Master Thesis

Prevalence of obesity in Austrian hospitals – a secondary data analysis

submitted by

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Declaration of Academic Integrity

I hereby confirm that the present diploma thesis is the result of my own independent scholarly work. I also confirm that in all cases, where material from the work of others (in books, articles, essays, dissertations, and on the internet) is acknowledged, quotations and paraphrases are clearly indicated. No material other than that cited in the reference list has been used. I have read and understood the Medical University's regulations and procedures concerning plagiarism.

Graz, 12.09.2024 Altin Zharri m.p.

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Abstract in German

Hintergrund: Die Prävalenz von Adipositas hat weltweit in den letzten vier Jahrzehnten zugenommen, auch in Österreich. Adipositas stellt erhebliche Herausforderungen für Patient*innen, Gesundheitsfachkräfte und das Gesundheitssystem dar. Bis dato ist das österreichische Gesundheitssystem hauptsächlich auf die Hospitalisierung und weniger auf die Prävention von Krankheiten ausgerichtet. Die steigende Prävalenz von Adipositas in der Allgemeinbevölkerung könnte zu mehr adipösen Patient*innen im Krankenhaus führen. Diese Masterarbeit zielt darauf ab, die Prävalenz von Adipositas bei Patient*innen in sekundären und tertiären Krankenhäusern in Österreich zu beschreiben, und Unterschiede nach Geschlecht, Altersgruppen, medizinischen Diagnosen und Pflegeabhängigkeit aufzuzeigen.

Methoden: Eine Sekundärdatenanalyse unter Verwendung von Daten aus der Pflegequalitätserhebung 2.0 (Nursing Quality Measurement 2.0) wurde durchgeführt. Diese Erhebung basiert auf einem deskriptiven Querschnittsdesign und wird jährlich durchgeführt. Die analysierten Daten wurden zwischen dem 9. und 11. November 2022 gesammelt.

Ergebnisse: Daten von 2741 stationären Patient*innen in tertiären und sekundären Krankenhäusern in Österreich wurden analysiert. 21,3 % der stationären Patient*innen wurden als adipös eingestuft. Tertiäre Krankenhäuser hatten eine ähnliche Prävalenz von Adipositas wie sekundäre Krankenhäuser. Mehr Frauen als Männer wurden als adipös eingestuft. Die höchste Prävalenz von Adipositas lag bei Patient*innen im Alter von 40–59 Jahren vor, die niedrigste bei Patient*innen über 80 Jahren. Adipöse Patient*innen hatten häufiger Diabetes Mellitus und Herz-Kreislauf-Erkrankungen. Pflegeunabhängige Patient*innen hatten eine höhere Prävalenz von Adipositas als pflegeabhängige Patient*innen.

Schlussfolgerungen: Im Vergleich zur Allgemeinbevölkerung weisen hospitalisierte österreichische Patient*innen eine höhere Prävalenz von Adipositas

auf. Diese Erkenntnisse können helfen, potenzielle Risikogruppen zu identifizieren sowie multidisziplinäre Teams und Entscheidungsträger im Gesundheitswesen bei der Entwicklung von Interventionen zur Verbesserung der Versorgungsqualität für adipöse Patient*innen, zu unterstützen.

Abstract in English

Background: The prevalence of obesity has increased worldwide over the past four decades, including in Austria. Obesity poses significant challenges for patients, healthcare professionals and the healthcare system. To date, Austria's healthcare system is primarily focused on hospitalisation and less in disease prevention. The rising obesity prevalence in the general population may lead to more obese patients in the hospital setting. This master thesis aims to describe the prevalence of obesity in patients treated at secondary and tertiary hospitals in Austria and to show differences by gender, age groups, medical diagnoses, and care dependency.

Methods: A secondary data analysis was performed using data from The Nursing Quality Measurement 2.0 survey. The survey itself is based on a descriptive cross-section design and conducted annually. The analysed data was collected between November 9th and 11th 2022.

Results: Data from 2741 inpatients treated at tertiary and secondary hospitals in Austria were analysed. 21.3% of the inpatients were classified as obese. Tertiary hospitals had a similar prevalence of obesity to secondary hospitals. More women than men were classified as obese. The highest prevalence of obesity was in patients aged 40–59 years, and the lowest was in patients over 80 years old. Obese patients were more likely to have diabetes mellitus and cardiovascular diseases. Care-independent patients had a higher prevalence of obesity than care-dependent patients.

Conclusions: Compared to the general population, hospitalised Austrian patients have a higher prevalence of obesity. These findings can help identify potential risk groups and assist multidisciplinary teams and healthcare decision-makers in developing interventions to improve care quality for obese patients.

Previously Published Research

According to WHO (2017), the global prevalence of obesity has roughly tripled over the last four decades, affecting an estimated 13% of the adult population in 2016. The highest obesity rates were observed in the WHO regions of the Americas (26.7%), Europe (21.9%), and Eastern Mediterranean (18.7%) (Yatsuya et al., 2014). Austria has also experienced a rise in obesity. Statistik Austria (2020) reported that in 2019, 16.5% of Austrians aged 15 and older were obese reported that in 2019, 16.5% of Austrians aged 15 and older were obese.

In international hospital settings, studies from the past decade show varying obesity prevalence rates depending on the country. In the US, Hossain et al. (2018) reported the highest obesity prevalence among hospitalised patients at 31%, while the lowest prevalence was reported by Orhurhu et al. (2020) at 19.3%. In Australia, obesity rates ranged from 22.5% (Dennis et al., 2018) to 39% (Dennis and Trevenen, 2016). In Europe, a Norwegian study by Følling et al. (2014) found an 18.3% obesity prevalence among adult patients at a single-site tertiary hospital. In Austria, Großschädl and Bauer (2022) reported that 25% of adult ICU patients were obese. A detailed description of the previously published research can be found in the supplementary appendix in Table 9.

