leading to stereotyping. Cultural competence training programs should be based on accepted educational theories and theories that explain the development of cultural competence. Furthermore, training programs should be developed to emphasize patient-centered care, to support the nurses' ability to treat the patients

as individuals, and to encourage them to reflect on their own cultural backgrounds (24). Beside educational programs, organizational approaches need to be developed and applied to improve cultural competence, considering cost factors and aspects related to individual and organizational contexts (25). Previous studies have shown that healthcare facilities must provide ongoing educational programs to ensure effective, culturally competent nursing care and to encourage nurses to continually increase their cultural competence (1, 24). Healthcare organizations should act to address challenges associated with cultural diversity and to ensure that nursing staff are provided with high-quality continuing education offers in cultural competence (24). This means that improvements in both the nurses' cultural competence levels and organizational factors are needed to provide equally high-quality care for all patients.

The results show that the educational level rather than length of working experience influenced cultural competence, with a higher educational level indicating higher levels of cultural competence. Our study findings support the findings of other studies (8, 11, 12) which show that increasing cultural competence depends on the nurses´ education level. This finding signifies that increasing cultural competence does not depend on previous diversity trainings but also on the nurses' educational level. According to Cicolini et al. (2015), this influence might be due to the greater exposure to cultural diversity that occurs in higher education (21).

The study findings also show that nurses who perceived themselves as very or somewhat competent had higher cultural competence levels than nurses who perceived themselves as rather incompetent or neutral. These results agree with those of other studies which show that nurses who rated themselves as having higher levels of self-perceived cultural competence had higher levels of cultural competence (12, 21, 23). Increasing an awareness of one's own cultural properties can be useful in cross-cultural encounters in a healthcare setting and can improve the cultural competence of nurses.

The strength of our study is its large sample size and inclusion of nurses and nursing students from different parts of Austria. The study participants were included using a convenience sampling, however, which limits the overall generalizability of the findings. The cross-sectional design presents a further limitation. Studies with a longitudinal design should be undertaken to

increase our understanding of the cultural competence of nurses in all Austria healthcare settings. Another limitation of this study is including nursing students, which may have influenced our results to a certain degree, even if they constitute only 7% of our sample. However, we invited only last-semester nursing students who already have substantial experience in nursing care. Some of the influencing factors, like years of work experience or multilingualism, could have been presented in more detail. Creating a finer subdivision regarding years of experience or assessing which other language(s) the participants can speak might have provided a more detailed insight on the results, and, maybe, might have even yielded slightly differing study results.

Conclusions

The need to provide culturally competent healthcare in Europe and specifically in Austria is changing due to ongoing demographic changes. Results of this study show that the nurses' cultural competence level was moderate to high. Older nurses who held an undergraduate degree or had completed higher education, participated in a diversity training program, and perceived themselves as somewhat or very culturally competent tended to have higher cultural competence levels. Effective interventions, such as educational training events or programs designed to meet nurses' needs, need to be implemented in Austrian acute care settings in order to promote culturally competent nursing care. Further research is deemed necessary to examine how other relevant variables influence cultural competence.

References

(1) Jongen C, McCalman J, Bainbridge R. Health workforce cultural competency interventions: a systematic scoping review. BMC Health Serv Res. 2018;18(1).

(2) Sharifi N, Adib-Hajbagheryb M, Najafic M. Cultural competence in nursing: A concept analysis. Int J Nurs Stud. 2019;99.

(3) Cai D-Y. A concept analysis of cultural competence. Int J Nurs Sci 2016;3(3):268-73.

(4) Kaihlanen AM, Hietapakka L, Heponiemi T. Increasing cultural awareness: qualitative study of nurses' perceptions about cultural competence training. BMC Nurs. 2019;18:38.

(5) McFarland M, Wehbe-Alamah H. Transcultural Nursing Concepts, Theories, Research, & Practice2018.

(6) Antón-Solanas I, Huércanos-Esparza I, Hamam-Alcober N, Vanceulebroeck V, Dehaes S, Kalkan I, et al. Nursing Lecturers' Perception and Experience of Teaching Cultural Competence: A European Qualitative Study. Int J Environ Res Public Health. 2021;18(3):1357.

(7) Ervin N, Bickes J, Schim SM. Environments of care: a curriculum model for preparing a new generation of nurses. J Nurs Educ. 2006;45(2):75 - 81.

(8) Cai D, He W, Klug D. Cultural competence among nurses and its influencing factors: A cross-sectional study. Nurs Health Sci. 2021;23(2):411-8.

(9) Statistik-Austria. Österreich. Zahlen. Daten. Fakten.; 2022.

(10) Červený M, Siaki LA, McGee P, Kilíková M. Perception of European nurses of culturally-appropriate health care – a cross-sectional study. Med Og Nauk Zdr. 2019;25(1):27-32.

(11) Lin HL, Guo JL, Chen HJ, Liao LL, Chang LC. Cultural competence among pre-graduate nursing students, new graduate nurses, nurse mentors, and registered nurses: A comparative descriptive study. Nurse Educ Today. 2021;97:104701.

(12) Cerveny M, Dimunova L, Della Pelle C, Papp K, Siaki LLA, Kilikova M, et al. Self-Reported Cultural Competence of Nurses Providing Nursing Care in Slovakia. J Nurs Scholarsh. 2020;52(6):705-12.

(13) Osmancevic S, Großschädl F, Stijic M, Lohrmann C. The German version of the Cultural Competence Assessment (CCA-G): cross-cultural adaptation and validation study in Austrian acute care settings. BMC Nurs. 2022;21(1):77.

(14) Caricati L, Dicembrino RB, Gionti L, Petre L, Ungurean L. Cultural Competence Assessment Instrument: Initial Italian validation and proposed refinement. Acta Biomed. 2015;86 Suppl 2:142-9.

(15) Shen Z. Cultural competence models and cultural competence assessment instruments in nursing: a literature review. J Transcult Nurs. 2015;26(3):308-21.

(16) UNECE. Conference of European Statisticians. Recommendations for the 2020 Censuses of Population and Housing. Conference of European Statisticians; Geneva Switzerland.2015.

(17) Chae D, Kang KH, Benkert R, Doorenbos AZ. Evaluation of the psychometric properties of the Korean version of the Cultural Competence Assessment. Jpn J Nurs Sci. 2018;15(1):56-66.

(18) Raigal-Aran L, Ferré-Grau C, Belzunegui-Eraso A. The Spanish version of the Cultural Competence Assessment (CCA-S): Transcultural validation study and proposed refinement. Nurse Educ Today. 2019;72:47-53.

(19) Schim SM, Doorenbos AZ, Miller J, Benkert R. Development of a Cultural Competence Assessment instrument. J Nurs Meas. 2003;11(1):29-40.

(20) IBM Corp. Released. IBM SPSS Statistics for Windows Version 26.0. NY: IBM Corp; 2019.

(21) Cicolini G, Della Pelle C, Comparcini D, Tomietto M, Cerratti F, Schim SM, et al. Cultural Competence Among Italian Nurses: A Multicentric Survey. J Nurs Scholarsh. 2015;47(6):536-43.

(22) Doorenbos AZ, Schim SM, Benkert R, Borse NN. Psychometric evaluation of the cultural competence assessment instrument among healthcare providers. Nurs Res. 2005;54(5):324-31.

(23) Doorenbos AZ, Morris AM, Haozous EA, Harris H, Flum DR, Doorenbos AZ, et al. Assessing Cultural Competence Among Oncology Surgeons. J Oncol Pract. 2016;12(1):61-2, e14-22.

(24) Oikarainen A, Mikkonen K, Kenny A, Tomietto M, Tuomikoski A-M, Meriläinen M, et al. Educational interventions designed to develop nurses' cultural competence: A systematic review. Int J Nurs Stud. 2019;98:75-86.

(25) Truong M, Paradies Y, Priest N. Interventions to improve cultural competency in healthcare: a systematic review of reviews. BMC Health Serv Res. 2014;14(1):99.

Supplementary file 1

The German Version of the Cultural Competence Assessment (CCA-G)

Cultural Awareness
Spiritual and religious beliefs are important aspects of many cultural groups.
Individuals can identify with more than one cultural group.
I believe that everyone, regardless of their cultural heritage, should be treated with respect.
I understand that people from different cultures can define the concept of “health care” in different ways.
I think that my knowledge about different cultural groups can help me in my work with individuals, families, and groups.
Cultural Competence Behavior
I seek information about cultural needs when I meet new people at my work or educational institution.
I have access to textbooks and other materials that help me learn more about people from different cultures.
I ask people to tell me about their expectations regarding nursing care services.
I avoid using generalizations to apply stereotypes to groups of people.
I recognize potential barriers to healthcare services that different people might encounter.
I remove barriers regarding nursing services affecting people from different cultural backgrounds, when I identify them.
I remove barriers for people from different cultures, when they tell me about them.
I gladly accept feedback from clients on how I relate to people from different cultures.
I find possibilities to adapt my nursing services to fit the cultural preferences of individuals and groups.

Chapter 6

The Effectiveness of Cultural Competence Interventions in Nursing: A Systematic Review and Meta-analysis

This chapter is accepted for publication in International Journal of Nursing Studies

Abstract

Background

The growing need to provide culturally competent nursing care has increased the importance of implementing and evaluating cultural competence interventions in healthcare settings. Previous research showed that increasing healthcare professionals' cultural competence can reduce racism and inequalities and enhance their ability to navigate cultural diversity. Whilst some evidence shows that educational interventions can improve cultural competence of healthcare professionals, a summary of this evidence is lacking, especially regarding the effectiveness of such interventions on nurses' cultural competence and patient-related outcomes.

Objectives

In this systematic review, the effectiveness of cultural competence interventions on nurses' levels of cultural competence and patient-related outcomes is assessed.

Design

A systematic review and a meta-analysis were conducted.

Methods

We searched in MEDLINE, Embase, CINAHL, PsychINFO, ERIC and CENTRAL up to September 2023 for studies using a quasi-experimental or experimental design. We used the Cochrane Handbook for Systematic Reviews of Interventions and PRISMA guideline for methodological and reporting guidance. Two researchers independently assessed the eligibility of the studies and their methodological quality. We assessed the quality of experimental studies using the Revised Cochrane Risk of Bias Assessment Tool for Randomized Trials (RoB 2), and the quality of quasi-experimental studies with the Risk of Bias in Nonrandomized Studies – of Interventions tool (ROBINS-I).

Results

Overall, 17 studies, three randomised controlled trials and 14 pre-test/post-test studies, were included in this review. Of these 17 studies, 12 provided sufficient, appropriate data for inclusion in the meta-analysis. Cultural competence interventions were offered through education and training (including lectures, presentations, case studies, discussions, or various reflection

activities) or technology-based applications and support (mobile app, online database, or web-based training). Education and training were shown to slightly increase nurses' levels of cultural competence, with a low certainty of the evidence. Technology-based applications and support may increase nurses' levels of cultural competence, but the evidence is very uncertain. No pooling of studies was possible for the patient-related outcomes.

Conclusion

Education and training can improve the level of nurses' cultural competence; therefore, they should be offered as continuing education for nurses. However, our confidence in the underlaying evidence for cultural competence interventions is low due to the imprecision and risk of bias of included studies; thus, the results should be interpreted with caution. Despite the growing interest in and body of research on nurses' cultural competence interventions, our review indicates a significant lack of studies examining the impact of such interventions on patient-related outcomes.

Keywords: Cultural competence, Nurses, Effectiveness, Interventions, Patient-related outcomes, Systematic review, Meta-analysis

Introduction

The importance of cultural competence in healthcare was first recognised in the early 1980s in the USA and continues to be a major strategy to address health inequities (e.g. lower quality of care for patients from different cultural backgrounds) worldwide. Healthcare policymakers, professionals, and educators use cultural competence skills to ensure the provision of quality and culturally congruent care for patients from different cultural backgrounds (1). Nurses' cultural competence is vital in culturally congruent care, which involves the meaningful, culture-based application of health and care knowledge to address the needs of individuals or groups, facilitating good health and well-being or to assist in managing illnesses, disorders, and end-of-life care (2).

Sharifi et al. (2019) defined nurses' cultural competence as *"the ability to provide effective, safe, and quality care to patients from different cultures and to consider the different aspects of their culture in care provision"* (p.6). This ability is acquired as part of an ongoing process, which requires personal effort, effective education, and organisational support in nursing care. Sharifi et al. (2019) conducted a concept analysis of nurses' cultural competence, identifying it as a dynamic construct shaped by cultural awareness, knowledge, sensitivity, skills, proficiency, and adaptability. The growing need to provide culturally competent nursing care has led to the increasing importance of implementing and evaluating appropriate interventions in all healthcare settings. Studies show that improving healthcare professionals' cultural competence can help reduce racism and healthcare inequalities (3, 4), enhancing the ability to navigate cultural diversities (5, 6). Examining the impact on healthcare professionals, particularly nurses, cultural competence enhances their proficiency in key cultural competence attributes. Cultural competence is associated with higher levels of patient satisfaction and improved treatment adherence (1, 6, 7).

Interventions designed to improve the cultural competence of nurses showed positive effects on nurses' self-assessed level of cultural competence (8). Increased cultural competence may help nurses to identify different needs of culturally diverse patients, reflect on their own cultural context and modify their behaviour accordingly (1, 9). Furthermore, it may reduce the effects of cultural and ethnic discrimination on care and improve care effectiveness

(3). For patients with different cultural backgrounds, the increased cultural competence of healthcare professionals may improve communication and participation in decisions and treatment options, which can lead to better patient-related outcomes (1, 9). When looking at these patient-related outcomes, certain studies reported an impact on quality of healthcare (1), patient satisfaction (1, 9, 10), patient adherence (9), and quality of life (7, 11). These improvements in patient-related outcomes can lead to patients having greater trust in healthcare systems (7, 11).

Whilst there is some evidence that educational interventions such as diversity training can improve the cultural competence of health professionals (1, 6, 7), there is a lack of summarised evidence regarding interventions performed to increase competence in nurses and their effectiveness on patient-related outcomes. An overview of systematic reviews by Truong et al. (2014) found some evidence suggesting that cultural competence interventions can enhance patient-related outcomes. However, definitive conclusions about their effectiveness are limited due to a lack of methodological rigor and the absence of validated outcome measurement instruments across studies. In a meta-analysis, Gallagher and Polanin (2015) evaluated the effectiveness of educational programmes designed to increase nurses' and nursing students' cultural competence levels but did not evaluate their effectiveness on patient-related outcomes. However, they found that the implemented programmes can increase cultural awareness, which may subsequently lead to potential benefits for patients (12).

Nevertheless, there remains a need for more rigorous study designs and the use of standardised assessment tools to attribute training to improvements in patient-related outcomes. In their systematic review on educational interventions designed to develop nurses' cultural competence, Oikarainen et al. (2019) showed a positive impact of educational interventions on nurses' self-assessed cultural competence. However, they concluded that a need still exists for high-quality studies that investigate the effectiveness of nurses' cultural competence interventions, and especially of technology-based interventions (13).

So far, mostly traditional educational interventions, including lectures, group discussions, and case studies have been evaluated in reviews. Since the publication of the meta-analysis conducted by Gallagher and Polanin

(2015), a variety of studies focusing on different educational interventions (e.g. using simulation pedagogy or mobile app-based training programmes) have been published (14-17). The evidence base for cultural competence interventions needs be strengthened by placing a greater emphasis on methodological rigor and the use of randomised controlled trials (13). Healthcare policymakers, professionals, and educators need to be kept updated about new educational approaches and their effectiveness so they can ensure the provision of quality and culturally congruent care to patients with different cultural backgrounds. Given the increase and variety of interventions available, it is necessary to assess the overall effectiveness of these interventions and to provide clear recommendations for nursing practice and education.

Thus, there is a need for up-to-date, summarised evidence regarding the effectiveness of cultural competence interventions on nurses and patient-related outcomes. In particular, the aim of this review and meta-analysis was to identify and summarize the existing evidence on cultural competence interventions that have been developed to improve nurses' levels of cultural competence and patient-related outcomes. Specific questions addressed by the review are:

1. How effective are cultural competence interventions in improving nurses' levels of cultural competence?

2. How effective are cultural competence interventions for nurses in improving patient-related outcomes (e.g. treatment outcomes, patient satisfaction)?

Methods

In order to summarize the current best evidence and answer the research questions, we conducted a systematic review including a meta-analysis; results were reported in accordance with the updated Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline (18). The Cochrane Handbook for Systematic Reviews of Interventions was used as methodological guidance for preparing and maintaining the effects of interventions (19). The protocol for this study was registered at the International Prospective Register of Ongoing Systematic Reviews (PROSPERO) under registration number CRD42020168015.

Eligibility criteria

To answer the research questions, we established the following inclusion and exclusion criteria, based on the PICOS (Population, Intervention, Comparator, Outcome, and Study design) framework (Table 1). Studies were excluded if results were summarized for healthcare professionals in general without presenting specific findings for nurses. In our study, we included interventions for nurses who provide direct care to patients. These interventions needed to be implemented to: a) overall improve the level of cultural competence or one or more of the cultural competence attributes (cultural awareness, cultural knowledge, cultural sensitivity, cultural skill, cultural proficiency, cultural desire, cultural dynamicity, cultural encounters), and/or b) increase patient-related outcomes (e.g. treatment outcomes, patient satisfaction, health behaviour, involvement in care, client-nurse trust). The effect of the interventions had to be measured using a valid and reliable instrument (20). We set no time or language limitations. Original studies as well as doctoral theses were included. Reviews, qualitative research, conference proceedings, opinion studies, books, and editorials were excluded (19). The comparison group should not receive any intervention.

Table 1 Eligibility criteria using PICOS format

Criteria	Inclusion	Exclusion
Population	Registered nurses	Nursing students, nurses' aides, nursing educators, nursing managers
Intervention	(Educational) interventions to improve nurses´ cultural competence, Interventions to increase patient-related outcomes	Intervention not aimed to improve the nurses´ cultural competence or patient-related outcomes
Comparators	No intervention Usual care	

Outcome	Cultural competence, or cultural competence attributes (attributes or subscales on measurement tools: cultural awareness, cultural knowledge, cultural sensitivity, cultural skill, cultural proficiency, cultural desire, cultural dynamicity, cultural encounters) Patient-related outcomes (treatment outcomes, patient satisfaction, health behaviour, involvement in care, client-nurse trust)	Not relevant to cultural competence, not relevant to patient-related outcomes Outcome not assessed with a valid and reliable measurement tool
Study design	Experimental (randomised controlled trials) and quasi-experimental studies (clinical controlled trials, pre-test/post-test studies)	Non-experimental studies, reviews, conference proceedings, opinion studies, books, editorials, qualitative research

Search methods

A systematic search in MEDLINE, Embase, CINAHL, PsychINFO, ERIC, and the Cochrane Central Register of Controlled Trials (CENTRAL) was conducted from the inception of the databases up to September 2023. We also searched the Current Controlled Trials metaRegister of Controlled Trials to identify other trials. To identify additional and especially grey literature, we searched Google Scholar, ResearchGate, the ProQuest database, and reference lists. For Google Scholar searches, only the first 200 references were considered per search string. The search was re-run in June 2024 for updated research purposes before the final analysis was performed. The searches were performed with keywords and MESH terms or subheadings, aligned to the inclusion criteria, and these keywords and terms/subheadings were combined with Boolean operators. For each research question, a separate search strategy was created and conducted for all mentioned data sources. The exemplary search strategy performed in CINAHL can be found in *Supplementary file S1*.

Data extraction

The search results were inserted into the reference manager EndNote (21), and duplicates were removed. Based on the eligibility criteria, titles and abstracts were screened for inclusion independently by two reviewers (SO, LMS). In the next step, the full text of articles was retrieved for full-text screening according to the eligibility criteria. Disagreements about inclusion and exclusion of studies between reviewers were resolved through discussion until a consensus was reached. A standardised data extraction form (19) was utilized to collect the following information from included studies:

a) General information about the study (authors, publication year, country, design, setting)

b) Participants' characteristics (sample size overall and per intervention or control group)

c) Intervention (theoretical background, description of intervention, duration)

d) Instrument used to measure the outcomes, time points of data collection

e) Outcomes of interest

The data extraction process was performed by the first author (SO), and the results were checked independently by LMS for accuracy. Any disagreements between the authors during this process were resolved through discussion and consensus. In cases of uncertainty, another author (DS) was consulted.

Quality assessment

The quality of RCTs was assessed independently by two authors using the revised version of the RoB 2, which consists of five domains: (1) bias arising from the randomisation process; (2) bias due to deviations from intended interventions; (3) bias due to missing outcome data; (4) bias in measurement of the outcome; and (5) bias in selection of the reported result (22). The domain-level judgements provide the basis for an overall risk-of-bias judgement for the specific trial being assessed. Each study was assessed for risk of bias and categorized as having either low risk, some concerns, or high

risk of bias. Judging a result to be at a particular level of risk of bias for an individual domain implies that the result has an overall risk of bias that is at least this severe (22). All disagreements regarding the quality assessment were discussed until a consensus was reached.

Quasi-experimental studies were evaluated using the Risk of Bias in Non-randomized Studies – of Interventions tool (ROBINS-I), which covers seven domains: (1) bias due to confounding; (2) bias in selection of participants into the study; (3) bias in classification of interventions; (4) bias due to deviations from intended interventions; (5) bias due to missing data; (6) bias in measurement of outcomes; and (7) bias in selection of the reported results (23). Using the overall ROBINS-I judgement, each quasi-experimental study was judged either to be of low risk of bias, moderate risk of bias, serious risk of bias, critical risk of bias or no information on which to base a judgement about risk of bias (23). The methodological quality of each included study was independently assessed by SO and LMS. Disagreements were resolved between two reviewers through discussion.

Certainty of evidence

To assess the certainty of evidence, the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) method was applied in line with the recommendations of the GRADE Working Group (19). The GRADE considerations (risk of bias, inconsistency, indirectness, imprecision, and other considerations) were used to assess the certainty of a body of evidence. This certainty of evidence can be rated as high, moderate, low, or very low. A GRADE summary of findings table was created using the GRADEpro GDT software (24), with results from the strongest study designs (RCTs if available) chosen to depict each outcome of interest. To interpret our findings, we used the standardised statements to interpreting and communicating the results of systematic reviews according to the GRADE guideline (25). The statements assume that the certainty of evidence is based not only on the imprecision of the result (i.e. the power of the analysis and the width of the confidence interval), but also on other criteria, such as the risk of bias of the studies, the inconsistency (heterogeneity) of the result, the indirectness (including subgroup analyses and the applicability of the outcome measure), and publication bias.

Data analysis

Data synthesis was conducted following the guidelines outlined in the Cochrane Handbook (19) and recommendations of Borenstein et al. (2009) (26). Meta-analyses of pooled effectiveness were conducted using RevMan 5.4.1 (27). When at least two comparable studies were available, the inverse variance random-effects model was applied to assign study weights, accounting for potential heterogeneity among the included studies. We synthesised the treatment–control and pre-test/post-test effect sizes independently. Standardised mean differences (*SMD*) with a 95% confidence interval (CI) were applied to pool studies with similar interventions, considering the measurement of outcomes using different assessment measures. The definition of *SMD* used in the analysis is Cohen's *d*, whereby 0.2 represents a small effect, 0.5 a moderate effect, and 0.8 a large effect (19). In situations where studies failed to report means and standard deviations, we used the p-value, tabulated t-value, difference of means, and standard error (19). If a study reported multiple outcomes (e.g. different attributes of cultural competence, but no overall cultural competence score), a simple composite score (i.e. the mean of standardised scores) was created and used for the meta-analyses (28).

Statistical heterogeneity between studies was assessed through visual inspection of the scatter of effect estimates in the forest plots and the calculated Chi^2 statistics and the associated I^2 statistics, where: a) 0% to 40% might not be important, b) 30% to 60% might represent moderate heterogeneity, c) 50% to 90% might represent substantial heterogeneity, and d) 75% to 100% represented considerable heterogeneity. The importance of the observed value of I^2 depends on: a) magnitude and direction of effects, and (b) strength of evidence for heterogeneity (e.g. *p*-value from the Chi^2 test, or a confidence interval for I^2) (19). When the reported data from the included studies did not allow for pooling, the results were synthesised narratively. Subgroup analyses were planned and were to be conducted according to the interventions and sensitivity analysis based on the risk of bias assessment, by removing studies with the greatest risk of bias from the analysis.

Results

Study selection

The literature search conducted to answer the first research question, how effective are nurses' cultural competence interventions in improving their levels of cultural competence, retrieved 6692 records. After removing duplicates, 5135 titles were screened for their relevance. In total, 32 studies were subjected to a full-text screening, of which 16 studies were finally included. The literature search for the second research question, how effective are nurses' cultural competence interventions in improving patient-related outcomes (e.g. treatment outcomes, patient satisfaction), retrieved 1720 records. Of these, 1005 were excluded after title and 83 after abstract screening. Full-text screening was undertaken in ten studies, resulting in three studies being included. Two of the included studies were also identified in the search for the first research question, resulting in 17 studies being included in this review. The study screening and selection process with the reasons for exclusion of studies at the full-text screening stage are presented in Figure 1 and Figure 2. The list of excluded studies during the full-text screening, including the reason for exclusion, is presented in *Supplementary file S2*.

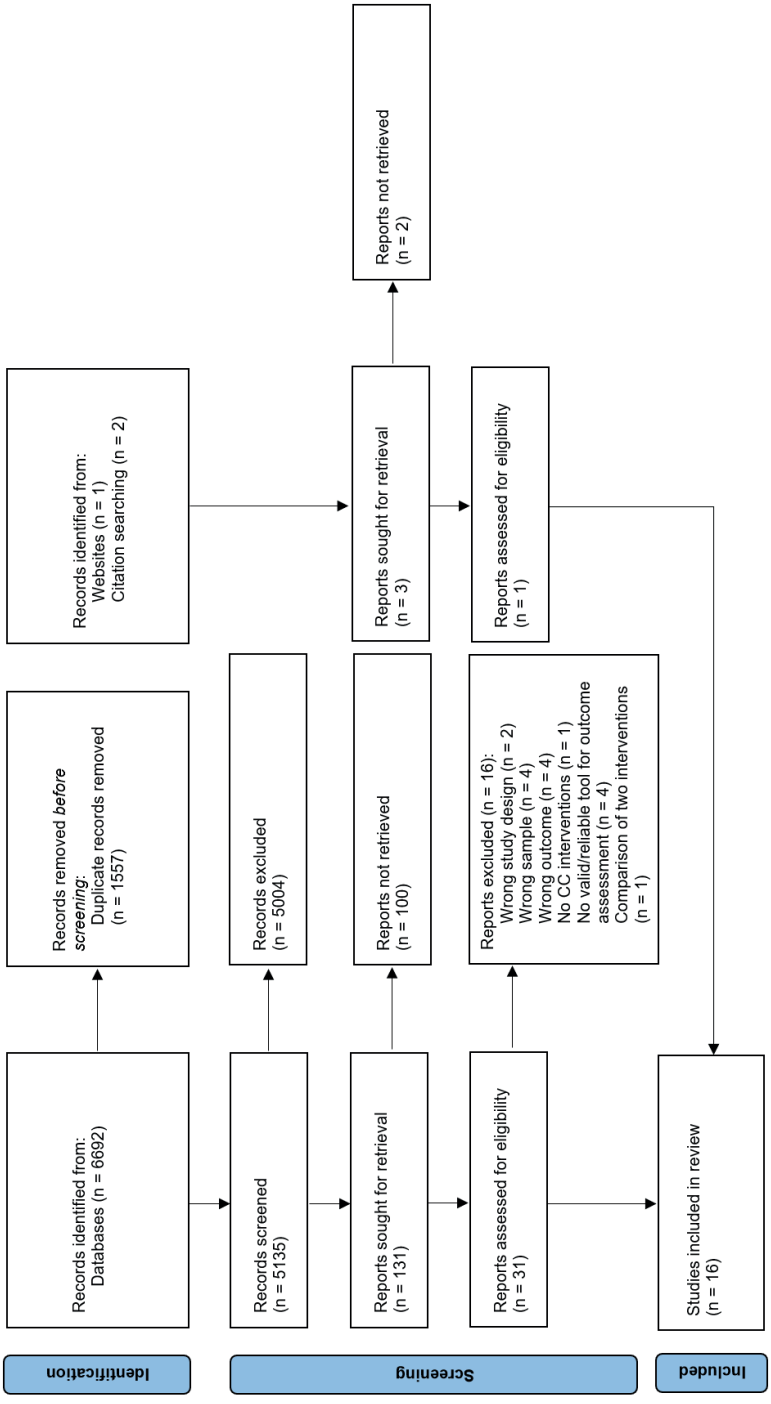


Figure 1 PRISMA flow chart of study selection of the first research question

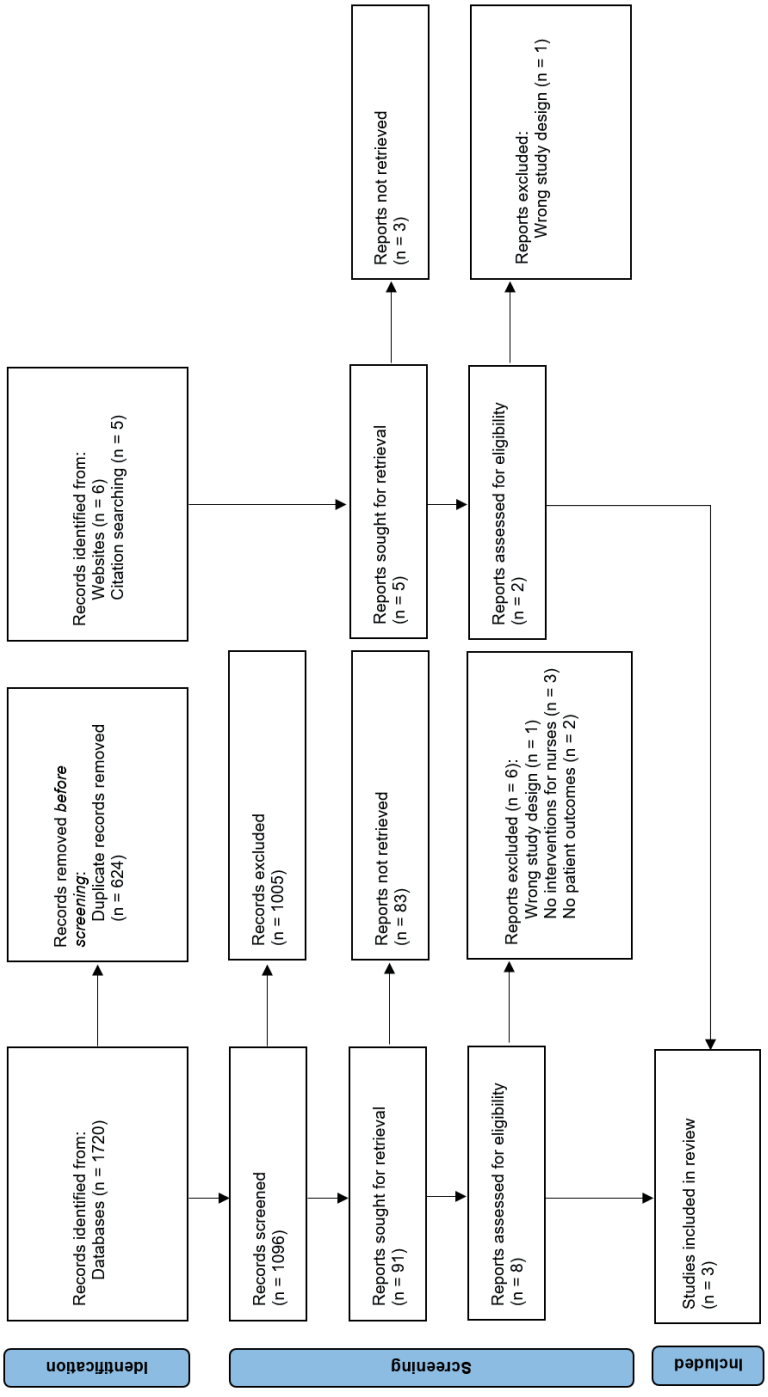


Figure 2 PRISMA Flow chart of study selection of the second research question

Table 2 Characteristic of included studies

Author(s) (Year) country	Study design	Setting	Sample characteristics	Theoretical background/ Intervention description and duration
Berlin et al. (2010) Sweden	RCT	Primary child healthcare centre	Child health nurses *N* = 51 IG = 24 CG = 27	Theoretical background: Camphina-Bacote´s cultural competence model Intervention: educational training Including case studies, discussions, lecture and reflection practice groups Duration: three days
Bhat et al. (2015) USA	Pre-test/ post-test	Palliative care and hospice units	Registered nurses working in combined palliative care and hospice units *N* = 15 No CG	Theoretical background: Leininger's Culture Care Theory, Lewin's three-stage theory of change Intervention: Web-based modules Including three modules: self-assessment and culture-specific definitions; cultural traditions of the hospital´s patient population; how to perform cultural assessment and develop culturally congruent care plans using Leininger´s cultural care model Duration: 20 min for each module, participants had nine weeks to complete all modules

Measurement instruments/ data collection	Outcomes of interest
• The Clinical Cultural Competence Training Questionnaire-pre (CCCTQ-PRE) • Clinical Cultural Competency Training Evaluation Questionnaire-post (CCCTEQ-POST) Data collection • **B**aseline (T0) • 4 weeks post-intervention (T1)	• Cultural awareness • Cultural knowledge • Cultural skills • Cultural encounters
Cultural Competence Assessment Scale (CCA) Data collection • Baseline (T0) • 9 weeks post-intervention (T1)	• Overall cultural competence • Cultural awareness and sensitivity • Cultural competence behaviour

Cooper Brathwaite (2005) USA	Pre-test/ post-test	Public health department	Registered nurses *N* = 76 No CG	Theoretical background: Campinha-Bacote's model of cultural competence, Purnell´s model of cultural competence, Theory of cross-cultural communication Intervention: Cultural competence educational programme Including lectures, case studies, discussions, role-play game and reflective exercises Duration: ten-hour course held over a five-week period
Cooper Brathwaite & Majumdar (2006) USA	Pre-test/ post-test	Public health department	Registered nurses *N* = 76 No CG	Theoretical background: Campinha-Bacote's model of cultural competence, Purnell's model of cultural competence, Theory of cross-cultural communication Intervention: Cultural competence educational programme Including lectures, case studies, discussions, role-play game and reflective exercises Duration: ten-hour course held over a five-week period

Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised (IAPCC-R) Data collection • Pre-intervention at baseline (T1) • 2 months later pre intervention (T2) • 1 week post-intervention (T3) • 3 months post-intervention (T4)	• Overall cultural competence
Cultural Knowledge Scale Data collection • Pre intervention at baseline (T1) • 2 months later (T2) • 1 week post-intervention (T3) • 3 months post-intervention (T4)	• Overall cultural competence

Debiasi & Selleck (2017) USA	Pre-test/ post-test	Two nurse-practitioner-led clinics	Nurse practitioners *N* = 13 No CG	Theoretical background: Purnell's Model for Cultural Competence Intervention: Cultural competence training Including PowerPoint presentation with theory, reflection questions, case studies and tips for practice based on identified needs Duration: one hour
Delgado et al. (2013) USA	Pre-test/ post-test	Medical centre	Nursing staff including registered nurses, patient care assistants and unit secretaries *N* = 98 No CG	Theoretical background: Campinha-Bacote's model of cultural competence Intervention: Cultural competence educational training Including exercise, lecture, simulation and debriefing Duration: one hour
Edwards (2019) USA	Pre-test/ post-test	Community medical centre	Registered nurses *N* = 28 No CG	Theoretical background: Leininger's theory on culture care diversity and universality Intervention: Workshop Including PowerPoint presentation, lecture, and discussion Duration: not stated

• Cultural Competence Assessment (CCA) • Clinicians' Cultural Sensitivity Survey Data collection • Pre-intervention • Post-intervention	• Overall cultural competence • Clients' perception of nurses' cultural competence
Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised (IAPCC-R) Data collection • Baseline (T0) • 3 months post-intervention (T1) • 6 months post-intervention (T2)	• Overall cultural competence
Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised (IAPCC-R) Data collection • Before and after workshop	• Overall cultural competence

Elminowski (2015) USA	Pre-test/ post-test	Healthcare organisation	Nurses *N* = 18 Nurse practitioner students *N* = 45 No CG	Theoretical background: Leininger's theory on culture care diversity and universality Intervention: Workshop on cultural awareness and cultural competence Including case study and presentation on basic definitions, steps to culturally competent care, cultural considerations in healthcare and health beliefs, techniques to improve patient adherence and communication barriers Duration: three hours
Hsu et al. (2023) Taiwan	Pre-test/ post-test	Haemo-dialysis centre	Nurses *N* = 40 No CG	Theoretical background: the cultural competence framework for clinical nurses Intervention: Situated simulation programme, consisting of three hours of basic concept courses on cultural competence and three hours of situated simulation teaching Duration: six hours

Cultural Competence Self-Assessment Scale Data collection Not stated	• Cultural competence
The Nursing Cultural Competence Scale (NCCS) Data collection • Baseline (T0) • Immediately after the intervention (T1) • 8 weeks post-intervention (T2)	• Overall cultural competence • Cultural awareness ability • Cultural action ability • Cultural resources application ability • Self-learning cultural ability

Kim & Lee (2016) Korea	Pre-test/ post-test	Public health centres	Public health nurses *N* = 41 IG = 21 CG = 20	Theoretical background not specified Cultural competence training programme, consisting of an offline training course with six modules focusing on cultural knowledge, sensitivity, awareness, communication skills, and cultural assessment skills, and online training with two weekly email newsletters and participation in BAND mobile community application Duration: four weeks of offline training conducted in small groups on one day (eight hours), and twice-weekly online education sessions in weeks two, three, and four The control group did not receive any interventions Participants in the control group had the possibility to participate in the same training programme after the experiment
Lal (2011) USA	Pre-test/ post-test	General hospital	Registered nurses *N* = 34 No CG	Theoretical background: Campinha-Bacote's model of care Intervention: Educational intervention via workshop, including theory and discussion about the model of care Duration: one day

• Jeffreys's Transcultural Self-Efficacy Tool (TSET) • The client-nurse trust scale • The nursing satisfaction scale Data collection • Pre-intervention (T0) • Post-intervention (T1) • 4 weeks post-intervention (T2)	• Overall cultural competence • TSET subscale practical dimension • TSET subscale cognitive dimension • TSET subscale affective dimension • Clients' trust in nurses • Satisfaction with nursing care
Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals–Revised (IAPCC-R) Data collection • Pre-intervention • Post-intervention	• Overall cultural competence • Cultural desire • Cultural awareness • Cultural knowledge • Cultural encounters • Cultural skills

Lange et al. (2013) USA	Pre-test/ post-test	Residential and home care agencies	Nurses, nursing assistants, other healthcare professionals *N* = 56 No CG	Theoretical background: Campinha-Bacote's model of care Intervention: Educational intervention, including discussion, activities, and engagement with diverse group members Duration: 12 sessions
Lin & Hsu (2020) Taiwan	RCT	Medical centre	Registered nurses *N* = 97 IG = 48 CG = 49	Theoretical background Campinha-Bacote's model of care. Intervention: Cultural competence educational course, including introduction, foreign picture books, a film, and reflections on prejudices and stereotypes and structured role-play activities. Duration: 12 hours (three hours weekly, over a four-week period) The control group received no intervention
Majumdar et al. (2004) Canada	RCT	Two community agencies and one hospital	Nurses and homecare workers *N* = 114 IG = 50 CG = 54	Theoretical background not stated Intervention: Cultural sensitivity training Duration: 36 hours CG received no intervention

The Cultural Self-Efficacy Scale (CSES) Data collection • Pre-intervention • Post-intervention	• Knowledge of cultural concepts • Confidence in performing culturally related skills
Nursing Cultural Competence Scale (NCCS) Data collection • Baseline (T0) • Immediately post-intervention (T1) • 2 months post-intervention (T2)	• Overall cultural competence • Cultural awareness ability • Cultural action ability • Cultural resources application ability • Self-learning cultural ability
• Cultural awareness questionnaire • Client satisfaction questionnaire Data collection • Baseline (t1) • 3 months post-randomisation (t2) • 6 months post-randomisation (t3) • 12 months post-randomisation (t4) (t4 after nurses in control group attended the cultural sensitivity training course)	• Overall cultural awareness Interacting with people of other cultures • Comfort in interacting with people of other ethnic groups • Information on cultural beliefs • Adopting healthcare literature • Understanding of multiculturalism • Issue of culture • Patient satisfaction

Mallery (2018) USA	Pre-test/ post-test	Surgical hospital	Registered nurses *N* = 25 No CG	Theoretical background: Bandura's theory of self-efficacy, Leininger's theory on culture care diversity and universality Intervention: The CultureVision online database (containing cultural information regarding 75 ethnic, cultural, religious, and ability groups) that gives healthcare practitioners access to information at the bedside regarding culturally competent patient care. Intervention including slide presentation, video introduction, Learning Guide resource, and exercises Duration: three-month period, during which the nursing staff had access to the CultureVision database

- Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised (IAPCC-R)
- The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS)

Data collection

- Pre-intervention
- Post-intervention

- Overall cultural competence
- Patient satisfaction

Sarvarizadeh et al. (2024) Iran	Pre-test/ post-test	Psychiatric hospital	Nurses *N* = 70 IG = 35 CG = 35	Theoretical background: Almutairi`s model of critical cultural competence Intervention: The flipped classroom Including activities before the class (PowerPoint presentations, videos, case reports, stories), activities during the class (exam, lecture and real-life stories relating to the topics), and activities after the class (sharing opinions and insights) Duration: eight hours (four two-hour sessions, conducted once a week over a four-week period)
Sung & Park (2021) Korea	Pre-test/ post-test	University hospital	Nurses *N* = 49 No CG	Theoretical background: the Purnell Model for Cultural Competence Intervention: Mobile app-based cultural competence training program Duration: eight learning modules, each maximum 15 min

RCT - Randomised Controlled Trial; IG - Intervention group; CG - Control group; CCCTQ - Clinical Cultural Competence Training Questionnaire; CCA - Cultural Competence Assessment Scale; IAPCC-R - Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals–Revised; NCCS - Nursing Cultural Competence Scale; TSET - Jeffreys's Transcultural Self-Efficacy Tool; CSES - Cultural Self-Efficacy Scale; NCCS - Nursing Cultural Competence Scale; HCAHPS - Hospital Consumer Assessment of Healthcare Providers and Systems; CCCS - Almutairi's Critical Cultural Competence Scale; CCSN-SF - Cultural Competence Scale for Nurses Short Version

Almutairi's Critical Cultural Competence Scale (CCCS) Data collection • Pre-intervention • Post-intervention	• Critical cultural competence overall • Cultural awareness • Cultural knowledge • Cultural skills • Cultural empowerment
Cultural Competence Scale for Nurses Short Version (CCSN-SF) Data collection • Pre-intervention • Post-intervention	• Overall cultural competence • Cultural sensitivity • Cultural knowledge • Cultural awareness • Cultural skill

Characteristics of included studies

All of the studies were published in English during the period from 2004 to 2024 (Table 2). Most studies were conducted in the USA (29-37). In three studies, the Randomised Control Trial (RCT) design was used (37-40), while the remaining studies used a pre-test/post-test study design. The study settings were mostly hospitals, such as university hospitals (41), general hospitals (34), psychiatric hospitals (42), and surgical hospitals (40). A few studies were conducted in community medical centres (32, 36, 38), one study in haemodialysis centre (43), one in residential and home care agencies (35), and one in a palliative and hospice setting (29). The sample size varied across studies, ranging from 13 to 114 nurses (39, 44). The three studies focusing also on patient-related outcomes included patients from different cultural backgrounds (29), low income and un-insured or under-insured clients (44), and married migrant women (45).