Table of Contents

List of Abbreviations

etc.: etcetera

e.g.: for example

i.e.: for example

ICU: Intensive Care Unit

SH: Secondary Hospital

TH: Tertiary Hospital

US: United States of America

Glossary

BFP: Body Fat Percentage

BMI: Body-Mass-Index

CDC: Centers for Disease Control and Prevention

CDS: Care Dependency Scale

DEXA: Dual-Energy-X-ray-Absorptiometry

HDL: High-Density Lipoprotein

HRQoL: Health-Related Quality of Life

ICD: International Classification of Diseases

NAFLD: Non-Alcoholic Fatty Liver Disease

PGLE: Potential Gains in Life Expectancy

SD: Standard Deviation

STEMI: ST-Elevation Myocardial Infarction

WC: Waist Circumference

WHO: World Health Organisation

WHR: Waist-to-Hip-Ratio

WHtR: Waist-to-Height Ratio

List of Figures

List of Tables

1. Introduction

1.1 Background of the research problem

Since 1975 the prevalence of obesity worldwide has tripled, as reported by the World Health Organization. In 2016, approximately 1.9 billion adults aged 18 and above were considered overweight with over 650 million of them being classified as obese. This accounts for 13% of the adult population. While obesity used to be a health concern in high-income nations it has now rapidly spread to low and middle-income countries, particularly in urban areas. On a global scale, except in the southern Sahara and Asia regions, there are more overweight than underweight individuals. In most countries overweight and obesity contribute to more deaths than underweight (WHO, 2023b). Since 1980 there has been a continuous rise in the prevalence of overweight and obesity with almost one-third of the world's population currently falling into these categories (Chooi et al., 2019). This increase in obesity prevalence has been documented in a variety of geographical areas, ethnicities, and socioeconomic backgrounds (Inoue et al., 2018)

Table 1 illustrates the age-standardized estimation of the prevalence of obesity for adults in specific countries in 1983, 2003, and 2016, according to the WHO (2017). This table demonstrates that the prevalence of obesity is increasing globally. Notably, countries with varying geographical locations and economic conditions were chosen.

Table 1: Prevalence of obesity in different countries according to WHO, 2017

Country	Prevalence of Obesity 1983	Prevalence of Obesity 2003	Prevalence of Obesity 2016
Austria	8.8%	15.0%	20.1%
US	15.0%	27.6%	36.2%
China	0.8%	2.8%	6.2%

Saudi Arabia	15.8%	27.5%	35.4%
South Africa	12.2%	21.3%	28.3%
Ethiopia	0.8%	2.3%	4.5%

When looking separately at the six designated regions by the WHO (Africa, Americas, Eastern Mediterranean, Europe, South East Asia and Western Pacific). it was noted that the Americas (26.7%), Europe (21.9%), and Eastern Mediterranean (18.7%) had the highest prevalence of obesity among adults above 20 years old (Yatsuya et al., 2014). One of the highest prevalences of obesity among adults worldwide has been observed in the United States (Boutari and Mantzoros, 2022). Focusing on the European Region, data from the WHO European Region Obesity Report indicates that nearly a quarter (23%) of individuals are affected by obesity. Notably, obesity is more common in females (24%) than in males (22%) in this context (WHO, 2022).

Similar to many other countries, the obesity problem has not spared Austria either. For this European country, the nationally representative “Austrian Health Survey 2019” found that 16.5% of Austrians aged 15 and older were classified as obese in 2019. This represented a 3.7% increase compared to the prevalence recorded in the years 2006/2007. In contrast to the global prevalence of obesity by gender, Austrian men presented with a higher prevalence of obesity at 17,9% compared to women, in whom a prevalence of 15,0% was found (Statistik Austria, 2020). Similar findings were also observed in another long-term trend study, analysing data in the time span from 1973 to 2014, conducted by Großschädl and Stronegger (2019), where the age-standardized prevalence of obesity was 16.8% for men and 14.6% for women. The research highlighted that, for the first time in Austria, men surpassed women in terms of obesity prevalence. Similarly, Dorner et al. (2023) described that obesity rates in the general Austrian population have been on the rise among both genders based on data from three cross-sectional health interview surveys, carried out between 2006 and 2019. Men experienced the highest increase, from 13.7% in 2006 to 20% in 2019 while women's prevalence went up from 15.2%, to 17.8% during the same period.

1.2 Definition of obesity

Defining obesity is essential because it influences several other factors (i.e. prevalence rates, epidemiological studies, public health policies etc.). It also provides a foundation to understand and address this complex phenomenon. Obesity is defined by the International Classification of Diseases 11 (ICD-11) as "a chronic complex disease characterised by an abnormal and excessive accumulation of adipose tissue, or body fat, resulting in an increase in body weight and body mass index (BMI) that can impair health (WHO, 2023a). Although the WHO recognised obesity as a global epidemic in the late 1940s, it was not until the late twentieth century that the term acquired significance once its association to major disorders was confirmed (James, 2008).

1.3 Assessment of obesity

There are several methods to assess body fat and classify obesity each with their own advantages and disadvantages. The sub-sections below provide an overview of some used approaches for evaluating obesity.

1.3.1 Usage of Body Mass Index to assess obesity

BMI is a statistical index that uses an individual's height and weight to estimate the percentage of body fat across individuals of any age (Weir and Jan, 2023). The calculation involves dividing the body mass (in kilogrammes) by height squared (in metres) ($BMI = Body\ mass\ (kg)/Height^2\ (m^2)$). This formula will then produce the individual's BMI as a result. BMI is one of the most widely used tools to assess obesity (Adab et al., 2018, Ghesmaty Sangachin et al., 2018). It has numerous advantages in assessing obesity, including its practicality, simplicity, accessibility, and applicability for population-level assessments (Nuttall, 2015, Khanna et al., 2022).