Theoretical framework and intervention details

To design the intervention, different theoretical frameworks were used. Campinha-Bacote's model of cultural competence was most frequently used as theoretical framework (30-32, 34, 35, 37, 38). This model defines cultural competence as an ongoing process encompassing the five components of cultural awareness, cultural knowledge, cultural skills, cultural encounters, and cultural desire (46). The second most frequently used theoretical framework was Leininger's theory of culture care diversity and universality (47), which focuses on culture and care relationships (29, 33, 36, 40). According to Leininger, culturally congruent care is provided when performing or making cognitively based assistive, supportive, facilitative, or enabling actions or decisions that are mostly tailored to fit the cultural values, beliefs, and life-worlds of individuals, groups, or institutions (47). The third most frequently used theoretical framework was the Purnell model for cultural competence. Purnell and Paulanka (2003) defined cultural competence as a self-cultural awareness, knowledge, and understanding of the client's culture, an acceptance of and respect for cultural differences, an openness toward cultural encounters, and an adaptation of care to be congruent with the client's culture. The theoretical backgrounds in the studies conducted by Majumdar et al. (2004) and Kim & Lee (2016) remained unclear.

Interventions across studies differed in terms of definitions, applied methods, durations, but also theoretical backgrounds. However, two superordinate categories were defined. The first category, referred to as education and training, included lectures, presentations, case studies, discussions, and various reflection activities (30-39, 42-45). The main focus in education and training interventions was on promoting and understanding concepts such as cultural knowledge, sensitivity, awareness, communication skills, and cultural assessment skills. Two of the studies included cultural simulation exercises in addition to the education and training sessions (32, 43). In Delgado et al. (2013), the cultural simulation was carried out using the "Clown Culture" method. Here, a group of instructors engage in a playful exploration of clown culture with the class, using interactive activities. Afterwards, they hold a debriefing session to discuss the students' reactions and feelings about the communication style, traditions and values of clown culture (32). The intervention in Hsu et al.´s (2023) study consisted of basic concepts on cultural competence (e.g. ability to draw on cultural resources) and three hours of situated simulation teaching. In Lin & Hsu (2020), participants were encouraged to understand the process of prejudice and stereotype formation through self-reflection, critiquing, and innovation. They also used structured role play activities to enable the participants to experience inequality in designed scenarios, which triggered reflections on how prejudices influence people's lives. Sarvarizadeh et al. (2024) implemented information on the importance, concepts, integration, barriers, and outcomes of cultural competence, as well as the provision of cultural care, through lectures and a tutorial using a flipped classroom method. The contents of the interventions in several studies (30, 31, 34, 35, 37) were developed based on the five components of Campinha-Bacote's model of cultural competence. In Kim and Lee (2016), the offline education consisted of six learning modules entitled concepts of cultural competence, multicultural policy, culture and nursing care, awareness and acceptance of other cultures, effective communication skills, and cultural assessment skills. In online education, participants were sent different learning materials (e.g. racial discrimination map or documentary films) to ensure continuous learning and encourage reflection on the awareness and acceptance of other cultures. Elminowski (2015) implemented educational training that included basic definitions, steps to provide culturally competent care, cultural considerations about healthcare and health beliefs, techniques to improve patient adherence, and commu-

nication barriers. In Debiasi et al. (2017), a one-hour cultural training module, delivered as a PowerPoint presentation, included the Purnell model for cultural competence and tips for practice based on identifying the needs of participating nurses. Details about the educational content were not stated in two studies (36, 39).

The second category, referred to as technology-based applications and support, contained three studies (29, 40, 41). Mallery (2018) focused on the online database CultureVision, which contains cultural information regarding different ethnic, cultural, religious, and ability groups, and gives healthcare practitioners access to information at the bedside that helps them provide more culturally competent patient care (40). Sung and Park (2021) assessed the effect of a mobile app-based cultural competence training programme. This programme consists of eight learning modules. Six modules address topics such as the importance of culturally competent nursing care, methods for assessing patients with diverse cultural backgrounds, and strategies for planning culturally competent nursing care by using the themes of Purnell's model of cultural competence. The remaining two modules address cultural attributes and characteristics specific to Arabic, Chinese, Russian, and Mongolian cultural groups. Bhat et al. (2015) examined the effects of web-based modules, including self-assessment and culture-specific definitions (29). The shortest intervention duration was one hour (32, 44), and the longest was three months (40).

Assessment tools

To assess the effects of interventions on the level of cultural competence, different validated assessment tools were used. The most frequently applied assessment tool was the Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals–Revised (IAPCC-R) (31, 32, 34, 36, 40), followed by the Cultural Competence Assessment scale (CCA) (29, 44), and the Nursing Cultural Competence Scale (NCCS) (38, 43). To assess the effect of interventions on patient-related outcomes, each study used a different assessment tool. To measure the clients' perception of nurses' cultural competence, the Clinicians' Cultural Sensitivity Survey was used by Debiasi and Selleck (2017) and the Client Nurse Trust Scale was used by Kim et al. (2016). Patient satisfaction was assessed using the Nursing Satisfaction

Scale (45) and the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) (40).

Risk of bias in included studies

Of the included RCTs, one study (38) had a low risk of bias, one study (37) had some concerns regarding the risk of bias, and one study (39) had a high risk of bias (Figure 2). Of the included pre-test/post-test studies, nine studies were identified as having a critical risk of bias, and five studies as having a serious risk of bias (Figure 3). The major source of bias in RCTs related to the randomisation process, while this related to confounding deviation from intended intervention and measurement of outcomes in the pre-test/post-test studies.

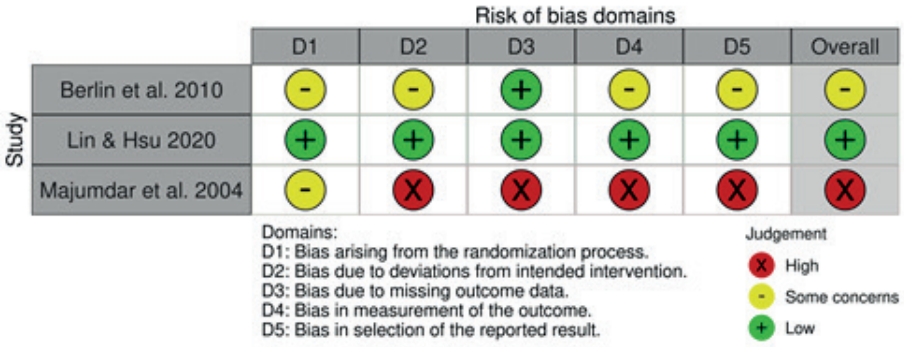


Figure 3 Risk of bias of included RCTs using ROB2

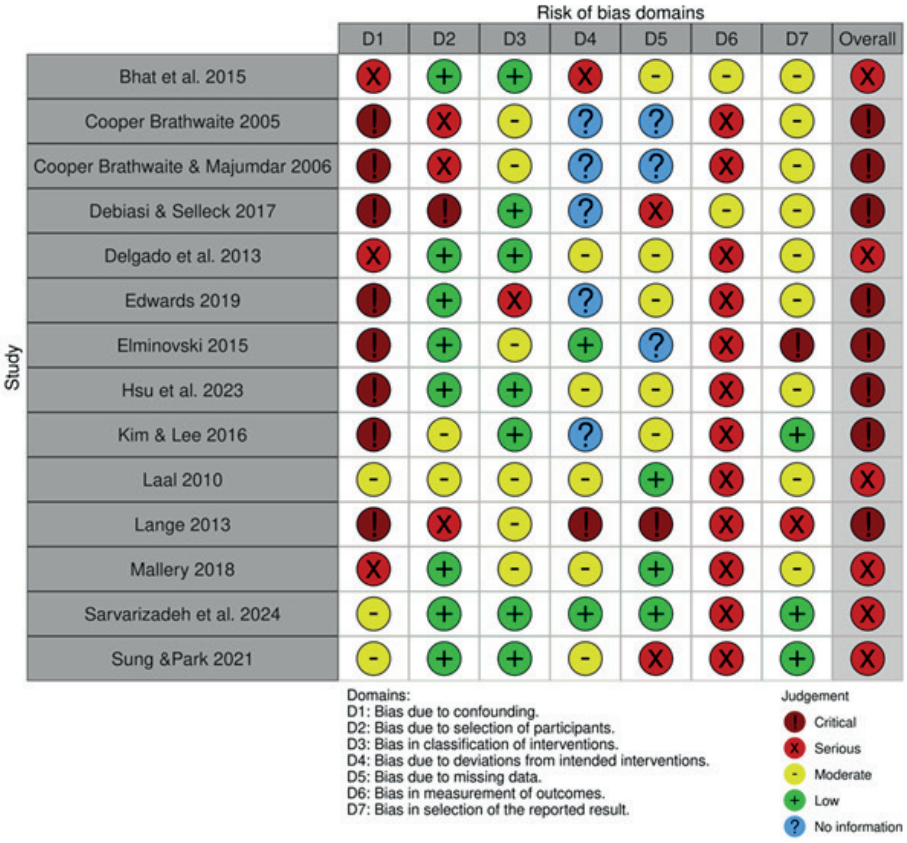


Figure 4 Risk of bias of included pre-post studies using ROBINS-I

Effect of interventions on nurses' cultural competence

The effect size of each outcome of interest or their narrative description within included studies is found in *Supplementary file S3*. Results in the following section are presented by the category of intervention (education and training; technology-based application and support) and by study design. Studies not included in the meta-analysis are presented in a narrative form.

Effect of education and training interventions on nurses' cultural competence (RCTs)

A meta-analysis with two RCTs (37, 38) was conducted to assess nurses' levels of cultural competence, resulting in a slight increase in the nurses' level of cultural competence (*SMD* 0.20, CI 95% [-0.02, 0.43], I^2 = 0%, p = 0.08) (Figure 5). One RCT could not be included in the meta-analysis due to inappropriate data reporting (39). When examining the attributes of cultural competence, we see that education and training did not significantly improve these attributes. The quality of evidence for these outcomes is considered to be low due to the imprecision and because the study conducted by Berlin et al. (2010) had some concerns regarding the risk of bias (see Figure 3).

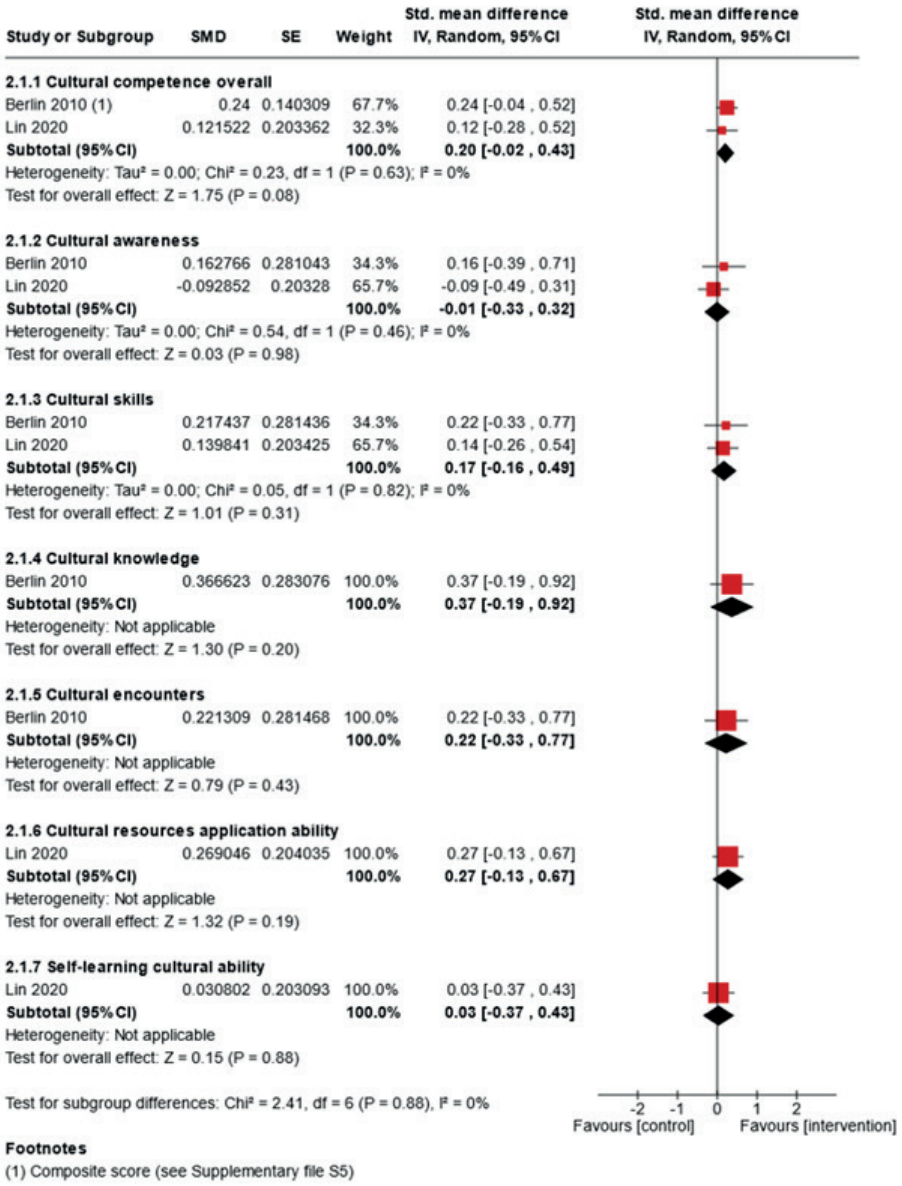


Figure 5 Meta-analysis of the effects of education and training on nurses' cultural competence immediately post-intervention (RCTs)

Since the RCT by Majumdar et al. (2004) could not be included in the meta-analysis, its findings are summarised narratively. Their study found that cultural sensitivity training significantly enhanced cultural awareness, understanding of multiculturalism, recognition of cultural differences and beliefs, adaptation of healthcare literature, and consideration of both social circumstances and culture in clinical practice.

Effect of education and training interventions on nurses' cultural competence (pre-test/post-test studies)

In the majority of the pre-test/post-test studies reviewed, education and training were identified as increasing the level of nurses' cultural competence. The meta-analysis on eight pre-test/post-test studies shows that education and training pre- vs. post intervention may result in a large increase in nurses' level of cultural competence (*SMD* 0.93, CI 95% [0.49, 1.38], I^2 = 85%, p < .00001) (Figure 6). To examine whether education and training also have long-term effects, a subgroup analysis of data was performed, including data from studies that collected these data multiple times after the intervention. The results of the meta-analysis of data from four pre-test/post-test studies with multiple data collection timepoints (31, 32, 41, 45) show a large but not significant increase in the cultural competence level (*SMD* 0.89, CI 95% [-0.08, 1.86], I^2 = 95%, p = 0.07) (*Supplementary file S4*). The evidence for this outcome is considered to be very low, as the data come from pre-test/post-test studies with high inconsistency (different measurement instruments and interventions used) and with a serious to critical risk of bias.

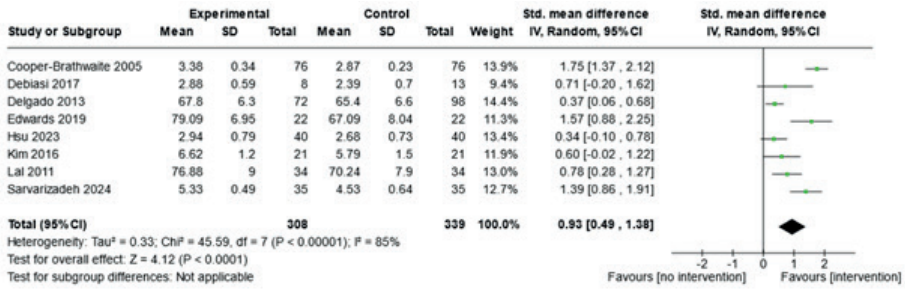


Figure 6 Meta-analysis of education and training on cultural competence overall (pre-test/post-test studies)

Three pre-test/post-test studies could not be included in the meta-analysis due to inappropriate data reporting (30, 33, 35). Cooper-Brathwaite and Majumdar (2006) reported a statistically significant change in participants' mean cultural knowledge scores over time (pre-intervention mean 3.78; one-week post-intervention mean 4.57; three-month post-intervention mean 4.59). The mean scores imply that the programme was effective and that learning remained sustained at the three-month follow-up, but no further data were provided (30). Elminowski (2015) claimed that cross-cultural training provided in workshops is an effective learning method. However, this study does not provide any data to underpin this statement (33). A comparison of pre- and post-cultural self-efficacy scores reported in the study by Lange et al. (2013) revealed that participants' confidence regarding their knowledge (pre-intervention mean 2.71 (*SD* 0.93); post-intervention mean 4.03 (*SD* 0.51); $p = 0.026$) and culturally-related skills (pre-intervention mean 3.10 (*SD* 0.98); post-intervention mean 4.22 (*SD* 0.52); $p < .001$) improved their interactions with patients and co-workers.

Effect of technology-based applications and support (pre-test/post-test studies)

A meta-analysis of data from two pre-test/post-test studies assessing the effectiveness of technology-based applications and support may result in a large increase in nurses' level of cultural competence (*SMD* 1.37, CI 95% [1.01, 1.74], $I^2 = 89\%$, $p < 0.0001$) post-intervention (Figure 7). By pooling the data on different attributes of cultural competence, a large effect was observed on cultural awareness, cultural knowledge, and cultural skills. The quality of evidence for these outcomes is considered to be very low due to the serious risk of bias and inconsistency (use of different measurement instruments) in these two pre-test/post-test studies.

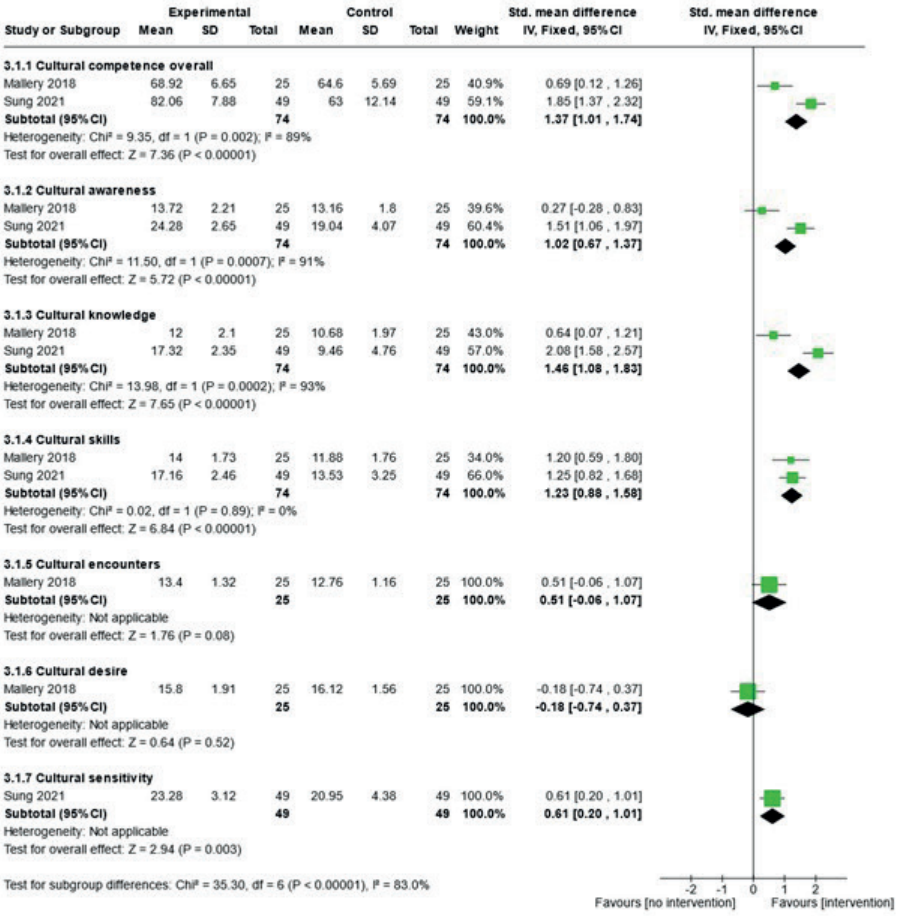


Figure 7 Meta-analysis of data on technology-based applications and support immediately post-intervention (pre-test/post-test studies)

One pre-test/post-test study could not be included in the meta-analysis due to inappropriate data reporting (29). The use of the technology-based application and support (web-based modules) resulted in statistically significant post-intervention changes in overall scores for cultural competence (pre-intervention mean 5.0; post-intervention mean 5.52, $p < 0.01$), and authors also reported changes in subscales cultural awareness and sensitivity (pre-intervention mean 5.81; post-intervention mean 6.81, $p = 0.05$) and subscale cultural competence behaviour (pre-intervention mean 4.42; post-intervention mean 5.07, $p < 0.01$).

Effect of interventions on patient-reported outcomes

No pooling of studies was possible for the patient-related outcomes. Two studies reported on the patient-related outcome patient satisfaction (39, 40). The use of the CultureVision database did not result in statistically significant differences in patient satisfaction (40). Majumdar (2004) reported observing no significant differences in mean scores between patients in the control groups and in the experimental groups with regard to patient satisfaction.

An effect of the intervention on client-nurse trust and satisfaction with nursing care was reported in one study (45). Results showed statistically significant differences between the experimental and the control group in client-nurse trust (Z = -2.42, p = .018), but also in terms of the changes in satisfaction with nursing care (F = 9.22, p = .004) (45). However, the evidence is very uncertain concerning the effects of education and training interventions on patient-related outcomes, since the results are from a single pre-test/post-test study or two studies with a small number of participants, and due to the methodological limitations of these studies.

Summary of findings

For each assessed outcome (nurses' cultural competence, patient satisfaction, client-nurse trust, and satisfaction with provided nursing care) the results from the strongest study designs were used in the summary of findings table (Table 3). Therefore, to assess the nurses' level of cultural competence, the pooled results for education and training in RCTs (37, 38) were chosen. To assess the patient-related outcome patient satisfaction, results from one RCT (39) were used, examining education and training. Client-nurse trust and satisfaction with provided nursing care were established using results for education and training from a pre-test/post-test study (45). The certainty of the underlying evidence for education and training on nurses' level of cultural competence is low due to the data imprecision and risk of bias. Regarding the effects of education and training on patient satisfaction, client-nurse trust, and satisfaction with provided nursing care, the underlying evidence is very uncertain due to the risk of bias and because the evidence is obtained from pre-test/post-test studies with small sample sizes.

Table 3 GRADE Summary of findings table

Effects of education and training on nurses' level of cultural competence
Patient or population: nurses
Setting: any setting
Intervention: education and training
Comparison: no intervention

Outcomes	No. of participants (studies) Follow-up	Certainty of evidence (GRADE)	Impact
Nurses' level of cultural competence (CC)	148 (2 RCTs)	⊕⊕◯◯ Low[a,b]	Education and training may increase the level of nurses' cultural competence slightly (*SMD* 0.20; CI 95% [-0.02, 0.43])
Patient satisfaction	104 (1 RCT)	⊕◯◯◯ Very low[c,d]	The evidence is very uncertain regarding the effect of Education and Training on patient satisfaction, as the result is based on one RCT with a high risk of bias.
Client-nurse trust	41 (1 non-randomised study)	⊕◯◯◯ Very low[d,e]	Education and Training may increase the level of trust in nurses, but the evidence is very uncertain regarding this effect, as the result is based on one study with a small sample size and with a critical risk of bias.
Satisfaction with provided nursing care	41 (1 non-randomised study)	⊕◯◯◯ Very low[d,e]	Education and Training may increase satisfaction with provided nursing care, but the evidence is very uncertain regarding this effect as the result is based on one study with a small sample size and with a critical risk of bias.

CI: confidence interval; **SMD**: standardised mean difference

High certainty: we are very confident that the true effect lies close to that of the estimate of the effect. **Moderate certainty:** we are moderately confident regarding the effect estimate: the true effect is likely to be close to the estimate of the effect but there is a possibility that it is substantially different. **Low certainty**: our confidence regarding the effect estimate is limited: the true effect may be substantially different from the estimate of the effect. **Very low certainty:** we have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect.

Explanations
a. one study has some concerns regarding the risk of bias
b. results based on only two studies, with low number of participants
c. downgraded two points because of high risk of bias; using the ROB2 toll, almost all domains had a high risk of bias
d. result based on only one study
e. downgraded two points due to the critical risk of bias; using the ROBINS-I toll, the study was rated as having a critical risk of bias due to confounding effects and the serious risk of bias in the measurement of outcomes

Discussion

This systematic review and meta-analysis was conducted to investigate whether cultural competence interventions can increase nurses´ levels of cultural competence or improve patient-related outcomes. A total of 17 studies, three RCTs and 14 pre-test/post-test studies, were included in this review; these were published from 2004 to 2024. All of the included studies report effects for interventions on nurses' level of cultural competence, while only three of the studies evaluated the effects of cultural competence interventions on patient-reported outcomes.

The interventions cited in these studies differ in terms of the definitions, applied methods (e.g. through the use of PowerPoint presentations, a mobile app, or an online education course), intervention duration, and measurement instruments used to assess the cultural competence of nurses or the patient-related outcomes. However, the included studies shared a few common characteristics, which led us to define two main categories. The first category, referred to as education and training, included lectures, presentations, case studies, discussions, and different reflection activities. Four-

teen studies were assigned to this category (30-39, 42-45). Three studies (29, 40, 41) were assigned to the second category, referred to as technology-based applications and support. Only two of these studies provided sufficient outcome data for inclusion in a meta-analysis (40, 41). Mallery (2018) focused on an online database called CultureVision, which contains cultural information regarding different ethnic, cultural, religious, and ability groups and gives healthcare practitioners access to information at the bedside regarding culturally competent patient care. Sung and Park (2021) assessed the effect of a mobile app-based cultural competence training programme, whereas Bhat et al. (2015) examined the effect of web-based modules, including self-assessment and culture-specific definitions.

Pooled results for the effects of education and training in RCTs showed a slight increase in nurses' level of cultural competence. Because this result is based on two RCTs, however, and there are some concerns about one of these regarding a risk of bias (37), the quality of evidence for this outcome is considered to be low (see Figure 2 and Table 3). The analysis of the pooled results for education and training from the pre-post studies shows a large effect, but also reveals the considerable data heterogeneity; therefore, confidence in these results is limited, and caution should be exercised when interpreting them. Follow-up examinations of the long-term effects of these interventions were only conducted in a few studies (31, 32, 43, 45), and the analysis of the pooled results shows a non-significant increase in the nurses' cultural competence level.

Two studies examined the impact of technology-based applications and support on nurses' cultural competence (40, 41), both reporting large effects on nurses' level of cultural competence immediately post-intervention. However, the evidence is very uncertain due to the risk of bias (see Figure 3) and high heterogeneity of the data (use of different measurement instruments; see Table 2) in these two pre-post studies.

Two previous reviews were undertaken to investigate evidence for cultural competence interventions, which were designed to improve nurses' self-assessed cultural competence (12, 13) and patient-related outcomes (12). The results of a systematic review conducted by Oikarainen et al. (2019) are similar to our findings. The authors explored the effectiveness of educational

interventions and showed positive effects on nurses' self- assessed cultural competence, ranging from small to very large effect sizes.

The results of our meta-analysis are in part similar to those from Gallagher and Polanin (2015). In their meta-analysis, the pre-test/post-test synthesis results indicated a statistically significant, moderate effect; in contrast, our meta-analysis of the pre-test/post-test study results on the effects of education and training on nurses' level of cultural competence show a large effect, but the certainty of this evidence is limited. However, all studies in our meta-analysis of pre-test/post-test studies indicate the effectiveness of an intervention. Gallagher & Polanin (2015) synthesis of treatment-control studies showed a non-statistically significant, yet positive (small to moderate) effect on nurses' cultural competence, whereby our synthesis of two RCTs shows a non-significant small increase in cultural competence.

A notable difference between Gallagher and Polanin's (2015) and our review is the measurement instruments used to assess the effectiveness of cultural competence. In our review, studies that did not assess outcomes with a valid and reliable measurement tool were excluded. By setting this exclusion criterion, we aimed to increase methodological rigor and strengthen the certainty of evidence.

In a recently published scoping review about interventions used to increase cultural competence in nurses working in clinical practice, it was suggested that appropriate educational training can increase nurses' cultural competence (48). Simulation in particular was highlighted, as it enables the incorporation of cultural components into various vocational training programmes, enhancing participants' comprehension of patient-centred cultural practices (48). In our review, only two studies included cultural simulation exercises in addition to education and training (32, 43). In Delgado et al. (2013), for example, cultural simulation was carried out using the "Clown Culture" method. A group of instructors engaged in a playful exploration of the clown culture with the class using interactive activities. Afterwards, they held a debriefing session to discuss the students' reactions to and feelings about the communication style, traditions, and values of the clown culture (32). However, the simulating part of the intervention lasted only 15 minutes, which was why the whole intervention (duration of intervention was only one hour) was added to the education and training group. In the

second study, the intervention duration was six hours, consisting of three hours of basic concept courses on cultural competence and three hours of situated simulation teaching (43). Since the effectiveness of both intervention parts was assessed together, we decided to add the study to the education and training intervention group, but no clear evidence was obtained for the effectiveness of simulation as a stand-alone intervention on the nurses' cultural competence. A systematic review focusing on simulation-based cultural competence training failed to provide any recommendations due to the overall low methodological quality of the included studies and high heterogeneity among the provided simulation-based interventions (49).

In this review, no pooling of studies was possible to assess the patient-related outcomes. Two studies reported patient satisfaction, but no statistical difference was evident after the implemented intervention (39, 40). A study on the effect of education and training intervention on client-nurse trust and satisfaction with nursing care reported significant effects on both outcomes, but the evidence is very uncertain because the results stem from a single pre-post study with a critical risk of bias (45). Chae et al. (2020) examined the cultural competence educational interventions of healthcare professionals on patient outcomes and found no evident improvement. As in this review, they found only three studies reporting patient-related outcomes, and only the study by Kim and Lee (2016) reported significant intervention effects. It thus remains unclear which intervention most effectively provides culturally competent education for nurses and leads to improved outcomes in patients with diverse cultural backgrounds (1). In our review, two of three studies reporting patient-related outcomes failed to provide detailed information about the patients included. Only Kim and Lee (2016) reported information about the patients included; therefore, a deep discussion about patient-related outcomes derived from enhanced cultural competence in nurses is not possible. Future studies should consider the following important questions when reporting patient-related outcomes: Do the patients have diverse cultural backgrounds, who reports their outcomes, and are the measurement instruments valid and reliable?

In a scoping review about racism in the context of the client-nurse relationship, Vaismoradi et al. (2022) highlighted the importance of cultural competence in nurses, as this facilitates culturally congruent care and helps to avoid racism in a client-nurse relationship. As these authors emphasised,

nurses sometimes struggle to balance their personal prejudices against their professional commitments, often resulting in health disparities and tensions rooted in racism. Sharifi et al. (2019) argued that this explains why improving nurses' cultural competence is crucial for delivering unbiased, individualised care. This improvement involves recognising cultural similarities and differences, adapting care to meet patients' needs, and ensuring the availability of organisational support.

One important consideration is that the use of self-administered instruments to measure nurses' cultural competence may have influenced the results in single studies. In a review on instruments used to measure nurses' cultural competence, Osmancevic et al. (2021) found that commonly utilised instruments are based on nurses' self-reporting competence (20). The subjective measurement method is also considered to be an important limitation. Due to the effect of the social-desirability bias, participants may give a socially appropriate answer that does not reflect their true beliefs (50). Self-administered instruments may also capture participants' perceptions rather than their actual implementation strategies, thus complicating the objective measurement of their attitudes. As a result, the validity of data obtained through self-administered questionnaires may be compromised, which can indirectly affect the reliability of the study's findings (43). Future research should address the need to develop assessment instruments that can be used to assess cultural competence through the patient perspective, in addition to use of validated self-reported cultural competence instruments.

Limitations

This study has a number of limitations. The majority of included studies were uncontrolled pre-test/post-test studies, which vary in their ability to estimate a causal effect (51). Syntheses of observational studies, like pre-post studies, are susceptible to risk for within-study and across-study biases, as well as increased heterogeneity. Pooling effect sizes from pre-test/post-test studies has a high risk of yielding biased outcomes due to the interdependence of pre- and post-intervention scores within the same group (52). This interdependence increases the susceptibility to confounding factors and may lead to bias in the summary effect (53). However, we attempted to minimize the limitations associated with including pre-test/

post-test studies by using the recommend ROBINS-I tool to assess the risk of bias. ROBINS-I is based on the consensus of a large team of developers who addressed all important bias domains (23). In addition, we emphasise the importance of interpreting the results of meta-analyses involving pre-test/post-test studies with caution.

Furthermore, due to the small number and generally low quality of all included studies, sensitivity analyses were not performed, although this had previously been intended as stated in the study protocol. Sensitivity analyses are used to assess the robustness of the meta-analysis and identify potential confounders or methodological differences between studies (53). The absence of sensitivity analyses in our study may limit the interpretability and generalisability of the study results.

Implications

Our review results show that education and training as well as technology-based applications and support can improve the level of nurses' cultural competence. Based on these results, we recommend cultural competence interventions (education and training, technology-based application and support) as continuing education for nurses in practice. The theoretical part of the interventions should promote an understanding of attributes such as cultural knowledge, sensitivity, awareness, communication, and cultural assessment skills. Discussing cultural assessments in the daily nursing routine and offering technology-based educational application and support (e.g. mobile apps) that are accessible to all nursing staff will help promote the maintenance of cultural competence.

The results of our review show that education and training may improve patient-related outcomes, but the certainty of evidence is very low. Given the limited number of studies addressing patient-reported outcomes and the significant limitations of the study methodology, more well-designed studies are needed that address the potential impact of cultural competence interventions on patient-reported outcomes. In particular, rigorously designed, randomised, controlled trials and longitudinal studies are needed to improve the generalisability of the results, and especially regarding effectiveness of cultural competence interventions. These studies should consistently address issues related to the definition of the term *cultural competence*,

theoretical frameworks, measurement instruments, and applied methods. Future research should aim to assess the impact of cultural competence interventions from the patient perspective, as well as the validity instruments used to measure nurses' self-reported cultural competence. In addition to the quantitative measurement methods (instruments) from the patients' or nurses' perspective, we also recommend using more qualitative approaches such as interviews to strengthen the quantitative results. Future studies with more robust designs should include a more in-depth exploration and discussion of simulation and its effectiveness on nurses' cultural competence but also on patient-related outcomes.

Conclusion

This systematic review and meta-analysis was carried out to investigate whether cultural competence interventions impact nurses' level of cultural competence or patient-related outcomes. Cited cultural competence interventions were offered through education and training (including lectures, presentations, case studies, discussions or different reflection activities) or technology-based application and support (mobile app, online database, or web-based training). Our results show that education and training may slightly increase the level of nurses' cultural competence, but certainty of evidence is low. Technology-based application and support can increase nurses' level of cultural competence, but the certainty of evidence is very low; therefore, the results should be interpreted with caution. Despite the growing interest and research in nurses' cultural competence interventions, our review indicates a significant lack of literature examining the impact of such interventions on patient-related outcomes. Due to the low number of studies reporting patient-related outcomes, along with considerable heterogeneity and inconsistency among these studies, the effectiveness of these interventions on patient-reported outcomes remains unclear. All of the studies included in our meta-analysis suggest that the intervention has a positive effect, providing further support for implementing cultural competence interventions. Our study provides up-to-date evidence for the interventions and offers recommendations for future research, practice, and education. In further research, more robust study designs are needed to evaluate the impact of cultural competence interventions on patient-reported outcomes.

Specifically, rigorously designed, randomised, controlled trials and longitudinal studies are necessary to enhance the generalisability of findings.

Education and training can improve the level of nurses' cultural competence; therefore, these should be offered as continuing education for nurses. A combination of offline and online education formats may be recommended. As offline educational interventions, workshops held with smaller groups, including interactive working packages, are considered to be more effective than face-to-face teaching or lecture settings. As our results show, the use of technology-based educational applications and support (e.g. mobile apps) can enhance cultural competence. These results should be used a basis for making these kinds of applications available to all nursing staff. As online educational interventions, online courses or open access courses can strengthen the continuous development of cultural competence.

References

(1) Horvat L, Horey D, Romios P, Kis-Rigo J. Cultural competence education for health professionals. CDSR. 2014(5).

(2) McFarland M, Wehbe-Alamah H. Transcultural Nursing Concepts, Theories, Research, & Practice. Fourth Edition ed. USA: McGraw-Hill Education; 2018.

(3) Smith LS. Reaching for cultural competence. Nursing2023. 2013;43(6):30-7.

(4) Jongen C, McCalman J, Bainbridge R. Health workforce cultural competency interventions: a systematic scoping review. BMC Health Serv Res. 2018;18(1):232.

(5) Vaismoradi M, Fredriksen Moe C, Ursin G, Ingstad K. Looking through racism in the nurse-patient relationship from the lens of culturally congruent care: A scoping review. J Adv Nurs. 2022;78(9):2665-77.

(6) Truong M, Paradies Y, Priest N. Interventions to improve cultural competency in healthcare: a systematic review of reviews. BMC Health Serv Res. 2014;14(1):99.

(7) Chae D, Kim J, Kim S, Lee J, Park S. Effectiveness of cultural competence educational interventions on health professionals and patient outcomes: A systematic review. Jpn J Nurs Sci. 2020;17(3):e12326.

(8) Smith LS. Evaluation of an educational intervention to increase cultural competence among registered nurses. J Cult Divers. 2001;8(2):50-63.

(9) Beach MC, Price EG, Gary TL, Robinson KA, Gozu A, Palacio A, et al. Cultural competence: a systematic review of health care provider educational interventions. Med Care. 2005;43(4):356-73.

(10) Govere L, Govere EM. How Effective is Cultural Competence Training of Healthcare Providers on Improving Patient Satisfaction of Minority Groups? A Systematic Review of Literature. Worldviews Evid Based Nurs. 2016;13(6):402-10.

(11) Alizadeh S, Chavan M. Cultural competence dimensions and outcomes: a systematic review of the literature. Health Soc Care Community. 2016;24(6):117-30.

(12) Gallagher RW, Polanin JR. A meta-analysis of educational interventions designed to enhance cultural competence in professional nurses and nursing students. Nurse Educ Today. 2015;35(2):333-40.