Moreover, BMI is divided into categories to assess whether an individual is underweight, at a normal weight, overweight, or obese. Obesity is classified by the

WHO using BMI categories, with a BMI of 30 kg/m² or higher in adults considered as the threshold for obesity. Table 2 provides an overview of BMI classification for adults over 18 years as per the ICD-11 guidelines.

Table 2: Classification of obesity by BMI

BMI (kg/m²)	Obesity's classification
≤ 18.5	Underweight
18.5 – 24.9	Normal weight
25.0 – 29.9	Overweight (Pre-obesity)
30.0 – 34.9	Obesity class I (Obesity)
35.0 – 39.9	Obesity class II (Severe obesity)
≥ 40.0	Obesity class III (Morbid obesity)

This BMI classification is used by the WHO for Caucasians, Hispanics and Black individuals (Weir and Jan, 2023).

However, despite its benefits, it is important to acknowledge the various challenges linked to the usage of BMI to define obesity. These challenges include difficulties in distinguishing between lean muscle mass and fat mass (e.g. in bodybuilders and Japanese sumo wrestlers), the inability to identify fat distribution, the low sensitivity and inequality across genders, races, ethnicities and age groups (Buss, 2014, Adab et al., 2018, Yamauchi et al., 2004). As an example, an individual with a BMI of 30 kg/m² who has abdominal adipose tissue accumulation and subsequent metabolic and/or cardiovascular comorbidities, may face greater health risks compared to someone, with a BMI of 40 kg/m² whose adipose tissue is mainly located in the lower extremities (Eisenberg et al., 2022). Another challenge with BMI is that it does not take into account the full extent of sarcopenic obesity (the combination of muscle loss and increased fat mass, especially visceral obesity) (Donini et al., 2022, Ludwig et al., 2017, Batsis and Zagaria, 2018). This means that evaluating the risk of obesity based on BMI should be approached as a very individual process.

During the past decade, ethnicity has become increasingly important in determining the appropriate cutoff points for classifying obesity. As an example, guidelines specific to the Asian and South Asian populations have been established for classifying a BMI between 23 and 24.9 kg/m² as overweight and a BMI of 25 kg/m² as obese (Haam et al., 2023, Misra, 2015, Weir and Jan, 2023). In Austria obesity is defined using the WHO threshold values of BMI ≥ 30 kg/m² (Statistik Austria, 2020).

1.3.2 Usage of other anthropometric indicators to assess obesity

Aside from BMI, there are several tools for defining obesity. Piqueras et al. (2021) described in their literature review several anthropometric indicators like Waist Circumference (WC), Waist-to-Hip Ratio (WHR), Waist-to-Height Ratio (WHtR), Body Fat Percentage (BFP), among others that can be used to assess obesity.

- *Waist Circumference (WC)* is a simple and practical method to assess visceral adipose tissue; it is defined as the circumference around the waist. Some of the disadvantages are that it lacks standardization in its measurement protocols, that it can be difficult to measure the WC in individuals BMI ≥ 35kg/m² and that it is influenced by gender, age and ethnicity.
- *Waist-to-Hip-Ratio (WHR)* is an index value for fat distribution in the body and indicates the ratio between the circumference of the waist and the hips. Some of the disadvantages include WHR accuracy being lower for individuals with BMI ≥ 35kg/m², that it is influenced by gender and that there are no specific data for children.
- *Waist-to-Height-Ratio (WHtR)* is an easy-to-use index to measure the distribution of body fat. It is also known as the Index of central obesity. WHtR is calculated by dividing the waist circumference (WC) by height in the same unit. Disadvantages include no specific data for children and, as with the above tools, difficulties assessing WHtR in individuals with BMI ≥ 35 kg/m2.
- *Body Fat Percentage (BFP)* indicates the proportion of fat mass in the whole body in relation to total body mass. It is therefore calculated by dividing the total

fat mass (kg) by the total body mass (kg). A disadvantage of the BFP is that it can be influenced by gender, age and ethnicity.
(Piqueras et al., 2021)

1.3.3 Usage of other methods to assess obesity

Apart from the above-mentioned indexes, there are other methods for assessing obesity. CT scans give a consistent and reliable measurement of visceral adipose tissue. Dual-Energy-X-ray-Absorptiometry (DEXA) is considered as the gold standard for measuring fat mass both at the overall and regional levels (Piqueras et al., 2021). Nonetheless, DEXA and CT-scan have significant drawbacks due to the equipment's limited accessibility, the high cost of the imaging examination, and the radiation exposure related to multi-slice CT-scan protocols (Samouda, 2021).

1.4 Causes and influencing factors of obesity

As seen in the previous chapter, multiple tools are available to assess obesity. However, a comprehensive assessment of obesity should go beyond anthropometric measurements and should identify the individual causes of obesity. The following section aims to explore the causes and influencing elements that contribute to the obesity pandemic. To start with, obesity is a complex condition that has numerous contributing variables. The primary cause of obesity is an imbalance between energy intake and expenditure, which results in the accumulation of excess energy as adipose tissue (Lin and Li, 2021).

Furthermore, genetics, environmental and social factors significantly impact obesity (Jackson et al., 2020). As an example of the genetic factor, when both parents are obese, the chances of a child also becoming obese are higher than if both parents are non-obese (Albuquerque et al., 2017). However, the rapid increase of obesity prevalence cannot be explained only by genetics. The interaction between genetic factors with environmental and social ones negatively contributes to the development of obesity. According to Lee et al. (2019) examples of social and

environmental factors include lifestyle choices, access to healthy foods, socioeconomic level, and urbanisation.