(13) Oikarainen A, Mikkonen K, Kenny A, Tomietto M, Tuomikoski A-M, Meriläinen M, et al. Educational interventions designed to develop nurses' cultural competence: A systematic review. Int J Nurs Stud. 2019;98:75-86.

(14) Chang L-C, Guo JL, Lin H-L. Cultural competence education for health professionals from pre-graduation to licensure delivered using facebook: Twelve-month follow-up on a randomized control trial. Nurse Educ Today. 2017;59:94-100.

(15) Creech C, Filter M, Wehbe-Alamah H, McFarland MR, Andrews M, Pryor G. An Intervention to Improve Cultural Competence in Graduate Nursing Education. Nurs Educ Perspect. 2017;38(6):333-6.

(16) Ho T-T-T, Oh J. Development and Evaluation of Cultural Competence Course on Undergraduate Nursing Students in Vietnam. Int J Environ Res Public Health. 2022;19(2):888.

(17) Silén-Lipponen M, Aura S. Cultural competence learning of the health care students using simulation pedagogy: An integrative review. Nurse Educ Pract. 2021;52:103044.

(18) Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021;372:n71.

(19) Higgins J, Thomas J, Chandler J, Cumpston M, Li T, Page M, et al. Cochrane Handbook for Systematic Reviews of Interventions. 2nd Edition ed. Chichester (UK): John Wiley & Sons; 2019.

(20) Osmancevic S, Schoberer D, Lohrmann C, Großschädl F. Psychometric properties of instruments used to measure the cultural competence of nurses: A systematic review. Int J Nurs Stud. 2021;113:103789.

(21) The EndNote Team. EndNote. EndNote 21 ed. Philadelphia, PA: Clarivate; 2013.

(22) Sterne JAC, Savović J, Page MJ, Elbers RG, Blencowe NS, Boutron I, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. BMJ. 2019;366.

(23) Sterne JA, Hernán MA, Reeves BC, Savović J, Berkman ND, Viswanathan M, et al. ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. BMJ. 2016;355:i4919.

(24) GDT G. GRADEpro Guideline Development Tool McMaster University and Evidence Prime; 2022.

(25) Santesso N, Glenton C, Dahm P, Garner P, Akl EA, Alper B, et al. GRADE guidelines 26: informative statements to communicate the findings of systematic reviews of interventions. J Clin Epidemiol. 2020;119:126-35.

(26) Michael Borenstein LVH, Julian P. T. Higgins, Hannah R. Rothstein. Multiple Outcomes or Time-Points within a Study. Introduction to Meta-Analysis. UK: John Wiley & Sons Ltd; 2009. p. 225-38.

(27) RevMan. Review Manager Web (RevMan Web). 5.4.1 ed: The Cochrane Collaboration; 2020.

(28) Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. Multiple Outcomes or Time-Points within a Study. Introduction to Meta-Analysis. UK: John Wiley & Sons Ltd; 2009. p. 225-38.

(29) Bhat AM, Wehbe-Alamah H, McFarland M, Filter M, Keiser M. Advancing Cultural Assessments in Palliative Care Using Web-Based Education. J Hosp Palliat Nurs. 2015;17(4):348-55.

(30) Cooper-Brathwaite A, Majumdar B. Evaluation of a cultural competence educational programme. JAN. 2006;53(4):470-9.

(31) Cooper-Brathwaite A. Evaluation of a Cultural Competence Course. J Transcult Nurs. 2005;16(4):361-9.

(32) Delgado DA, Ness S, Ferguson K, Engstrom PL, Gannon TM, Gillett C. Cultural competence training for clinical staff: measuring the effect of a one-hour class on cultural competence. J Transcult Nurs. 2013;24(2):204-13.

(33) Elminowski NS. Developing and Implementing a Cultural Awareness Workshop for Nurse Practitioners. J Cult Divers. 2015;22(3):105-13.

(34) Lal A. The impact of an educational offering on the cultural competence of acute care registered nurses in an urban Midwest hospital in the United States. DP - 2011 2011.

(35) Lange JW, Mager DR, Andrews N. The ELDER expansion project: building cultural competence among long term home care workers. Appl Nurs Res. 2013;26(2):58-62.

(36) Edwards AME. Implementation of a transcultural nursing education program to improve nurses' cultural competence.DP - 2019: Walden University; 2019.

(37) Berlin A, Nilsson G, Törnkvist L. Cultural competence among Swedish child health nurses after specific training: A randomized trial. Nurs Health Sci. 2010;12(3):381-91.

(38) Lin M-H, Hsu H-C. Effects of a cultural competence education programme on clinical nurses: A randomised controlled trial. Nurse Educ Today. 2020;88:N. PAG-N.PAG.

(39) Majumdar B, Browne G, Roberts J, Carpio B. Effects of cultural sensitivity training on health care provider attitudes and patient outcomes. J Nurs Scholarsh. 2004;36(2):161-6.

(40) Mallery JT. The Impact of a Cultural Competency Intervention on Provider and Patient Outcomes: A Doctor of Nursing Practice Project: Southeastern Louisiana University; 2018.

(41) Sung S, Park H-A. Effect of a mobile app-based cultural competence training program for nurses: A pre- and posttest design. Nurse Educ Today. 2021;99:104795.

(42) Sarvarizadeh M, Miri S, Darban F, Farokhzadian J. Innovative cultural care training: the impact of flipped classroom methods on critical cultural competencies in psychiatric nursing: a quasi-experimental study. BMC Nurs. 2024;23(1):340.

(43) Hsu JC, Wang MS, Wang PY, Lian SY, Lin MH. The Effects of the Situated Simulation Program on the Cultural Competence of Hemodialysis Nurses: A Quasi-Experimental Study. Healthcare 2023;11(19).

(44) Debiasi LB, Selleck CS. Cultural competence training for primary care nurse practitioners: an intervention to increase culturally competent care. J Cult Divers. 2017;24(2):39-45.

(45) Kim YK, Lee H. The effectiveness of a cultural competence training program for public health nurses using intervention mapping. J Korean Acad Community Health Nurs. 2016;27(4):410-22.

(46) Campinha-Bacote J. The Process of Cultural Competence in the Delivery of Healthcare Services: a model of care. J Transcult Nurs. 2002;13(3):181-4; discussion 200-1.

(47) Leininger M. Culture care theory: a major contribution to advance transcultural nursing and practices. J Transcult Nurs. 2002;13(3):189-92.

(48) Červený M, Kratochvílová I, Hellerová V, Tóthová V. Methods of increasing cultural competence in nurses working in clinical practice: A scoping review of literature 2011–2021. Front Psychol. 2022;13.

(49) Walshe N, Condon C, Gonzales RA, Burke E, Chianáin LN, Thamanam N, et al. Cultural Simulations, Authenticity, Focus, and Outcomes: A Systematic Review of the Healthcare Literature. Clin Simul Nurs. 2022;71:65-81.

(50) Schellings G, Van Hout-Wolters B. Measuring strategy use with self-report instruments: Theoretical and empirical considerations. Metacogn Learn. 2011;6(2):83-90.

(51) Polit DF, Beck CT. Nursing Research: Generating and Assessing Evidence for Nursing Practice. Eleventh edition. ed. Philadelphia: Wolters Kluwer; 2021.

(52) Cuijpers P, Weitz E, Cristea IA, Twisk J. Pre-post effect sizes should be avoided in meta-analyses. Epidemiol Psychiatr Sci. 2017;26(4):364-8.

(53) Metelli S, Chaimani A. Challenges in meta-analyses with observational studies. BMJ Ment Health. 2020;23(2):83-7.

Supplementary file S1

Search strategy

Databases	Search terms
CINAHL **Research Question 1** **2605 results**	AB (((MH "Cultural Competence") OR "cultural competence" OR (MH "Cultural Diversity")) OR ((MH "Cultural Sensitivity") OR "cultural sensitivity") OR ((MH "Transcultural Nursing") OR (MH "Transcultural Care")) OR ("culturally competent care") OR ("cultural awareness") OR ("cultural knowledge") OR ("cultural self-efficacy"))) AND AB ((education OR teaching OR learning OR training OR skill* OR course OR program OR method OR workshop OR simulation OR ("computer based learning") OR ("online learning")) AND AB ((MH "Nurses") OR nurs* NOT student*)
CINAHL **Research Question 2** **380 results**	(((MH "Cultural Competence") OR "cultural competence" OR (MH "Cultural Diversity")) OR ((MH "Cultural Sensitivity") OR "cultural sensitivity") OR ((MH "Transcultural Nursing") OR (MH "Transcultural Care")) OR ("culturally competent care") OR ("cultural awareness") OR ("cultural knowledge") OR ("cultural self-efficacy")) AND (intervention OR education OR teaching OR learning OR training OR skill* OR course OR program OR method OR workshop OR simulation OR ("computer based learning") OR ("online learning")) AND (((MH "Patient-Reported Outcomes")) OR ((MH "Quality of Life") OR "quality of life") OR ((MH "Health Behavior") OR "health behaviour") OR ("patient outcome*") OR ("patient satisfaction") OR ("involvement in care") OR ("treatment outcome*") OR ("patient related outcome*")) AND (((MH "Nurses")) OR nurs* NOT student*)
MEDLINE **Research Question 1** **2480 results**	("Culturally Competent Care"[MeSH Terms] OR "Cultural Competency"[MeSH Terms] OR "Transcultural Nursing"[MeSH Terms] OR "Cultural Diversity"[MeSH Terms] OR "cultural diversit*" OR "culturally competent care" OR "cultural competenc*" OR "transcultural nursing" OR "cultural sensitivity" OR "cultural awareness" OR "cultural self-efficacy" OR "cultural knowledge") AND (education OR teaching OR learning OR training OR skill* OR course OR program OR method* OR workshop OR simulation OR "computer based learning" OR intervention NOT qualitative) AND ("Nurses"[Mesh] OR nurs* NOT student*)

MEDLINE **Research Question 2** **649 results**	(“Culturally Competent Care”[MeSH Terms] OR “Cultural Competency”[MeSH Terms] OR “Transcultural Nursing”[MeSH Terms] OR “Cultural Diversity”[MeSH Terms] OR “cultural diversit*” OR “culturally competent care” OR “cultural competenc*” OR “transcultural nursing” OR “cultural sensitivity” OR “cultural awareness” OR “cultural self-efficacy” OR “cultural knowledge”) AND (education OR teaching OR learning OR training OR skill* OR course OR program OR method* OR workshop OR simulation OR “computer based learning” OR intervention NOT qualitative) AND (“Nurses”[Mesh] OR nurs* NOT student*) AND (“patient related outcome*”) OR (“treatment outcome*”) OR (“patient satisfaction”[MeSH Terms] OR “patient satisfaction”) OR (“health behaviour”) OR (“involvement in care”) OR (“health status”) OR (“health status”[MeSH Terms]) OR “Patient Outcome Assessment”[MeSH Terms])
Ovid (Embase, ERIC, Cochrane, PsychInfo) **Research question 1** **1607 results**	1. nurses/ or nursing staff/ 2. cultural competency/ or cultural diversity 3. transcultural nursing/ 4. culturally competent care/ 5. (nurs* not student). 6. (“cultural competenc*” or “cultural diversity” or “cultural sensitivity” or “cultural awareness” or “cultural self-efficacy” or “cultural knowledge” or “transcultural nursing” or “culturally competent care”). 7. (intervention or education or teaching or learning or training or skill or course or program or method or workshop or simulation or “computer based learning”). 8. 1 or 5 9. 2 or 3 or 4 or 6 10. 7 and 8 and 9

Ovid (Embase, ERIC, Cochrane, PsychInfo) **Research question 2** **691 results**	1.	cultural competency/ or cultural diversity/
	2.	quality of life/
	3.	culturally competent care.mp.
	4.	transcultural nursing.mp.
	5.	cultural sensitivity.mp.
	6.	cultural awareness.mp.
	7.	cultural self-efficacy.mp.
	8.	cultural knowledge.mp.
	9.	..nlpx “query=nurs*”
	10.	involvement in care.mp.
	11.	treatment outcome.mp.
	12.	patient-related outcome*.mp.
	13.	patient satisfaction.mp.
	14.	patient outcome*.mp.
	15.	health status.mp.
	16.	health behaviour.mp.
	17.	2 or 10 or 11 or 12 or 13 or 14 or 15 or 16
	18.	1 or 3 or 4 or 5 or 6 or 7 or 8
	19.	(intervention or education or teaching or learning or training or skill* or course or program or method or workshop or simulation or “computer based learning”).
	20.	17 and 18
	21.	21 9 and 19 and 20

Supplementary file 2

Excluded studies and the reasons for exclusion

	Study	Reason for exclusion
1.	Aboshaiqah, A. E., et al. (2017) https://web.p.ebscohost.com/ehost/detail/detail?vid=0&sid=36c7ff72-f9f8-4870-bb63-51db11d97cf1%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#AN=122316102&db=cin20	Wrong study design
2.	Bristol, S., et al. (2018) 10.1016/j.jen.2018.03.013	Outcomes of interest not included
3.	Bunjitpimol, P., et al. (2018) 10.12669/pjms.341.14080	No tested tool for the outcome assessment
4.	Chae, D., et al. (2021) 10.1016/j.ecns.2021.04.013	Wrong sample
5.	Choi, Y. J. and K. J. Lee (2007) 10.1016/j.apnu.2006.07.006	Intervention did not include cultural competence intervention for nurses
6.	Coleman et al. (2016) 10.9730/ojccnh.org/v6n1a3	Outcomes of interest not included
7.	Felsenstein, D. R. (2018) 10.1097/NND.0000000000000450	No tested tool for the outcome assessment
8.	Huang et al. (2018) https://doi.org/10.1016/j.genhosppsych.2017.10.002	Intervention did not include cultural competence intervention for nurses
9.	Kataoka-Yahiro et al. (2017) 10.1177/1049909116638347	Outcomes of interest not included

10.	Kaur, R., et al. (2019) 10.1007/s00520-018-4507-4	Outcomes of interest not included
11.	Lee et al. (2020) 10.1186/s12912-020-00500-3	Outcomes of interest not included
12.	Neilly et al. (2019) 10.1891/2380-9418.12.1.16	Wrong sample
13.	Park, M. S. and Y. R. Kweon (2013) 10.4040/jkan.2013.43.5.626	Wrong study design
14.	Russell, S. and N. Corbitt (2022) 10.1188/22.CJON.183-189	Outcomes of interest not included
15.	Schim, S. M., et al. (2006) 10.1177/1049909106292246	Wrong sample
16.	Slobodin, O., et al. (2021) 10.2147/RMHP.S365233	Wrong sample
17.	Smith, L. S. (2001) https://pubmed.ncbi.nlm.nih.gov/11855050/	Comparison of two interventions
18.	Taylor, G. M. (2013) https://web.p.ebscohost.com/ehost/detail/detail?vid=0&sid=08a9222c-785f-42d4-a3b6-2e339b12c250%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#AN=109864384&db=cin20	No tested tool for the outcome assessment
19.	Thomas, V. J. and T. Cohn (2006) 10.1111/j.1365-2648.2006.03741.x	No tested tool for the outcome assessment
20.	Waxman et al. (2020) https://doi.org/10.1016/j.ecns.2020.06.015	Wrong study design

Supplementary file S3

Detail information on effect size of each outcome of interest or their narrative description

Author(s) (Year) country	Study design	Measurement instruments/ data collection	Outcomes of interest
Berlin et al. (2010) Sweden	RCT	• The Clinical Cultural Competence Training Questionnaire-pre (CCCTQ-PRE) • Clinical Cultural Competency Training Evaluation Questionnaire-post (CCCTEQ-POST) Data collection • Baseline (T0) • 4 weeks post-intervention (T1)	Cultural awareness IG Pre 4.04 (0.82); Post 4.04 (0.82); CG Pre 3.83 (0.87); Post 3.90 (0.87; *p*=0.70 Cultural knowledge IG Pre 2.63 (0.88); Post 3.12 (0.88) CG Pre 2.70 (0.94); Post 2.77 (0.99); *p*=0.20 Cultural Skills IG Pre 2.93 (0.87); Post 3.50 (0.84) CG Pre 3.53 (0.92); Post 3.30 (0.96); *p*=0.025 Cultural encounters IG Pre 3.40 (0.84); Post 3.76 (0.84) CG Pre 3.72 (0.82); Post 3.57 (0.85); *p*=0.10

Bhat et al. (2015)	**USA**	Pre-test/ post-test	Cultural Competence Assessment Scale (CCA) Data collection • Baseline (T0) • 9 weeks post-intervention (T1)	Cultural competence overall IG Pre 5; IG Post 5.52; $p<0.001$ Cultural awareness and sensibility IG Pre 5.81 vs Post 6.81; $p<0.05$ Cultural Competence Behaviour IG Pre 4.42 vs IG Post 5.07; $p<0.$
Cooper Brathwaite (2005)	**USA**	Pre-test/ post-test	Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised (IAPCC-R) Data collection • Pre-intervention at baseline (T1) • 2 months later pre intervention (T2) • 1 week post-intervention (T3) • 3 months post-intervention (T4)	Cultural competence overall (T1) IG 2.87 (0.23) (T2) IG 2.82 (0.18) (T3) IG 3.38 (0.34) (T4) IG 3.51 (0.37) T2 vs. T3 $p<0.01$ T3 vs. T4 $p<0.01$

Cooper Brathwaite & Majumdar (2006) USA	Pre-test/ post-test	Cultural Knowledge Scale Data collection • Pre intervention at baseline (T1) • 2 months later (T2) • 1 week post-intervention (T3) • 3 months post-intervention (T4)	Cultural knowledge overall (T1) IG 3.78 (T2) IG 3.77 (T3) IG 4.57 (T4) IG 4.59 T1 vs. T2- not significant T2 vs. T3 $p<0.01$
Debiasi & Selleck (2017) USA	Pre-test/ post-test	• Cultural Competence Assessment (CCA) • Clinicians' Cultural Sensitivity Survey Data collection • Pre-intervention • Post-intervention	Cultural competence overall The estimated effect was small Clients' perception of nurses' cultural competence Client perception increased after the training, but the changes were not statistically significant.
Delgado et al. (2013) USA	Pre-test/ post-test	Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised (IAPCC-R) Data collection • Baseline (T0) • 3 months post-intervention (T1) • 6 months post-intervention (T2)	Cultural competence overall T0 IG 65.4 (6.6) T1 IG 67.8 (6.3) T2 IG 67.6 (6.6)

Edwards (2019) USA	Pre-test/ post-test	Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised (IAPCC-R) Data collection • before and after workshop	Cultural competence overall IG pre 67.09 (8.04) post 79.09 (6.95), *p*= 0.000
Elminowski (2015) USA	Pre-test/ post-test	Cultural Competence Self-Assessment Scale Data collection Not stated	Cultural competence The results of this study demonstrated that cross-cultural training provided through workshops is an effective learning method.