As stated by Fruh (2017), unhealthy eating habits, sedentary lifestyles, and high-calorie diets are major contributors to obesity. In addition, the location of adipose tissue in the human body matters. Adipose tissue is categorised into two types based on its location: subcutaneous (under the skin) and visceral (intra-abdominally, around internal organs in the abdominal cavity). Among these two types of adipose tissue, visceral adipose tissue presents the greatest health risk (Chait and den Hartigh, 2020). Last but not least, as obesity-related traits can begin at a young age, childhood influences may be viewed as early-life contributors to obesity (Lehmann et al., 2020).

In Austria, apart from the above-mentioned factors, several other elements influence obesity. Socioeconomic status has an impact on obesity levels, with lower socioeconomic status showing higher prevalences of obesity (Burkert and Freidl, 2019). Education level is another factor affecting obesity. According to Großschädl and Stronegger (2019) long-term trend analysis, obesity was more prevalent among individuals with the lowest educational level, mainly men. A further influencing factor for obesity in Austria is (heavy) smoking. A cross-sectional study conducted with bank employees, in Vienna, revealed that among daily smokers, the number of cigarettes smoked per day was significantly associated with increased body weight and BMI (Gasperin et al., 2014).

1.5 Consequences of obesity

Obesity is a complex, multifactorial condition in which excess body fat has numerous negative impacts on health. It has become a major public health concern due to its impact on morbidity, mortality, and healthcare costs (Lin and Li, 2021). This section will look at some of the most serious consequences of obesity on the individual and healthcare system level.

1.5.1 Consequences of obesity on the individual's health and wellbeing

- *Cardiovascular Diseases:* First of all, obesity raises the risk of cardiovascular diseases including coronary artery disease, hypertension, and heart failure. Excess body fat increases cholesterol and triglyceride levels, which contribute to the development of atherosclerosis. These cardiovascular issues can lead to heart attacks, strokes, and a shorter lifespan (Fruh, 2017). The likelihood of cardiovascular diseases is especially increased by visceral adipose tissue (Chait and den Hartigh, 2020).

- *Metabolic Syndrome:* Furthermore, obesity has been linked to the development of the metabolic syndrome and type 2 diabetes. Metabolic syndrome is a disorder that involves a unique set of modifiable main risk factors that increase the risk for cardiovascular disease. Modifiable risk variables include low levels of High-Density Lipoprotein (HDL) cholesterol, elevated triglyceride levels, high blood pressure, elevated presence of fasting plasma glucose and of intra-abdominal/ectopic fat accumulation. The occurrence of any three of the components is required for diagnosis of the metabolic syndrome (Han and Lean, 2016).

- *Non-Alcoholic Fatty Liver Disease:* Obesity has been connected to a higher risk of non-alcoholic fatty liver disease (NAFLD). It is a specific hepatic manifestation of metabolic syndrome in obese individuals and is one of the most frequent liver illnesses worldwide. The presence of visceral adipose tissue in the abdominal cavity of obese people influences the development of NAFLD. A high percentage of visceral adipose tissue raises the risk for NAFLD, as up to 80% of NAFLD patients are obese (Milić et al., 2014).

- *Type 2 Diabetes Mellitus:* Obesity is a significant risk factor for type 2 diabetes, especially when it is associated with increased abdominal and intra-abdominal fat distribution. The underlying mechanism of type 2 diabetes is caused by a combination of insulin resistance and inadequate insulin release. The risk of the disease increases linearly with higher BMI (Klein et al., 2022).

- *Respiratory Diseases:* Moreover, obesity can cause respiratory problems that include sleep apnea and decreased lung function. Sleep apnea, which is characterized by disrupted breathing while sleeping, can cause daytime tiredness and raise the chance of an accident. Reduced lung function may impair the body's ability to deliver oxygen to tissues and organs, causing hypoxia and resulting in a vicious circle of other health problems (Lin and Li, 2021).

- *Diseases of the musculoskeletal system:* In addition, obesity has been identified as a major risk factor for the onset and progression of osteoarthritis in load-bearing joints, particularly the knee, but also the hip and ankle (Molina and Morgan, 2023, Wall et al., 2022). As stated by Evans et al. (2021) who looked at the association between BMI and knee replacement surgery results, patients with a BMI ≥ 40 kg/m² had a 4 % probability to require revision surgery after 10 years, compared with 2.8% in the normal weighted patients (BMI between 18.5 – 24.9 kg/m²).

- *Other diseases and complications:* Obesity has been associated with several common cancers, such as breast, colorectal, esophageal, kidney, gallbladder, uterine, pancreatic, and liver cancer. The disease raises the risk of dying from cancer and may modify treatment options. Obesity is responsible for 4-8% of all cancers (Pati et al., 2023). Furthermore, obesity is a major risk factor for wound infection, increased surgical blood loss, and a longer surgical time (Tjeertes et al., 2015).

Moreover, obesity has a significant psychological influence on those who are affected by it. Obese individuals often experience issues with their mood, self-esteem, quality of life, and body image. According to Sarwer and Polonsky (2016) this psychological distress not only influences treatment-seeking on behalf of obese individuals, but can also have an impact on treatment success. As a consequence, most multidisciplinary teams treating obesity include mental health specialists who are capable of identifying and alleviating these concerns in patients as needed. Likewise, people with obesity often face a pervasive and persistent kind of societal

stigma. This stigma is also present within the healthcare setting. Healthcare professionals who have weight prejudices against obese patients include medical doctors, nurses, dietitians, psychologists, physiotherapists, physician assistants, occupational therapists, speech therapists, podiatrists, and exercise physiologists (Lawrence et al., 2021). Consequently, individuals with obesity may encounter challenges in accessing healthcare services and interacting with healthcare professionals due to this stigma (Mold and Forbes, 2013). According to research, weight stigma can cause physical and psychological distress, and hinder the affected individuals from receiving appropriate care (Rubino et al., 2020).

Another consequence of obesity is its impact on the health-related quality of life (HRQoL). Milder et al. (2014) describes the HRQoL as a measure of a person's own perceived health, in the context of their physical, mental, social, and emotional well-being. In their study, Reinbacher et al. (2023) state that increased BMI was connected to adverse effects in the physical health and social function spheres of HRQoL. Finally, obesity has an impact on life expectancy, due to an increased risk for a variety of chronic diseases and comorbidities, which contributes to a shortened lifetime. According to a recent study, the potential gains in life expectancy (PGLE) without the presence of obesity for men and women in the 26 European countries in 2012 was 1.22 years for men and 0.98 years for women (Vidra et al., 2019). In a nutshell, and as previously pointed out, obesity has a wide range of negative health effects. However, the phenomenon known as the obesity paradox offers a different perspective. Hence it is necessary to better comprehend this phenomenon, which will be explained in depth in the following paragraph.

The Obesity Paradox: It should be emphasised that obesity appears to benefit the prognosis of some cardiovascular diseases and subsequently, the odds of survival for a specific group of patients. This phenomenon has been called the Obesity Paradox and it claims that critically ill patients with various forms of cardiovascular diseases may have a better prognosis if they are classified as overweight or mildly obese. This paradox appears to be more noticeable in class I obesity and less prominent in more severe or morbidly obese individuals (class II-III) (Elagizi et al., 2018). The improved outcomes seen in this specific group of patients are likely to

be multifactorial and might be explained by two physiological effects, according to Ludwig et al. (2017). First, the adipocytes in overweight and class I obese individuals promote chronic inflammation (known as pro-inflammation), which may have cardioprotective properties in the critically ill. Additionally (although still poorly understood), overweight and class I obese individuals seem to have a better gut microbiome that contributes to a better withstanding of critical illness than normal or underweight individuals (Ludwig et al., 2017). Furthermore, obesity has been linked to decreased long-term mortality following general surgery, implying that the widespread belief that obesity is a substantial risk factor in general surgery is unjustified (Tjeertes et al., 2015).

However, the obesity paradox is viewed critically as well. Donini et al. (2020) reported significant heterogeneity between studies investigating the phenomenon. A major explanation of the discrepancy between research could be the use of BMI in the definition and classification of obesity, which should instead include excess body fat as the main feature of this disease. Ludwig et al. (2017) argue that using BMI alone to define obesity does not give a complete picture of metabolic health, which might be the root problem of the obesity paradox. Antonopoulos et al. (2016) suggest that it might be more accurate to label the obesity paradox as the "BMI paradox".

1.5.2 Consequences of obesity in the healthcare setting

The consequences of obesity go beyond the individual's health. One of the main fields in which obesity's consequences have a major impact, is the healthcare setting. The following section will look at some of its most serious consequences in this setting.

- *Increased healthcare costs and demand for healthcare services:*

First of all, obesity and its comorbidities are linked to increased economic costs to the healthcare system. Tremmel et al. (2017) concluded in a systematic literature review that obesity has a major direct cost on both industrialised and developing countries, even though the methods used to estimate health expenses differ significantly from one country to another.

Aside from the direct economic costs, obesity has indirect costs that are mostly based on productivity losses due to illness accompanying it, disability, and early mortality. Dee et al. (2014) reported that indirect costs were larger than direct costs, accounting for 54% to 59% of total estimated costs. Obese adults have a higher risk of hospitalisation and recurrent inpatient readmissions than the general population. These are two significant factors that contribute to the increased healthcare costs of obese patients (Bioletto et al., 2023).

Furthermore, healthcare facilities frequently encounter an overwhelming demand for obesity-related services. According to Cecchini (2018), the utilisation of healthcare services among individuals with class II and class III obesity will increase significantly in the United States until 2025. In particular, class III obesity (BMI ≥40 kg/m²) has a major impact on demand and cost for all healthcare services. As stated by Lehnert et al. (2013), excessive service utilisation is the primary cause of increased medical expenses. According to research, with increasing BMI, overall costs increase progressively, particularly among the obese. With the rising prevalence of obesity in a specific country, a bigger proportion of total yearly national healthcare spending goes into managing and treating obesity and obesity-related health problems. Evans et al. (2023) investigated the relationship between obesity, healthcare utilisation, and comorbidities among adults across six European countries. They observed that hypertension, dyslipidaemia, and type 2 diabetes were the most commonly reported comorbidities. Participants who reported ≥ 2 obesity-related comorbidities were more than twice as likely to have been hospitalised in the year prior to the study.

- *Increased workload and risk of injury for healthcare professionals:*

The growing number of obese patients, as well as the severity of obesity, has an influence on the healthcare workforce, particularly in the acute, inpatient setting. Nurses, who deliver the most direct care to patients and are present at patients' bedsides almost around the clock, are among those most affected (Großschädl and Bauer, 2022). There is growing evidence suggesting that patient's obesity increases nursing workload and time taken for clinical care. There are numerous nursing tasks that are particularly affected by patient obesity and require more nursing staff. They

include tasks such as adequate hygiene, wound care, repositioning, handling body parts, and mobilisation. In addition, more nursing time may be necessary for a thorough physical assessment, planning nursing diagnosis, and interventions (Huang et al., 2021). Due to the shortage of nurses in hospitals, clinical care for patients with obesity may not be appropriately delivered. This puts both patients and staff at safety risks, including falls, musculoskeletal/back injuries, physical and mental exhaustion. Musculoskeletal injuries among healthcare professionals can result in healthcare organizations compensating injured staff, hiring and training replacement staff or increasing overtime for actual employees (McClean et al., 2021).