Hsu et al. (2023) Taiwan	Pre-test/ post-test	The Nursing Cultural Competence Scale (NCCS) Data collection • Baseline (T0) • Immediately after the intervention (T1) • 8 weeks post-intervention (T2)	Cultural Competence overall T0 2.68 (0.73) T1 2.94 (0.79) T2 2.67 (0.88) Cultural awareness ability T0 2.36 (0.92) T1 2.59 (1.04) T2 2.32 (0.99) Cultural action ability T0 2.65 (0.91) T1 2.86 (1.01) T2 2.48 (1.01) Cultural resources application ability T0 2.99 (1.01) T1 3.37 (1.07) T2 3.09 (1.09) Self-learning cultural ability T0 2.71 (0.88) T1 2.92 (0.94) T2 2.78 (1.34)

Kim & Lee (2016) Korea	Pre-test/ post-test	• Jeffreys's Transcultural Self-Efficacy Tool (TSET) • The client-nurse trust scale • The nursing satisfaction scale Data collection • Pre-intervention (T0) • Post-intervention (T1) • 4 weeks post-intervention (T2)	Cultural competence overall IG T0 5.79 (1.50) T1 6.62 (1.20) T2 7.59 (1.48) CG T0 6.00 (1.09) T1 5.99 (0.88) T2 6.67 (0.92) (*F*=3.54, *p*=.034) TSET cognitive dimension subscale IG T0 6.59 (1.45) T1 6.80 (1.29) T2 7.83 (1.36) CG T0 6.28 (1.15) T1 6.36 (0.85) T2 7.07 (0.85) (*F*=0.52, *p*=.598), TSET practical dimension subscale IG T0 4.95 (1.65) T1 6.41 (1.58) T2 7.27 (1.49) CG T0 5.66 (1.06) T1 5.51 (1.21) T2 6.31 (1.38) (*F*=6.57, *p*=.002), TSET affective dimension subscale IG T0 5.66 (1.06) T1 5.51 (1.21) T2 6.31 (1.38) CG T0 6.09 (1.33) T1 6.16 (1.03) T2 6.30 (1.05) (*F*=2.76, *p*=.070) Client´s trust in nurses IG pre 3.85 (.042); CG pre 4.01 (0.46) IG post 4.11 (0.53); CG post 3.94 (0.44), (*Z*=-2.42, *p*= .018) Satisfaction with nursing care IIG pre 3.69 (0.66); CG pre 3.98 (.0.83) IG post 4.09 (0.50); 3.76 (0.35), adjust (*F*=9.22, *p*=.004)

Lal (2011) USA	Pre-test/ post-test	Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals–Revised (IAPCC-R) Data collection • Pre-intervention • Post-intervention	Cultural competence overall IG pre 70.24 (7.9) post 76.88 (9.0); $p< 0.001$ Cultural desire IG pre 17.12 (2.24) post 17.85 (2.39) Cultural Awareness IG pre 14.21 (1.95) post 15.44 (2.05) Cultural Knowledge IG pre 11.68 (2.53) post 13.38 (2.84) Cultural Encounters IG pre 13.74 (2.03) post 14.79 (1.91) Cultural Skills IG pre 13.50 (2.15) post 15.41 (2.23)
Lange et al. (2013) USA	Pre-test/ post-test	The Cultural Self-Efficacy Scale (CSES) Data collection • Pre-intervention • Post-intervention	Knowledge of cultural concepts IG pre 2.71 (0.93) post 4.03 (0.51); $p = 0.026$ Confidence in performing culturally-related skills IG pre 3.10 (0.98) post 4.22 (0.52); $p = 0.000$

Lin & Hsu (2020) Taiwan	RCT	Nursing Cultural Competence Scale (NCCS) Data collection • Baseline (T0) • Immediately post-intervention (T1) • 2 months post-intervention (T2)	Cultural Competence overall IG T0 3.09 (0.41); T1 3.17 (0.40); T2 3.23 (0.43), *p*=.84 CG T0 3.11 (0.46); T1 3.04 (0.49); T2 3.17 (0.54), Cultural awareness ability IG T0 3.77 (0.75); T1 3.91 (0.70); 3.72 (0.90) CG T0 3.72 (0.83); T1 3.59 (0.78); T2 3.80 (0.81), *p*=.74 Cultural action ability IG T0 2.72 (0.76); T1 2.79 (0.79); T2 2.92 (0.77) CG T0 2.87 (0.70); T1 2.78 (0.80); T2 2.81 (0.79), *p*=.32 Cultural resources application ability IG T0 3.36 (0.81); T1 3.50 (0.88); T2 3.46 (0.98) CG T0 3.52 (0.87); T1 3.24 (1.03); T2 3.46 (0.93), *p*=.34 Self-learning cultural ability IG T0 2.52 (1.00); T1 2.59 (0.86); T2 2.82 (0.97) CG T0 2.62 (1.02); T1 2.56 (1.06); T2 2.62 (1.02), *p*=.39

Majumdar et al. (2004) Canada	RCT	Cultural awareness questionnaire Client satisfaction questionnaire Data collection • Baseline (t1) • 3 months post-randomisation (t2) • 6 months post-randomisation (t3) • 12 months post-randomisation (t4) (t4 after nurses in control group attended the cultural sensitivity training course)	Nurses´ cultural awareness Understanding of multiculturalism IG 2.70 vs. CG 2.37 Cultural awareness IG 14.66 vs. CG1.66, *p*= 0.001 Interacting with people of other cultures IG 3.52 vs. CG 3.31 Comfort in interacting with people of other ethnic groups IG 4.07 vs. CG 3.80 Information on cultural beliefs IG 3.23 vs CG 2.41, *p*= 0.00 Adopting health care literature IG 2.81 vs. CG 2.05, *p*= 0.002 Issue of culture IG 13.73 vs CG 11.36, *p*= 0.001 Patient satisfaction no statistically significant differences in mean scores between IG and CG related to patient satisfaction.

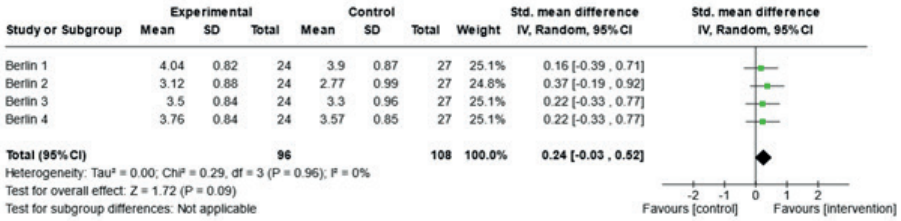
Mallery (2018) **USA**	Pre-test/ post-test	• Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised (IAPCC-R) • The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Data collection • Pre-intervention • Post-intervention	Nurses' cultural competence overall Pre 64.60 (*SD* 5.69), post 68.92 (*SD* 6.65), *p*= 0.0015 Cultural awareness Pre 13.16 (1.80), post 13.72 (2.21), *p*=0.2547 Cultural knowledge Pre 10.68 (1.97), post 12.00 (2.10), *p*=0.0057 Cultural skill Pre 11.88 (1.76), post 10.00 (1.73), *p*=0.000 Cultural encounters Pre 12.76 (1.16), post 13.40 (1.32), *p*=0.0293 Cultural desire Pre 16.12 (1.56), post 15.80 (1.91), *p*=0.3695 Patient satisfaction No statistically significant changes between pre and post values on HCAHPS

Sarvarizadeh et al. (2024) Iran	Pre-test/ post-test	Almutairi's Critical Cultural Competence Scale (CCCS) Data collection • Pre-intervention • Post-intervention	Critical cultural competence overall IG Pre 4.53 (0.64) IG Post 5.33 (0.49), *p*= 0.001 Cultural awareness IG Pre 4.29 (0.97), IG Post 5 (0.75), *p*= 0.001 Cultural knowledge IG Pre 4.38 (0.88), IG Post 5.48 (0.53), *p*= 0.001 Cultural skills IG Pre 4.29 (1.36), IG Post 5.58 (1.27), *p*= 0.001 Cultural empowerment IG Pre 4.6 (1.11), IG Post 5.39 (0.68), *p*= 0.001
Sung & Park (2021) Korea	Pre-test/ post-test	Cultural Competence Scale for Nurses Short Version (CCSN-SF) Data collection • Pre-intervention • Post-intervention	Cultural competence overall Pre IG 63.00 ± 12.14; Post IG 82.06 ± 7.88 *p*<0.001 Cultural sensitivity Pre IG 20.95 ± 4.38; Post IG 23.28 ± 3.12 *p*<0.001 Cultural knowledge Pre IG 9.46 ± 4.07; Post IG 17.32 ± 2.35 *p*<0.001 Cultural awareness Pre IG 19.04 ± 4.76; Post IG 24.28 ± 2.65 *p*<0.001 Cultural skill Pre IG 13.53 ± 3.25 Post IG 17.16 ± 2.46 *p*<0.001

RCT- Randomised Controlled Trial; IG- Intervention group; CG- Control group; CCCTQ- Clinical Cultural Competence Training Questionnaire; CCA- Cultural Competence Assessment Scale; IAPCC-R- Inventory for Assessing the Process of Cultural Competence Among Healthcare Professionals-Revised; NCCS- Nursing Cultural Competence Scale; TSET- Jeffreys's Transcultural Self-Efficacy Tool; CSES- Cultural Self-Efficacy Scale; NCCS- Nursing Cultural Competence Scale; HCAHPS- Hospital Consumer Assessment of Healthcare Providers and Systems; CCCS- Almutairi's Critical Cultural Competence Scale; CCSN-SF- Cultural Competence Scale for Nurses Short Version

Supplementary file S4

Composite scores and meta-analysis



Footnote

Berlin 1	Cultural awareness
Berlin 2	Cultural knowledge
Berlin 3	Cultural skills
Berlin 4	Cultural encounters

Figure 1 Composite score; cultural competence overall, Berlin et al. 2010 (see Figure 4 in manuscript)

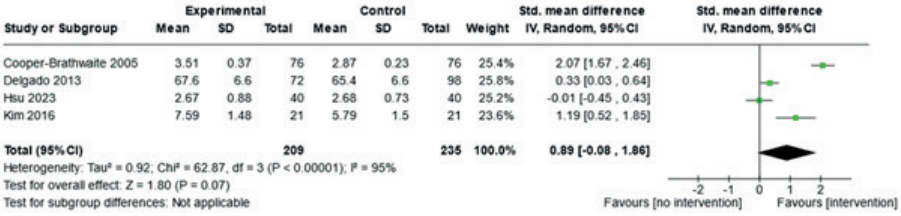


Figure 2 Meta-analysis of education and training on overall cultural competence in long-term effect

General Discussion

In this doctoral thesis, several objectives were addressed. The first aim of the work described in this doctoral thesis was to identify and critically appraise the psychometric properties of instruments used internationally to measure nurses' cultural competence (Chapter 3). Based on the results of the first study, the second aim was to translate the CCA into the German language and to test the psychometric properties of the German version of the instrument (Chapter 4). The third aim was to use the CCA-G instrument to evaluate cultural competence among nurses and nursing students in Austrian acute care settings (Chapter 5). The fourth and final aim described in this thesis was to identify relevant international literature and synthesise the existing evidence on nursing cultural competence interventions that have been developed to improve levels of cultural competence and patient-related outcomes (Chapter 6).

This chapter presents the most significant findings from the conducted studies included in this thesis. Subsequently, theoretical and methodological considerations related to the included studies are presented. Furthermore, implications for nursing practice, education, and for further research are presented. A conclusion summarising the key points is provided at the end of this chapter.

Main findings

The main results of the work presented in this doctoral thesis are summarised below. For purposes of clarity, the main findings are presented in the order the studies were conducted (Chapters 3–6).

Overview of instruments used for the assessment of nurses' cultural competence

The first study (Chapter 3), a systematic review was conducted to evaluate the measurement properties of instruments used to assess nurses' cultural competence. This study provides a broad overview of the existing international instruments and their psychometric properties. The review includes 44 studies covering 21 instruments, among which the most frequently tested were the Cultural Awareness Scale (1), Transcultural Self-Efficacy Tool (2),

Cultural Self-Efficacy Scale (3), and Cultural Competence Assessment (4). Psychometric evaluations were conducted by applying COSMIN criteria (5) to address content validity, structural validity, internal consistency, reliability, measurement error, and construct validity. Most instruments have been previously tested to assess at least one aspect of validity, but seldom for reliability. No studies were found in which the cross-cultural validity, criterion validity, or responsiveness of the included instruments were tested. The review highlights the need for robust, multidimensional instruments to assess cultural competence comprehensively. While certain tools are often used and well established in research, nevertheless, methodological limitations and gaps in psychometric evaluation will restrict the applicability of these instruments in practice and research unless further modifications and psychometric testing are made. Based on the results of this review, some recommendations are made. Firstly, the **Transcultural Self-Efficacy Scale** (2) can be used to assess cultural competence in nursing students. The results for the quality appraisal of measurement properties indicate high content validity and internal consistency for this instrument, but also moderate construct validity and low reliability. Therefore, further reliability testing is recommended. Secondly, two instruments, namely the **Cultural Competence Assessment** (4) and the **Cultural Competence Health Practitioner Assessment** (6), are recommended for assessing cultural competence in registered nurses. The results for the quality appraisal of measurement properties indicate the moderate to high validity and reliability of both instruments.

German version of the Cultural Competence Assessment (CCA-G)

The results of the first study served as the basis for the selection of an instrument to be adapted for use in German-speaking countries. The aim of study 2 (Chapter 4) was to translate and cross-culturally adapt the CCA by translating it into the German language and to evaluate its psychometric properties. Among the recommended instruments described in a previous systematic review, we chose the CCA for its strong construct validity and acceptable internal consistency. After the translation of the CCA from the English into the German language, several validity and reliability psychometric properties were tested. In CCA-G, five items related to cultural assessment were excluded during face and content validity testing, as cultural assess-

ment is not standard in Austrian acute healthcare practice. Additionally, negatively worded items intended to prevent agreement bias were deleted due to their difficulty and potential to confuse respondents. Internal consistency was strong based on the overall scale and the cultural awareness subscale results, while the cultural competence behaviour subscale results, although slightly lower, remained acceptable. The latter demonstrated robust factor loadings, confirming it as a key component. While behaviour represents an observable and actionable aspect of cultural competence, comprehensive cultural competence assessment requires instruments that address at least three key attributes: cultural awareness, knowledge, and skill. However, the CCA-G has been shown to be a valid and reliable tool for evaluating cultural awareness and cultural competence behaviour, core elements that foster culturally congruent, person-centred nursing care.

Cultural competence and influencing factors in nurses working in Austrian acute care settings

In the previous study (Chapter 4), the first instrument (CCA-G) used to assess nurses' cultural competence in the German language was presented as a valid and reliable tool. The aim of study 3 (Chapter 5) was to assess nurses' cultural competence in acute care and factors that influence this with the CCA-G. Austrian nurses and nursing students exhibited moderate to high levels of cultural competence, demonstrating notably high levels of cultural awareness and moderate levels of cultural competence behaviour. Multiple factors were found to significantly influence their cultural competence levels, including their age, educational level, cultural diversity training received, and self-perceived cultural competence. This means that older nurses who had an undergraduate degree or had completed higher education, participated in a diversity training programme, and perceived themselves as somewhat or highly culturally competent tended to have higher cultural competence levels. The study results emphasise the role of self-perception in cultural competence. Nurses who rated themselves as more culturally competent had higher competence levels, reflecting the importance of self-awareness in cultural encounters. Despite these positive findings of moderate to high levels of cultural competence, the study highlights limitations in cultural competence behaviours, indicating a need for enhanced training and organisational support.

Cultural competence interventions and their effectiveness on nurse and patient outcomes

The final study presented in this doctoral thesis (Chapter 6), a systematic review and meta-analysis, was conducted to investigate whether cultural competence interventions can increase nurses' levels of cultural competence or improve patient-related outcomes. A total of 17 studies, three RCTs, and 14 pre-test/post-test studies were included in this review, published from 2004–2024. All of the included studies reported the effects of the intervention on nurses' level of cultural competence, while three of the studies evaluated the effects of cultural competence interventions on patient-reported outcomes. Cultural competence interventions were offered through education and training (e.g. lectures, presentations, case studies, discussions, and different reflection activities) or technology-based applications and support (e.g. mobile app, online database, and web-based training). The results of the meta-analysis show that education and training as well as technology-based applications and support can improve the level of nurses' cultural competence; therefore, these should be offered as continuing education for nurses in practice. Due to a low number of studies reporting patient-related outcomes, along with the considerable heterogeneity and inconsistency observed among these studies, the effectiveness of these interventions to influence patient-reported outcomes remains unclear.

Theoretical consideration

In this section, the key findings of this thesis are discussed in a broader context. These are the: a) assessment of nurses' cultural competence, b) Cultural Competence Assessment German Version (CCA-G), c) Cultural Competence of Austrian nurses working in acute care setting, and d) cultural competence interventions and their effectiveness.

Assessment of nurses' cultural competence

Cultural competence is a dynamic and continuous process rather than an endpoint event. It represents a competence that can be developed, improved, and refined over time (7). According to Sharifi et al. (2019), the development of cultural competence requires personal effort, effective education, and organisational support in nursing care (8). In this doctoral thesis,

we describe at what personal effort in terms of competencies means, and more specifically how it can be measured and what an effective intervention may be. The organisational support was not a subject of this doctoral thesis, because this would go beyond the scope of the work. To investigate the influence of organisational support, additional samples of nurses, e.g. nurses in leading positions or nurse managers, need to be analysed. However, we would like to mention that the benefit of nurses' cultural competence cannot be realised completely without considering organisational support.

The first study presented in this doctoral thesis shows that not every instrument mentioned in the systematic review can be recommended for further use, as some of these may offer incomplete assessments of cultural competence. A measurement instrument requires a clear definition of the construct being measured (9); however, the lack of a standardised definition of the term *cultural competence* means that the instruments are being used to assess different factors of this construct. These factors are often derived from cultural competence theories, models, or concept analyses. In nursing practice, education, and research, plenty of these have been applied (7, 8, 10-15), but all of the researchers have considered the concept of cultural competence as multidimensional. Multidimensional means that all factors (also called attributes, aspects, or dimensions) considered to be relevant are included in the construct of cultural competence. In a literature review of cultural competence models and assessment instruments in nursing, four factors were identified that were indicated for all of them (15): awareness, knowledge, skill, and sensitivity. This indicates that a concept of cultural competence needs to be multidimensional and include the most important mentioned factors. In the same way, a measurement instrument used to assess nurses' cultural competence needs to be multidimensional and include at least these most important factors of cultural competence. However, in our systematic review, not all of the included instruments covered all of the named factors.

Cultural Competence Assessment German Version (CCA-G)

Based on the theoretical assumptions and evaluated psychometric properties, one of the instruments recommended in our systematic review is the Cultural Competence Assessment scale (CCA) (4). The original CCA scale consisting of two subscales is based on the cultural competence model; the

latter, in turn, consists of four factors, namely cultural diversity, cultural awareness, cultural sensitivity, and cultural competence behaviours. In the next study (Chapter 4), we translated and psychometrically tested the German-language version of this instrument. In previous studies on the CCA, two factors, cultural awareness and sensitivity (CAS) and cultural competence behaviours (CCB) could be confirmed through an exploratory factor analysis (EFA) (4, 14) and a confirmatory factor analysis (CFA) (16). However, in our study, these factor models could not be confirmed. Five items related to cultural assessment were removed during face and content validity testing in our study. This can be explained by the fact that cultural assessment is not a standard component of nursing assessment in acute healthcare settings in Austria, making these items difficult to answer (17).

As described above, cultural competence of nurses is a multidimensional concept; therefore, robust and multidimensional instruments are needed to assess nurses' cultural competence comprehensively (18). If a concept has different aspects, the measurement instrument should reflect this multidimensionality (9). The psychometric testing of the CCA-G resulted in the creation of two subscales: cultural awareness and cultural competence behaviours. We examined the CCA-G for the completeness of the cultural competence construct, but as discussed earlier we were not able to confirm that the CCA-G can be effectively used to assess nurses' cultural competence in its entirety.

Cultural competence of Austrian nurses

Austrian nurses and nursing students working in acute care settings show moderate to high levels of cultural competence (19). Our subscale results demonstrate that they have high levels of cultural awareness but display only moderate cultural competence behaviour, indicating that limitations still exist in terms of addressing cultural needs in the daily nursing practice. During the psychometric testing, items regarding cultural assessment were deleted. However, implementing cultural assessments into nursing daily practice, assessing patients' cultural needs and expectations for care, and adapting interventions to meet these needs and expectations are key elements of cultural competence (4). It seems as though cultural assessment is problematic in Austrian acute care. If we carefully examine the results of study 3, we recognise that Austrian nurses are aware of cultural influences

on care and are willing to increase their cultural competence, but many of the study participants also reported that they do not have access resources (e.g. text books that would help them to learn more about different cultural values and needs). Some barriers (e.g. discriminatory perceptions or discriminatory behaviours) regarding nursing care may not be known; therefore, these are seldom recognised by nurses (20). In summary, Austrian nurses rarely have the opportunity to adapt their nursing care to fit the cultural preferences of their patients (19).

In order to enhance nurses' cultural competence, organisational support (in terms of time resources) is needed (21). Access to different data sources (e.g. textbooks, journals) and targeted education and training programmes are necessary to provide ongoing professional development. Curtis et al. (2019) argued that healthcare organisations must take responsibility for promoting culturally congruent, patient-centred care (see Chapter 1) by addressing workplace stressors and promoting workforce diversity. In their study, time pressure and working pressure were identified as barriers to providing culturally congruent, patient-centred care (22). On the other hand, the authors identified the increase in the number of nurses with different cultural backgrounds as a facilitator. Due to their own cultural backgrounds, these nurses are more likely to identify barriers to providing culturally congruent care and may strive more strongly to provide such culturally congruent, patient-centred care. As a further facilitator, the need to apply different strategies to recruit and retain culturally competent nurses, such as financial incentives or professional development opportunities (23), is emphasised.

Using the method of multiple regression analysis, study 3 (Chapter 5) identified factors that may be relevant to the development of cultural competence from the perspective of the individual nurse. The age, education level, previous cultural diversity training, and self-perceived cultural competence were identified as influencing factors. Approximately half of the nurses who had participated in cultural diversity training previously scored higher on the CCA-G. These results align with those for the Cultural Competence Model, suggesting that increased training leads to more frequent culturally competent behaviours (14). This finding is consistent with those of previous studies (4, 14, 24) which indicate that prior diversity training enhances cultural competence. However, some studies have found that prior

diversity training specifically affects culturally competent behaviour rather than awareness (25, 26). Although training on cultural diversity has been identified internationally as one of the most important factors in the development of cultural competence (20, 27-31), some of the implemented trainings also have been criticised. Critiques have suggested that some diversity trainings are not up to date and lead to stereotyping (32), and many researchers have called for state-of-the-art educational interventions (e.g. simulations or technology support) rooted in established theories, emphasising patient-centred care and self-reflection (19-21, 32, 33). It is therefore crucial to search for and scrutinise the effectiveness of these interventions, which is presented below.

Cultural competence interventions and their effectiveness

Cultural competence has been widely recognised as a skill that can be developed by carrying out targeted educational interventions (7). Previous research established the implementation of educational interventions as an effective approach to enhance all or at least some factors of cultural competence (29-32). Based on our systematic review and meta-analysis, we present these results within the theoretical framework of this doctoral thesis, applying the concept analysis described by Sharifi et al. (2019) (see Figure 3).

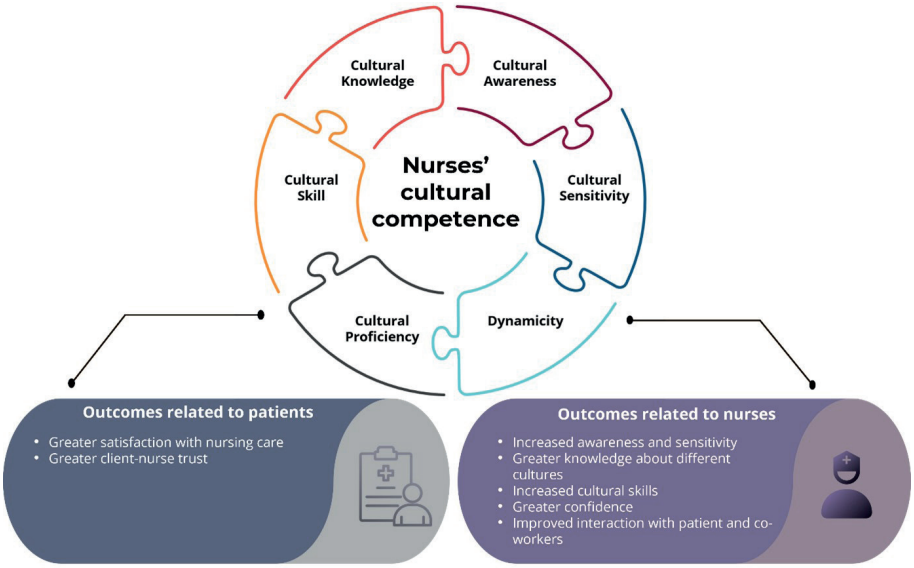


Figure 2 Theoretical framework used in this doctoral thesis based on the concept analysis described by Sharifi et al. (2019) and modified based on our study results

Based on the results of our last study (Chapter 6), the implementation of cultural competence interventions results in improvements in patient-related outcomes, as well as outcomes related to nurses. Although many more patient-related outcomes were mapped in the concept of nurses' cultural competence (8), our study results provide evidence for improvement in only two outcomes, namely satisfaction with nursing care and client-nurse trust. Two studies have assessed the effectiveness of cultural competence interventions on patient satisfaction, but no statistically significant differences in outcomes were evident after the intervention were implemented (34, 35). In the systematic review by Chae et al. (2020), the authors examined the influence of cultural competence educational interventions implemented by healthcare professionals on patient outcomes and found no statistically significant improvement (36). Like our findings, these authors found only three studies reporting patient-related outcomes, and only one study reported significant intervention effects (37). It thus remains unclear which intervention most effectively provides culturally competent education for nurses and leads to improvements in patient outcomes (30).

The improved outcomes related to nurses were increased awareness and sensitivity, greater knowledge about different cultures, improved cultural skills, increased confidence, and enhanced interactions with patient and co-workers. Our review findings indicate overall that education and training, as well as technology-based applications and support, can enhance nurses' cultural competence. Based on these findings, cultural competence interventions should be offered as part of continuing education for practicing nurses. However, regardless of the type of intervention implemented, cultural competence interventions need to be grounded in established theories (e.g. Campinha-Bacote's model of cultural competence (38)) to strengthen the nurses' ability to provide person-centred care and encourage self-reflection regarding their own cultural backgrounds and biases (19, 30, 32, 33).

Methodological reflection

This section includes a critical reflection on some of the methodological decisions made when conducting the individual studies included in this doctoral thesis. Firstly, the strengths of the studies are highlighted and, secondly, the limitations are critically reflected upon.

Strength of the conducted studies

A major strength of the performed studies is the use of the most comprehensive and newest versions of relevant methodological approaches (i.e. reporting guidelines, quality appraisal tools, data analysis methods). To find relevant literature in our first study, we used a highly sensitive search filter that enabled us to identify studies on measurement properties of measurement instruments (39). At the time our study was carried out, the COSMIN research group had published this search filter only for PubMed. Once permission to modify this had been received, we modified this search filter for every database we searched as part of our systematic review. To assess the quality of studies and instruments included, we used the most advanced methodological approaches available, including quality assessments including the COSMIN checklist (40) and the criteria for good psychometric properties (5). Additionally, the synthesised evidence was graded by taking a modified GRADE approach (5). Unlike previous reviews on the measurement properties of instruments used to measure cultural competence, our systematic review addressed nurses and nursing students, underlining the importance of focusing on a specific population (5). By using the COSMIN approach, our high-quality systematic review provides a comprehensive overview of the quality (i.e. measurement properties) of instruments and supports the evidence-based recommendations provided that help researchers select the most suitable instrument for an assessment of cultural competence (i.e. in research or clinical practice or in discriminative, evaluative, or predictive applications). We have published these clear recommendations for the most suitable available measurement instrument (5). Using the current standardised methodological approaches, our systematic review has appeared in the highest-ranked nursing journal (*International Journal of Nursing Studies*).

The strength of the second and third study was its large sample of 915 participants. We were able to include data from nurses and nursing students from different parts of Austria. During the adaptation and preliminary testing phases, we included a large number of experts (nurses, nursing researchers, nursing educators, psychologists, and experts in questionnaire development) in different phases of the testing. Furthermore, this is the first nurses' cultural competence assessment instrument to be tested in German language which can now be used in the German-speaking countries (17).

A key strength of the fourth study, a systematic review and meta-analysis, lies in its application of the most up-to-date methods, such as rigorous and comprehensive quality appraisal tools. The quality assessment of randomised controlled trials (RCTs) was conducted using the ROB2 tool (41), while the pre-post study quality was evaluated with the ROBINS-I tool (41). Both tools are recognised for their comprehensive frameworks and stringent rating criteria. ROBINS-I is based on the consensus of a large group of experts and builds on recent developments regarding the risk of bias assessment of randomised trials and diagnostic test accuracy studies (42). Additionally, as in the first systematic review, the findings were synthesised and presented using summary-of-findings tables created with the GRADE approach (43). To interpret our findings, we used the standardised statements to interpret and communicate the results of systematic reviews based on the GRADE Guideline (44). The statements assume that the certainty of the evidence is based not only on the imprecision of the result (i.e. the power of the analysis and the width of the confidence interval), but also on other criteria, such as the risk of bias of the studies, the inconsistency (heterogeneity) of the result, the indirectness (including subgroup analyses and the applicability of the outcome measure), and publication bias.

Limitations of the conducted studies

Some limitations of the studies included in this thesis should be addressed. The first study was limited due to the need to synthesise evidence from pooled studies published in different languages (on instruments) and conducted in different countries. These included instruments with (slightly) different cultural competence constructs. Therefore, some of the pooled, modified versions did not cover all of the same factors of the cultural competence concept. In the case of the modified cultural awareness scales (CAS), these instruments are consistent with the underlying concept of the scale, including items included to assess attitudes (e.g. perceptions of educational experiences, cognitive awareness, and comfort with interactions) (45-47). Measurement instruments often have multiple/modified versions, e.g. different language versions, modified or adapted versions with a different number of items (e.g. short forms), and versions with a different mode of administration, response scales, or scoring algorithms (48). Evaluating each version individually ensured that the highest-quality instrument is identified

and can be recommended for future use. For example, a longer version may be comprehensive, while a shorter version may lack relevant items (48). The summarised results would have been more comprehensive if modified instruments had been pooled together only if they had the same factor models. In future studies, this limitation could potentially be avoided by using the upgraded COSMIN guideline (48) and the new guideline for reporting systematic reviews of outcome measurement instruments, the 2024 version of the PRISMA-COSMIN for outcome measurement instruments (49). Among its other new features, the upgraded COSMIN guideline incorporates methods for grading the quality of the evidence (certainty assessment using the GRADE approach) in the review management file, which allows the better utilisation and reporting of extracted information about each measurement instrument.

A further limitation in this thesis is the use of the cross-sectional study design in study 2 and 3. The cross-sectional study design is often used to provide an initial view of a given topic; data is collected at one point in time, and a snapshot of a sample population is provided (50). This design is useful for estimating prevalence and exploring associations between variables, for instance, to identify influencing factors. However, this study design did not allow us to draw conclusions about causality (51). To increase the understanding of nurses' cultural competence, future studies with longitudinal designs should be undertaken. As the sampling method in study 2 and 3, we used convenience sampling, because this commonly used method provides an efficient, cheap, and easy way to select participants (50). However, it may be that only nurses who were interested in the topic of cultural competence took part in this study. This consideration may limit the overall generalisability of the study findings.

Another important methodological consideration regarding study 2 and 3 is related to the instrument used. The CCA-G is a self-reporting instrument. Like other instruments used to assess the cultural competence, the CCA-G is also limited by its risk of bias. The social desirability bias is most commonly reported, which may lead participants to give a socially acceptable answers that do not reflect their true beliefs (52). To address this limitation and gain a more comprehensive understanding of nurses' cultural competence, it would be beneficial to include patient-report instruments and qualitative evaluation methods, such as interviews, focus groups, or observational stud-

ies, in future studies. Such methods allow for a deeper exploration of participants' experiences, attitudes, and behaviours and provide more detailed insights into the topic of cultural competence.

A limitation of the fourth study is that most of the included studies employed a pre-post design, and the ability of this design to accurately estimate causal effects is inherently limited (53). Syntheses of observational studies, like pre-post studies, are susceptible to a risk of within-study and across-study bias, as well as increased heterogeneity. In addition, observational studies may not be the most appropriate study design for assessing causal relationships between an intervention and an outcome, as several characteristics might differ or change over time between the different intervention groups. In uncontrolled pre-post studies, a significant risk of bias exists due to the interdependence of pre- and post-intervention scores within the same group. This interdependence increases the susceptibility to confounding factors (53) and may bias the summary effect (54). However, as the meta-analysis of observational data is more directly applicable to the general population, it is often desirable to combine observational data with RCTs (54). We were also able to include three RCTs in our meta-analysis, which yielded similar results as those of observational studies. In addition, we also attempted to minimise the limitation related to including pre-post studies by using the recommended ROBINS-I tool to assess the risk of bias. ROBINS-I is based on the consensus of a large team of developers because it covers all important bias domains (42). This is not true of any other tool used to assess the risk of bias in observational studies (43). In view of these limitations, we emphasise the need to interpret the results cautiously, and particularly the results of meta-analyses that include a substantial proportion of data from uncontrolled pre-test/post-test studies.

Implications

Key implications and recommendations for research as well as practice and nursing education have been drawn to enhance the assessment of nurses' cultural competence and to improve the effectiveness of cultural competence interventions. These implications and recommendations are presented in research and practice and nursing education sections.

Implications and recommendations for research

Given the large availability of instruments for assessing cultural competence, the development of entirely new self-administered instruments is not recommended (18). Instead, we recommend the adaptation and further testing of the psychometric properties of the existing instruments. In particular, we recommend that researchers conduct further testing of less frequently assessed properties, such as measurement error, responsiveness, and cross-cultural validity. Testing these aspects is essential to ensure that instruments provide reliable and valid results in different healthcare settings and populations (5). Based on our study results, we recommend some measurement instruments for use in further research as well as in nursing practice and nursing education. The Cultural Competence Assessment (CCA) (4) and the Cultural Competence Health Practitioner Assessment (CCHPA) (6) are recommended for assessing nurses' cultural competence. The Transcultural Self-Efficacy Scale (55) can be used as a tool to assess cultural competence in nursing students, but further reliability and validity testing is recommended. Furthermore, in addition to the quantitative measurement methods (instruments), we recommend the use of qualitative approaches, such as interviews or mixed methods. Qualitative results will provide more insight into the topic, improve the interpretability of study results, and support quantitative results.

Since the CCA-G includes only two factors of the cultural competence construct, we recommend further extending this instrument. In order to avoid limitations associated with self-reporting instruments and to increase our understanding of nurses' cultural competence, we recommend including patient-reporting of cultural competence in future studies. Furthermore, the use of qualitative evaluation methods, such as interviews or focus groups in addition to surveys would be beneficial. Applying such methods may allow for a deeper exploration of participants' experiences, attitudes, and behaviours and may provide more detailed insights into the topic of cultural competence (56). Future studies should also be conducted to assess the usability of the CCA-G in other healthcare settings, and especially in long-term care institutions, as the number of residents with a migrant background is increasing every year in Austria long-term care settings (19, 57).

According to the results of study 4, education and training may improve nurses' cultural competence. However, only a limited number of studies have assessed the effectiveness of cultural competence interventions on patient-related outcomes, and considerable limitations in study methodology were noted (58). Therefore, more well-designed studies are needed that address the potential impact of cultural competence interventions on patient-related outcomes. In particular, rigorously designed, randomised, controlled trials and longitudinal studies are needed to improve the interpretability and generalisability of the results on the effectiveness of cultural competence interventions. Longitudinal studies need to be considered due to uncertainties regarding how long it may take for the implemented intervention to influence patient outcomes.

Implications and recommendations for practice and nursing education

Cultural competence interventions continue to be major strategy to enhance the cultural competence of nurses. Ongoing nursing education related to cultural diversity is recommended to promote culturally congruent, person-centred nursing care (7, 8, 30, 32, 59, 60). Already before graduation, nursing students need to be prepared to take care of culturally diverse patients (61). In particular, these students should have the opportunity to develop a deeper cultural awareness by receiving education on key aspects of culturally congruent, patient-centred care, such as communication, language, religion, social values, and cultural norms (62).

The results of study 4 show that education and training as well as technology-based applications and support can improve the level of nurses' cultural competence (58). Based on these results, we recommend cultural competence interventions (education and training, technology-based application and support) as continuing education for nurses in practice. Using a combination of offline and online education is recommended. As offline educational interventions, workshops in small groups including interactive working packages, problem-based learning, or simulations may be more effective than traditional face-to-face teaching or lectures. For example, blended learning methods have been shown to stimulate participants to learn more actively (63). As our results show, technology-based educational applications and support (e.g. mobile apps) can enhance cultural competence. These

results argue for making these kinds of applications accessible to all nursing staff. As online educational interventions, promoting online courses or open access courses (e.g. Massive Open Online Courses (MOOCs)) that can be joined at any time can strengthen the continuous development of cultural competence (58). Online learning resources are versatile and can be used to help meet individual learning needs and promote self-directed learning (63).

To measure personal efforts as well as the effectiveness of cultural competence interventions, we recommend the use of a valid and reliable instrument. To assess the cultural competence of nurses, the Cultural Competence Assessment (CCA) (4) and the Cultural Competence Health Practitioner Assessment (CCHPA) (6) are recommended. CCHPA emerges as the most comprehensive tool for assessing cultural competence, particularly due to its detailed structure and broad applicability. However, this tool can be considered time-consuming since it consists of 67 items. In contrast, the CCA offers a more feasible alternative, with a significantly shorter, 25-item format that can be completed in less time. This argument may be particularly advantageous in clinical or research settings where time constraints are an important issue; therefore, the balance between comprehensiveness and feasibility needs to be considered when selecting an appropriate instrument. The translated and psychometrically tested CCA-G is recommended for assessing cultural awareness and cultural competence behaviour in nurses in German-speaking countries (17).

The provision of culturally congruent, person-centred nursing care cannot be achieved without the support of healthcare organisations (64). Although this topic is not the subject of this doctoral thesis, organisational support is highly relevant to nurses' acquisition of cultural competence. We recommend that healthcare organisations provide nurses with the necessary tools (e.g. technology-based educational applications like mobile apps and support), resources (e.g., relevant literature or time for learning), and opportunities for continuing education so they can provide higher-quality nursing care to patients with different cultural backgrounds.

Conclusion

In the introduction of this doctoral thesis, we introduced our reader to Hasib. By presenting his case, we wanted to highlight the importance of pro-

viding person-centred, culturally congruent nursing care. Hasib's struggle to maintain his spiritual practice during hospitalisation highlights how unmet cultural and spiritual needs can lead to distress, even when the care team's intentions are to ensure the patient's safety. Addressing such needs is a cornerstone of the provision of person-centred, culturally congruent nursing care. In this doctoral thesis, we described studies carried out to modify the CCA-G, an instrument that can be used to assess nurses' cultural competence in German-speaking countries and which can be easily integrated into nursing practice due to its practicability. We also have provided information about the cultural competence of Austrian nurses and identified influencing factors by using the CCA-G. Furthermore, we identified several ways to enhance person-centred, culturally congruent nursing care, such as educational interventions. These could include workshops for nurses in smaller groups including interactive working packages, but also instructions for how to perform cultural assessments and provide care to best meet the patients' cultural and spiritual needs.

Thinking back on Hasib's case, the culturally congruent, patient-centred care would include a cultural assessment conducted together with him and his family due to his communication difficulties. His spiritual needs would be assessed, and nursing care would be adapted in light of these needs. For Hasib, this could include assisting him with ritual washing and creating a safe environment for prayer several times a day. Such adaptations would ensure the patient's safety while still respecting his cultural and spiritual needs.

References

(1) Rew L, Becker H, Cookston J, Khosropour S, Martinez S. Measuring cultural awareness in nursing students. J Nurs Educ. 2003;42(6):249-57.

(2) Jeffreys MR, Smodlaka I. Exploring the factorial composition of the transcultural self-efficacy tool. Int J Nurs Stud. 1998;35(4):217-25.

(3) Bernal H, Froman R. Influences on the cultural self-efficacy of community health nurses. J Transcult Nurs. 1993;4(2):24-31.

(4) Doorenbos AZ, Schim SM, Benkert R, Borse NN. Psychometric evaluation of the cultural competence assessment instrument among healthcare providers. Nurs Res. 2005;54(5):324-31.

(5) Prinsen CAC, Mokkink LB, Bouter LM, Alonso J, Patrick DL, de Vet HCW, et al. COSMIN guideline for systematic reviews of patient-reported outcome measures. Qual Life Res. 2018;27(5):1147-57.

(6) Harris-Haywood S, Goode T, Gao Y, Smith K, Bronheim S, Flocke SA, et al. Psychometric evaluation of a cultural competency assessment instrument for health professionals. Med Care. 2014;52(2):e7-e15.

(7) Alizadeh S, Chavan M. Cultural competence dimensions and outcomes: a systematic review of the literature. Health Soc Care Community. 2016;24(6):117-30.

(8) Sharifi N, Adib-Hajbagheryb M, Najafic M. Cultural competence in nursing: A concept analysis. Int J Nurs Stud. 2019;99.

(9) de Vet HCW, Terwee CB, Mokkink LB, Knol DL. Measurement in Medicine: A Practical Guide. Cambridge: Cambridge University Press; 2011.

(10) Alligood MR. Nursing Theorists and Their Work. 9th ed. Amsterdam: Elsevier; 2017.

(11) Lin C-J, Lee C-K, Huang M-C. Cultural Competence of Healthcare Providers: A Systematic Review of Assessment Instruments. J Nurs Res. 2017;25(3):174-86.

(12) McFarland M, Wehbe-Alamah H. Transcultural Nursing Concepts, Theories, Research, & Practice. 4th ed. USA: McGraw-Hill Education; 2018.

(13) Purnell L. The Purnell Model for Cultural Competence. J Transcult Nurs. 2002;13(3):193-6.

(14) Schim SM, Doorenbos A, Benkert R, Miller J. Culturally congruent care: putting the puzzle together. J Transcult Nurs. 2007;18(2):103-10.

(15) Shen Z. Cultural competence models and cultural competence assessment instruments in nursing: a literature review. J Transcult Nurs. 2015;26(3):308-21.

(16) Chae D, Kang KH, Benkert R, Doorenbos AZ. Evaluation of the psychometric properties of the Korean version of the Cultural Competence Assessment. Jpn J Nurs Sci. 2018;15(1):56-66.