- *Disparities in obesity care:*

Obesity disproportionately impacts diverse communities, adding to the disparities in healthcare. Disparities in access and quality of obesity care have a negative impact on affected individuals in several ways. They can limit access to proper care, reduce the availability of obesity-trained physicians and healthcare professionals, and lower the likelihood of receiving an official diagnosis of obesity. For individuals with lower socioeconomic status and ethnic minorities, the results of weight loss surgery are often less successful (Stenberg et al., 2020). Factors contributing to these inequalities include challenges faced by minority communities, limited access to care, and decreased utilisation of weight loss therapies and surgery (Washington et al., 2023). As a result, obese patients may receive a lower-quality care compared to normal-weight individuals, which may cause a discrepancy in healthcare within the hospitalised population.

1.5.3 Particularities of obesity for the Austrian hospital setting

The healthcare system in Austria has traditionally prioritised more treating diseases through hospital stays over preventive measures. There is a strong emphasis on inpatient care, as evidenced by high hospital utilisation and resource allocation disparities between the hospital and ambulatory care sectors. Hospitals are the principal treatment centres for diseases that often demand longer inpatient stays (Bachner et al., 2018). As previously stated, obesity is linked to a variety of

comorbidities, including cardiovascular disease, diabetes, and musculoskeletal disorders, all of which may necessitate hospitalisation and inpatient care at a certain point. Given that Austria's healthcare system is primarily focused on hospitalisation, the rising prevalence of obesity in the general population may potentially lead to an increase in the prevalence of obese patients in Austrian hospitals. In the Austrian inpatient setting, the prevalence of obesity in intensive care patients has already been assessed, with 25% of intensive care patients in Austria (N= 460) being obese (Großschädl and Bauer, 2022).

Furthermore, the Austrian hospital system is subdivided into two main units, namely into secondary and tertiary hospitals. Secondary hospitals, usually referred to as general hospitals, are medical facilities that offer patients primary and secondary medical care. They offer many different medical services, such as emergency, surgical, and general medical treatment. These hospitals serve for many patients as their first point of contact, and they frequently deal with common medical problems. On the other side, tertiary hospitals, commonly referred to as university hospitals, are specialised healthcare facilities, often embedded within medical universities. They are known for providing specialized medical services, medical education, and research. These hospitals frequently entail highly specialised clinics that deal with complicated medical issues and treatments. Secondary and tertiary hospitals play distinct roles in Austria’s healthcare system and complement each other in order to provide a comprehensive healthcare (Bachner et al., 2018).

1.6 Challenges for healthcare professionals in managing obesity in the hospital setting

As the prevalence of obesity in the general population rises, so does the proportion of obese individuals admitted to hospitals, and obese patients receiving inpatient care (McClean et al., 2021). Notably, people with obesity exhibit multiple comorbidities (Apovian, 2016, Lim and Boster, 2023). Another fact to consider is that an increasing frequency of bariatric surgery (Sheetz et al., 2019) confronts hospitals with a growing number of obese patients. This increases the burden of disease on the healthcare system and poses a major challenge for the

multidisciplinary healthcare personnel. In handling obese patients, the emergency department, normal wards, radiography, operating rooms, physiotherapy, and possibly the morgue are the ones most likely to be affected (McClean et al., 2021). For example, from a medical doctor's point of view, obesity impairs the clinician's capacity to physically assess and diagnose obese patients. The reasons behind it are enlarged skin folds covering affected areas, large abdomens, inability to find anatomical landmarks, and difficulties moving larger, heavier body parts (McClean et al., 2021).

From nurses' perspective, caring for obese patients in an inpatient hospital setting is more challenging and necessitates more time, personnel, specialised equipment and skills. A few examples of these challenges are wound management, skin integrity maintenance, pain management, pressure ulcer prevention, mobilisation, cardiopulmonary resuscitation, and respiratory care (Ewens et al., 2022). In comparison to normal weighted patients, caring for unconscious obese patients, requiring full care, may necessitate an additional 1.5 hours of care each day that inevitably increases the utilisation of human resources (McClean et al., 2021).

The challenges posed by obesity in the physiotherapeutic profession include a higher risk of injury for both physical therapist and patient, lack of special equipment, inadequate staff training, insufficient time and/or personnel resources and a lack of studies in the area (Marienfeld, 2016). Healthcare professionals may also face challenges from patients with obesity in standard examinations and procedures, such as blood pressure assessments (due to the absence of extra-large cuffs), MRIs and CTs (decreased image quality due to excessive adipose tissue), medication overdoses or subtherapeutic doses (due to metabolic changes) (McClean et al., 2021).

1.7 Research gap

An initial search of several databases revealed that there are currently few national and international publications about the prevalence of obesity in the inpatient setting. This topic is often studied within the context of malnutrition in hospitalised

patients. Most studies about the prevalence of obesity are conducted in nursing homes and long-term care institutions. In Austria, the steadily growing prevalence of obesity in the general population is causing concern, with studies by Großschädl and Stronegger (2019), Dorner et al. (2023), Statistik Austria (2020) documenting its rise. While most studies have focused on the prevalence of obesity in the general Austrian population, there is a considerable research gap in examining the prevalence of obesity among Austrian hospitalised patients. This is important as hospitalised patients are a distinct subgroup of the general population, with various health conditions and specific healthcare requirements.

Furthermore, due to the categorisation of the Austrian hospitals in secondary and tertiary hospitals, it is important to establish a status quo of the prevalence of obesity in these different settings, with the ambition of enacting proactive measures to provide optimal care for obese patients in secondary and tertiary hospitals. Until this point, no recent data on the prevalence of obesity in hospitalised patients in secondary and tertiary hospitals in Austria are available. This master's thesis may serve as an additional step in order to further close this gap.