(17) Osmancevic S, Großschädl F, Stijic M, Lohrmann C. The German version of the Cultural Competence Assessment (CCA-G): cross-cultural adaptation and validation study in Austrian acute care settings. BMC Nurs. 2022;21(1):77.

(18) Osmancevic S, Schoberer D, Lohrmann C, Großschädl F. Psychometric properties of instruments used to measure the cultural competence of nurses: A systematic review. Int J Nurs Stud. 2021;113:103789.

(19) Osmancevic S, Großschädl F, Lohrmann C. Cultural competence among nursing students and nurses working in acute care settings: a cross-sectional study. BMC Health Serv Res. 2023;23(1):105.

(20) Claeys A, Berdai-Chaouni S, Tricas-Sauras S, De Donder L. Barriers and facilitators in providing care for patients with a migration background. J Clin Nurs. 2023;32(5-6):912-25.

(21) Schenk L, Sonntag P-T, Beck P, Khan Z, Peppler L, Schouler-Ocak M. Organisational and staff-related effects on cultural competence in the hospital setting: a cross-sectional online survey of nursing and medical staff. BMC Health Serv Res. 2022;22(1):644.

(22) Curtis E, Jones R, Tipene-Leach D, Walker C, Loring B, Paine SJ, et al. Why cultural safety rather than cultural competency is required to achieve health equity: a literature review and recommended definition. Int J Equity Health. 2019;18(1):174.

(23) Medicine NAoSEa. The Future of Nursing 2020-2030: Charting a Path to Achieve Health Equity. Wakefield MK, Williams DR, Le Menestrel S, Flaubert JL, editors. Washington, DC: The National Academies Press; 2021.

(24) Lin MH, Chang TH, Lee YH, Wang PY, Lin LH, Hsu HC. Developing and validating the nursing cultural competence scale in Taiwan. PLoS ONE. 2019;14(8).

(25) Červený M, Dimunová L, Della Pelle C, Papp K, Siaki LLA, Kilíková M, et al. Self-Reported Cultural Competence of Nurses Providing Nursing Care in Slovakia. J Nurs Scholarsh. 2020;52(6):705-12.

(26) Cicolini G, Della Pelle C, Comparcini D, Tomietto M, Cerratti F, Schim SM, et al. Cultural Competence Among Italian Nurses: A Multicentric Survey. J Nurs Scholarsh. 2015;47(6):536-43.

(27) Betancourt JR, Green AR. Commentary: linking cultural competence training to improved health outcomes: perspectives from the field. Acad Med. 2010;85(4):583-5.

(28) Červený M, Siaki L, McGee P, Kilíková M. Perception of European nurses of culturally-appropriate health care – a cross-sectional study. Med Og Nauk Zdr. 2019;25(1):27-32.

(29) Handtke O, Schilgen B, Mösko M. Culturally competent healthcare – A scoping review of strategies implemented in healthcare organizations and a model of culturally competent healthcare provision. PLOS ONE. 2019;14(7).

(30) Horvat L, Horey D, Romios P, Kis-Rigo J. Cultural competence education for health professionals. Cochrane Database Syst Rev. 2014(5).

(31) Jongen C, McCalman J, Bainbridge R. Health workforce cultural competency interventions: a systematic scoping review. BMC Health Serv Res. 2018;18(1):232.

(32) Oikarainen A, Mikkonen K, Kenny A, Tomietto M, Tuomikoski A-M, Meriläinen M, et al. Educational interventions designed to develop nurses' cultural competence: A systematic review. Int J Nurs Stud. 2019;98:75-86.

(33) WHO. The health of refugees and migrants in the WHO European Region2023 30.08.2024. Available from: https://www.who.int/europe/news-room/fact-sheets/item/the-health-of-refugees-and-migrants-in-the-who-european-region.

(34) Majumdar B, Browne G, Roberts J, Carpio B. Effects of cultural sensitivity training on health care provider attitudes and patient outcomes. J Nurs Scholarsh. 2004;36(2):161-6.

(35) Mallery JT. The Impact of a Cultural Competency Intervention on Provider and Patient Outcomes: A Doctor of Nursing Practice Project: Southeastern Louisiana University; 2018.

(36) Chae D, Kim J, Kim S, Lee J, Park S. Effectiveness of cultural competence educational interventions on health professionals and patient outcomes: A systematic review. Jpn J Nurs Sci. 2020;17(3).

(37) Kim YK, Lee H. The effectiveness of a cultural competence training program for public health nurses using intervention mapping. J Korean Acad Community Health Nurs. 2016;27(4):410-22.

(38) Campinha-Bacote J. The Process of Cultural Competence in the Delivery of Healthcare Services: a model of care. J Transcult Nurs. 2002;13(3):181-4.

(39) Terwee CB, Jansma EP, Riphagen II, de Vet HCW. Development of a methodological PubMed search filter for finding studies on measurement properties of measurement instruments. Qual Life Res. 2009;18(8):1115-23.

(40) Terwee CB, Prinsen CA, Chiarotto A, deVet HC, Bouter LM, Alonso J, et al. COSMIN methodology for assessing the content validity of patient-reported outcome measures: a Delphi study. Qual Life Res. 2018;27(5):1159-70.

(41) Sterne JAC, Savović J, Page MJ, Elbers RG, Blencowe NS, Boutron I, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. BMJ. 2019;366.

(42) Sterne JA, Hernán MA, Reeves BC, Savović J, Berkman ND, Viswanathan M, et al. ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. BMJ. 2016;355:i4919.

(43) Higgins J, Thomas J, Chandler J, Cumpston M, Li T, Page M, et al. Cochrane Handbook for Systematic Reviews of Interventions. 2nd Edition ed. Chichester (UK): John Wiley & Sons; 2019.

(44) Santesso N, Glenton C, Dahm P, Garner P, Akl EA, Alper B, et al. GRADE guidelines 26: informative statements to communicate the findings of systematic reviews of interventions. J Clin Epidemiol. 2020;119:126-35.

(45) McElroy J, Smith-Miller CA, Madigan CK, Li Y. Cultural Awareness Among Nursing Staff at an Academic Medical Center. J Nurs Adm. 2016;46(3):146-53.

(46) Başalan F, Bayık Temel A. Cultural awareness scale: Psychometric properties of the Turkish version. Collegian. 2017;24(5):499-504.

(47) Choi H, Suh E, Park C, Park J, Fernandez E. Reliability and Validity of a Korean Version of the Cultural Awareness Scale (K-CAS). Korean J Adult Nurs. 2015;27:472-9.

(48) Mokkink LB, Elsman EBM, Terwee CB. COSMIN guideline for systematic reviews of patient-reported outcome measures version 2.0. Qual Life Res. 2024;33(11):2929-39.

(49) Elsman EBM, Mokkink LB, Terwee CB, Beaton D, Gagnier JJ, Tricco AC, et al. Guideline for reporting systematic reviews of outcome measurement instruments (OMIs): PRISMA-COSMIN for OMIs 2024. J Patient Rep Outcomes. 2024;8(1):64.

(50) Liamputtong P. Handbook of Research Methods in Health Social Sciences: Springer Singapore; 2019.

(51) Polit DF, Beck CT. Nursing Research: Generating and Assessing Evidence for Nursing Practice. 11th ed. Philadelphia: Wolters Kluwer; 2021.

(52) Schellings G, Van Hout-Wolters B. Measuring strategy use with self-report instruments: Theoretical and empirical considerations. Metacogn Learn. 2011;6(2):83-90.

(53) Cuijpers P, Weitz E, Cristea IA, Twisk J. Pre-post effect sizes should be avoided in meta-analyses. Epidemiol Psychiatr Sci. 2017;26(4):364-8.

(54) Metelli S, Chaimani A. Challenges in meta-analyses with observational studies. BMJ Ment Health. 2020;23(2):83-7.

(55) Jeffreys MR, Dogan E. Factor analysis of the transcultural self-efficacy tool (TSET). J Nurs Meas. 2010;18(2):120-39.

(56) Li S, Miles K, George RE, Ertubey C, Pype P, Liu J. A critical review of cultural competence frameworks and models in medical and health professional education: A meta-ethnographic synthesis: BEME Guide No. 79. Med Teach. 2023;45(10):1085-107.

(57) Perchinig; B, Schaur K. Betreuungs- und Pflegebedarf älterer MigrantInnen: Bedarfsabschätzung und Herausforderungen. Vienna: International Centre for Migration Policy Development; 2015.

(58) Osmancevic S, Steiner LM, Großschädl F, Lohrmann C, Schoberer D. Effectiveness of nurses´ cultural competence interventions: systematic review and meta-analysis. 2025.

(59) Campinha-Bacote J. Delivering patient-centered care in the midst of a cultural conflict: the role of cultural competence. Online J Issues Nurs. 2011;16(2):5.

(60) Govere L, Govere EM. How Effective is Cultural Competence Training of Healthcare Providers on Improving Patient Satisfaction of Minority Groups? A Systematic Review of Literature. Worldviews Evid Based Nurs. 2016;13(6):402-10.

(61) Majda A, Zalewska-Puchała J, Bodys-Cupak I, Kurowska A, Barzykowski K. Evaluating the Effectiveness of Cultural Education Training: Cultural Competence and Cultural Intelligence Development among Nursing Students. Int J Environ Res Public Health. 2021;18(8):4002.

(62) Tosun B, Yava A, Dirgar E, Şahin EB, Yılmaz EB, Papp K, et al. Addressing the effects of transcultural nursing education on nursing students' cultural competence: A systematic review. Nurse Educ Pract. 2021;55:103171.

(63) Du L, Zhao L, Xu T, Wang Y, Zu W, Huang X, et al. Blended learning vs traditional teaching: The potential of a novel teaching strategy in nursing education - a systematic review and meta-analysis. Nurse Educ Pract. 2022;63:103354.

(64) Taylor RA, Alfred MV. Nurses' Perceptions of the Organizational Supports Needed for the Delivery of Culturally Competent Care. West J Nurs Res. 2010;32(5):591-609.

Chapter 8

Abstract

Nurses' cultural competence has been identified as one of the key competencies that enable nurses to provide culturally congruent, person-centred care that respects and integrates patients' cultural values and needs. To address knowledge gaps and identify opportunities for improving person-centred, culturally congruent nursing care, it is essential to identify the most valid and reliable instruments that can be used to assess nurses' cultural competence. An assessment of cultural competence is also needed to evaluate the impact of implemented interventions, such as cultural competence education programmes. The overall aims of the work presented in this doctoral thesis were to assess nurses' cultural competence with a valid and reliable measurement instrument and to assess the effectiveness of educational interventions. Results of these assessments then served as sources for recommendations for education and practice. To achieve these aims, we conducted a systematic review (Chapter 3), a cross-sectional study on nurses (*N* = 915) working in Austrian acute care setting (Chapter 4 and 5), and performed a meta-analysis (Chapter 6).

In this doctoral thesis, we provide a broad overview of the existing international instruments and their psychometric properties. The review included 44 studies covering 21 instruments. Furthermore, we modified the CCA-G, which is a valid and reliable tool for evaluating cultural awareness and cultural competence behaviour, as core elements in fostering culturally congruent, person-centred nursing care. Using the CCA-G, we show that Austrian nurses and nursing students exhibit moderate to high cultural competence, demonstrating notably high levels of cultural awareness and moderate levels of cultural competence behaviour. Multiple factors were found to significantly influence these cultural competence levels, including age, educational level, cultural diversity training, and self-perceived cultural competence. The results of the meta-analysis show that education and training as well as technology-based applications and support can enhance nurses' cultural competence; therefore, these should be offered as continuing education for nurses in practice. The use of a combination of offline interventions (workshops in small groups, including interactive working packages) and online interventions (open access courses like Massive Open Online Courses (MOOCs)) is recommended. To assess cultural awareness and cultural competence behaviour in nurses in German-speaking countries, we recommend the use of

the CCA-G. Future studies should be conducted to assess the usability of the CCA-G in other healthcare settings, and especially in long-term care institutions, as the number of residents with a migrant background is increasing every year in Austrian long-term care settings.

Chapter 9

Zusammenfassung

Die kulturelle Kompetenz von Pflegepersonen stellt eine Schlüsselkompetenz dar, die es den Pflegepersonen ermöglicht, eine kulturell kongruente, personenzentrierte Pflege zu leisten, die die kulturellen Werte und Bedürfnisse der Patient*innen respektiert und einbezieht. Um Wissenslücken zu schließen und Möglichkeiten zur Verbesserung der personenzentrierten, kulturkongruenten Pflege zu ermitteln, ist es wichtig, zuverlässige Instrumente zur Messung der kulturellen Kompetenz zu identifizieren. Die Einschätzung der kulturellen Kompetenz ist auch erforderlich, um die Auswirkungen durchgeführter Interventionen (z. B. Fortbildungen) zu bewerten. Die Ziele dieser Dissertation sind die Einschätzung der kulturellen Kompetenz von Pflegepersonen mit einem validen und zuverlässigen Messinstrument und die Effektschätzung von Fortbildungsmaßnahmen. Die Ergebnisse dieser Arbeit dienen zur Empfehlungsableitung für die pflegerische Ausbildung und Praxis. Um diese Ziele zu erreichen, wurde eine systematische Übersichtsarbeit (Kapitel 3), eine Querschnittsstudie mit Pflegepersonen in österreichischen Akuteinrichtungen (*N* = 915) (Kapitel 4 und 5), und eine Meta-Analyse (Kapitel 6) durchgeführt. Innerhalb der systematischen Übersichtsarbeit (44 Studien zu 21 Instrumenten) wird ein umfassender Überblick über die international bestehenden Instrumente und ihre psychometrischen Eigenschaften gegeben. Darüber hinaus modifizierten wir das CCA-G, ein valides und reliables Instrument zur Evaluierung von kulturellem Bewusstsein und kulturell kompetentem Verhalten, welche als Grundelemente zur Förderung personenzentrierter, kulturkongruenter Pflege angesehen werden. Anhand des CCA-G zeigten wir, dass österreichische Pflegepersonen eine moderate bis hohe kulturelle Kompetenz aufweisen. Dabei zeigten sie hohes kulturelles Bewusstsein und einen moderaten Grad an kulturell kompetentem Verhalten. Alter, Bildungsniveau, Weiterbildung zur kulturellen Diversität sowie die wahrgenommene kulturelle Kompetenz waren signifikante Einflussfaktoren. Ergebnisse der Metaanalyse zeigten, dass Weiterbildung sowie technologiegestützte Anwendungen und Unterstützung die kulturelle Kompetenz verbessern können; daher sollten diese als Fortbildung für Pflegepersonen in der Praxis angeboten werden. Eine Kombination aus Offline-Fortbildungsmaßnahmen (Workshops in kleinen Gruppen mit interaktiven Arbeitspaketen) und Online- Fortbildungsmaßnahmen (frei zugängliche Kurse wie Massive Open Online Courses (MOOCs)) wird empfohlen. Für die Einschätzung

des kulturellen Bewusstseins und des kulturell kompetenten Verhaltens von Pflegepersonen im deutschsprachigen Raum empfehlen wir das CCA-G. Künftige Studien sollen die Anwendbarkeit des CCA-G in anderen Gesundheitsbereichen, wie den Langzeitpflegeeinrichtungen, untersuchen, da die Anzahl der Bewohner*innen mit Migrationshintergrund in österreichischen Langzeitpflegeeinrichtungen steigt.

Chapter 10

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Chapter 11

Curriculum Vitae

Selvedina Osmancevic studied 'Health and Nursing Science' at the Medical University of Graz, Austria, and obtained her Bachelors' degree in 2013. From 2013 to 2016, she pursued her Masters' degree in Health and Nursing Science with a special focus on nursing research. In 2019 she started her doctoral studies, participating in the Doctoral program Nursing Science of the Medical University of Graz (Austria), Maastricht University (The Netherlands), and Bern University of Applied Science (Switzerland). In the context of her doctoral studies, she was involved in the organization of The European Doctoral Conference in Nursing Science (EDCNS) in years 2019 and 2024.

In 2018, she started working as a researcher at the Institute of Nursing Science at the Medical University of Graz. The focus of her research are topics of quality of care. She is part of the international research team of the annually conducted 'Nursing Quality Measurement 2.0' survey (measurement of care indicators such as pressure ulcers, incontinence or malnutrition in the Austrian healthcare institutions). In teaching Masters' students, she focuses on research techniques and statistical analysing techniques.

Selvedina Osmancevic is active as a reviewer in numerous scientific journals (e.g. BMC Nursing, Human Resources for Health, BMC Geriatrics, International Journal of Nursing Studies Advanced).

Chapter 12

List of publications and presentations

Articles in peer-reviewed journals

Osmancevic S, Steiner LM, Großschädl F, Lohrmann C, Schoberer D. The Effectiveness of Cultural Competence Interventions in Nursing: A Systematic Review and Meta-analysis. 2025. Accepted for publication in International Journal of Nursing Studies.

Osmancevic S, Großschädl F, Stijic M, Lohrmann C. The German version of the Cultural Competence Assessment (CCA-G): cross-cultural adaptation and validation study in Austrian acute care settings. BMC Nurs. 2022;21(1):77.

Osmancevic S, Schoberer D, Lohrmann C, Großschädl F. Psychometric properties of instruments used to measure the cultural competence of nurses: A systematic review. Int J Nurs Stud. 2021;113:103789.

Osmancevic S, Großschädl F, Lohrmann C. Cultural competence among nursing students and nurses working in acute care settings: a cross-sectional study. BMC Health Serv Res. 2023;23(1):105.

Hoedl M, **Osmancevic S**, Bauer S. Characteristics of Fecal Incontinence A Secondary Analysis of Stool Consistency Data as Predictors for Incontinence-Associated Dermatitis. J Dermat Nurses Asso. 2023; 15(2): 76-83.

Hoedl M, **Osmancevic S**, Thonhofer N, Reiter L, Schoberer D. Psychosocial interventions for healthcare workers during the COVID-19 pandemic: rapid review and meta-analysis. Wien Med Wochenschr. 2023; 1-8.

Hoedl M, Bauer S, Eglseer D, Everink I, Gordon AL, Lohrmann C, Saka B, Schols JMGA, **Osmancevic S**. Urinary incontinence prevalence and management in nursing homes in Austria, the Netherlands, Turkey and the United Kingdom: A multi-site, cross-sectional study. Arch Gerontol Geriatr. 2022; 103:104779.

Hoedl M, Eglseer D, Bernet N, Everink I, Gordon AL, Lohrmann C, **Osmancevic S**, Saka B, Schols JMGA, Thomann S, Bauer S. Which factors influence the prevalence of institution-acquired falls? Results from an international, multi-center, cross-sectional survey. J Nurs Scholarsh. 2022; 54(4):462-469

Osmancevic S, Bauer S. Pain and its associated factors in nursing home residents. Geriatr Nurs. 2022; 47: 29-33.

Osmancevic S, Eglseer D, Bauer S, Hoedl M. Secondary data analysis of intertrigo in hospital and geriatric settings: a comparison of prevalence, anatomical locations, and interventions. Wound Manag Prev. 2022; 68(3): 12-18.

Lampersberger LM, Bauer S, **Osmancevic S**. Prevalence of falls, incontinence, malnutrition, pain, pressure injury and restraints in home care: A narrative review. Health Soc Care Community. 2022; 30(6):e3656-e3669.

Schoberer D, **Osmancevic S**, Reiter L, Thonhofer N, Hoedl M. Rapid review and meta-analysis of the effectiveness of personal protective equipment for healthcare workers during the COVID-19 pandemic. Public Health Pract. 2022; 4: 100280.

Eglseer D, **Osmancevic S**, Hoedl M, Lohrmann C, Bauer S. Improving the quality of nursing care in Austria: 10 years of success. J Nurs Manag. 2021; 29(2):186-193.

Everink IH, Gordon AL, Rijcken S, **Osmancevic S**, Schols JMG. Learning and improving in long-term care internationally: the International Prevalence Measurement of Care Quality (LPZ). Geriatr Gerontol Aging. 2021;15:e0210056

Oral presentation on international and national conferences

Osmancevic S, Großschädl F, Lohrmann C. Vielfalt in der Pflege: Kulturelle Kompetenz in der pflegerischen Praxis. Pflegekongress 2024; 28-29 November 2024; Vienna, Austria.

Osmancevic S, Großschädl F, Lohrmann C. Cultural Competence: Illuminating Paths to Patient-Centered Care. European Doctoral Conference in Nursing Science; 19-20 September 2024; Graz, Austria.

Osmancevic S, Großschädl F, Lohrmann C. How culturally Competent Are Austrian Nurses? 9th International Conference of European Transcultural Nursing Association; 12-15 June, 2024; London, UK.

Osmancevic S. Cultural competence among academic nurse professionals. 8 th International Conference Quality and Its Perspectives: 4 Pillars of Care; 24 April 2024; Pardubice, Czech Republic.