1.8 Research aims and questions

The primary aim of this analysis was to describe the prevalence of obesity among adult patients admitted to secondary and tertiary hospitals in Austria in 2022. The second aim was to present possible differences of obesity's prevalence between hospital types by gender, age groups, medical diagnoses, and care dependency scale. Consequently, the following research questions emerge:

1. *What is the prevalence of obesity among adult patients admitted to secondary and tertiary hospitals in Austria in 2022?*

2. *How does the prevalence of obesity in secondary and tertiary hospitals in Austria differ from each other regarding gender, age groups, medical diagnoses and care dependency?*

2. Methods and materials

The following chapter describes the chosen research design, the data collection process, and data analysis.

2.1 Study design

The study design of this master thesis was a secondary data analysis using data from The Nursing Quality Measurement 2.0 survey (in German: Pflegequalitätserhebung 2.0) of patients admitted to Austrian secondary and tertiary hospitals. A secondary data analysis is a research method that involves analysing previously acquired data for the purposes of answering new research questions or examining alternative hypotheses (Polit, 2021). Conducting a secondary data analysis offers several advantages in research, such as cost and time efficiency, existence of large sample sizes, investigation of trends over a determined time period, and avoidance of research fatigue in over-researched groups, e.g. in specific cancer subtypes (O'Connor, 2020).

The Nursing Quality Measurement 2.0 survey is an annual, independent, comprehensive, and standardised measurement of nursing quality in the Austrian healthcare system and herein served as the foundation to address the research questions. It has been conducted since 2009 by the Institute of Nursing Science at the Medical University of Graz in cooperation with the project International Prevalence Measurement of Care Problems, originally developed in the Netherlands. So far, this project has been implemented in the Netherlands, Austria, Switzerland, the United Kingdom, and Turkey (Großschädl et al., 2023). It has a quantitative, multicentre, cross-sectional study design. Data on pressure ulcers, incontinence, malnutrition, falls, physical restraints, pain and care dependency are collected in this survey at various voluntarily participating Austrian healthcare institutions. The prevalence of these care problems/indicators at a specific point in time is then depicted (Lohrmann et al., 2023).

2.2 Study population and sampling

The survey was open to all Austrian healthcare facilities (hospitals, geriatric hospitals, nursing homes, rehabilitation facilities, etc.), with more than 50 beds, which are invited in advance by the Institute of Nursing Science of the Medical University Graz via E-Mail to take part in the survey. For all healthcare facilities, taking part in the survey is entirely voluntary. Therefore, all inpatients/residents admitted to the participating facilities during the data collecting period have the possibility to be included in the study population of the Nursing Quality Measurement 2.0 survey; inpatients/residents who gave explicit verbal informed consent were enrolled in the survey. The patients'/residents' participation in the study was voluntary. The participating healthcare facilities have to pay two fees, one for participating in the survey, and one for each enrolled patient/resident (Eglseer et al., 2021). A convenience sampling method was used to select the sample. This sampling method has the advantage that participants are accessible and readily available, yet some disadvantages are that it is not generalizable to the larger population and prone to selection and/or sampling bias (Jager et al., 2017).

Inclusion criteria for the present secondary data analysis were explicit consent on behalf of the individuals who participated in the original survey, participants over 18 years of age, and complete data on the obesity status (height and weight). Participants with missing or incomplete data on obesity status were excluded from the analysis. In order to answer the research question, only data belonging to tertiary and secondary hospital settings was analysed and data from other institutions (i.e., nursing homes, rehabilitation centres) was excluded.

2.3 Data collection and instrument

The present master thesis utilised de-identified patient data, obtained from the last conducted Nursing Quality Measurement 2.0 of secondary and tertiary hospitals in Austria in 2022. The 2022's annual survey was implemented between November 9th and 11th. Healthcare institutions that consented to participate received in advance information, survey materials, and training. Since 2021, the data has been

directly submitted into the password-protected input software by healthcare facilities. Data was only collected from patients/residents in the healthcare facilities who provided verbal informed consent. A survey team, made up of an independent (external) nurse and an (internal) one working in the unit, collected the data, primarily by physically evaluating the patient. If a physical evaluation wasn't possible, the patient health records were used to provide information from the survey team (Großschädl and Bauer, 2022). Members of the survey team got advanced standardised training and were supplied the necessary materials. When carrying out the survey, the two survey team members should reach a consensus. If this was not successful, the independent, external nurse made the decision (Lohrmann et al., 2023).

The instrument used to collect the data was a questionnaire developed by Maastricht University (Halfens et al., 2013). Existing instruments, such as the Braden Scale and the Care Dependency Scale (CDS), are incorporated into the questionnaire, which have been extensively psychometrically tested, are valid and reliable (Eglseer et al., 2021). A multinational research group with experts in the respective fields, revises and updates the questionnaire annually (Großschädl et al., 2023). The questionnaire was translated into German both forward and backward and a pilot test was conducted in order to determine its degree of applicability (Eglseer et al., 2021). There are three levels of questions that are contained in the questionnaire:

- *Level 1:* Questions about the type of healthcare facility.
- *Level 2:* Questions about the type of ward/unit.
- *Level 3:* Questions addressed to the participants: one part gathers general patient-related data (i.e., gender, age, etc.), while the other collects data on the characteristics of the specific care indicator (i.e. pressure injuries, malnutrition) (Lohrmann et al., 2023).

Nursing leaders at the individual institutions, as well as nursing managers on specific wards, answer questions at levels 1 and 2 respectively, while questions at level 3 are elaborated by the survey team members and the inpatient/resident (Eglseer et al., 2021). The complete questionnaire can be found in the supplementary appendix of this thesis.

2.4 Variables

The relevant variables for this analysis were BMI, gender, age groups, medical diagnoses, and care dependency.

BMI was calculated based on the participant's height and weight data. For this analysis, obesity was defined as a cutoff value of BMI ≥ 30 kg/m² (WHO, 2023a). Height and weight data was gathered during the malnutrition screening phase using centimetres and kilograms as measurement units. The preferred method to obtain height and weight data was through measurements done directly at the patients, patient self-reporting and patient's healthcare records (Lohrmann et al., 2023).

The biological gender and age of the participants were collected as part of the demographic characteristics of the study population. Participants had the option to choose among three possibilities concerning the biological gender: male, female or "preferring not to disclose the biological gender".
The variable age was calculated based on the participant's birthdate. Furthermore, this variable, itself a continuous variable, was categorised into four age groups for better comparison. The age groups were selected in an attempt to ensure that the gap between each group was roughly equal. The formed categories of age groups were the following:

- 18-39 years old
- 40-59 years old
- 60-79 years old
- Above 80 years old

The participants' medically diagnosed diseases were categorised by allocating them to distinct disease groups (i.e., diseases of the circulatory, respiratory, musculoskeletal system, endocrine disorders, strokes, neoplasms, etc.) according to ICD-10 (WHO, 2019). In total, there were 27 distinct groupings of diagnosed disorders. For participants with multiple diagnosed diseases, it was possible to assign the participants to several groups.
Care dependency was assessed in the questionnaire using the care dependency scale (CDS). The CDS was developed in the Netherlands to assess the care

dependency originally for individuals with dementia and mental disabilities (Dijkstra et al., 1996). The instrument was translated into different languages, tested for its psychometric properties in various settings and was found to be a valid and reliable instrument (Lohrmann et al., 2003). The CDS is assessed using 15 items (i.e., eating and drinking, mobility, getting dressed and undressed, communication etc). Each of these 15 items has five possible answers in the format of a Likert scale and a corresponding value (1-5) is assigned from the survey team members. Essentially, this means that the assessment of care dependency is carried out from the perspective of professionals. The possible values that can be assigned are the following:

- Completely dependent (1 point)
- Mainly dependent (2 points)
- Partially dependent (3 points)
- Mainly independent (4 points)
- Completely independent (5 points)

As a consequence, a value on the scale in the range of 15 - 75 points per participant is possible. The lower the value, the more dependent the patient is on care. In simple terms, a participant with a total score of 15 would thus be entirely reliant on nursing care and a participant with a total score of 75 would be entirely self-sufficient in terms of nursing care (Lohrmann et al., 2023).

2.5 Data analysis

Descriptive statistics were used to describe the characteristics of the research population. This included calculating means with standard deviations, as well as medians with interquartile ranges for continuous variables. For categorical variables frequencies and percentages were calculated. SPSS Statistics® version 29.0 (IBM Corp., 2022) was used for data analysis. The prevalence of obesity was determined using standard definitions of BMI (height and weight) and ranked into categories according to WHO ICD-11 and Centers for Disease Control and Prevention (CDC) such as underweight, normal weight, overweight, and obese (WHO, 2023a, CDC, 2022). The presentation of results through tables and diagrams was implemented with Microsoft Excel® version 2016.

2.6 Usage and disclosure of large language models/Artificial Intelligence

OpenAI's large language model ChatGPT Version 3.5 (Chat GPT Version 3.5 OpenAI, 2024) was used during the writing phase of this master thesis to enhance the language, improve the flow, and correct grammar errors within the article. The output generated by the AI underwent extensive review, revision and editing to ensure accuracy. The author of this thesis assumes full responsibility for all the content presented. Details of the prompt used are included in the bibliography section.

2.7 Ethical considerations

This secondary data analysis was carried out using de-identified data, ensuring full data anonymisation, therefore no participant or healthcare provider can be identified from the data. Furthermore, the original study of "Nursing Quality Measurement 2.0" received a positive vote from the responsible ethics committee (Medical University of Graz) for the study's implementation under the approval number: 20-192 ex 08/09. This study was carried out in accordance with the Helsinki Declaration and the Good Clinical Practise Guidelines (GCP) and only data from participants who provided verbal informed consent were gathered.

3. Results

The following part will report in detail the relevant findings of the performed analysis. The original study of "Nursing Quality Measurement 2.0" for the year 2022 was carried out across 34 Austrian hospitals. On the days of the survey, a total of 3933 inpatients from the participating institutions were asked about their verbal informed consent to participate in the study. From these potential participants, 2869 inpatients (72.9%) provided their verbal informed consent. The most common cause for study non-participation was refusal to participate (25.6%). The second most common

reason was the absence of patients due to examinations (23.1%). Patients' poor cognitive health came in third (21.7%). Compared to tertiary hospitals, secondary hospitals had a slightly higher percentage of patients who didn't participate in the study as a result of terminal illness and not understanding or speaking the German language. Table 3 shows the detailed distribution for non-participation reasons based on hospital type.

Table 3: Reasons for study non-participation

Non-Participating reasons	Patients SH* (N=623)	Patients TH* (N=441)	Patients Total (N=1064)
Refusal	24.7%	26.8%	25.6%
Not available during measurement	22.5%	24.0%	23.1%
Cognitive impairment	21.3%	22.2%	21.7%
Other reason	10.9%	8.2%	9.8%
Doesn't understand or speak German	9.5%	7.9%	8.8%
Covid-19 suspicion or Covid-19 positive	5.1%	5.2%	5.2%
Comatose	3.0%	4.3%	3.6%
Terminally ill	2.9%	1.4%	2.3%
*SH= Secondary hospitals *TH=Tertiary hospitals			

Another inclusion criterion for this secondary data analysis was complete measurement to calculate BMI (height and weight). Since data on height and/or weight for 128 patients was incomplete, these patients were excluded from the secondary data analysis. There were no unplausible BMI values (defined as BMI ≤ 10kg/m² or ≥ 60kg/m²) in any hospital type. A total of 2741 patients fulfilled the inclusion criteria and were included in the final analysis.

3.1 Sample characteristics

From the 2741 patients, there were slightly less men participating in the survey (48.7%) than women. The average age was 65.8 years with a standard deviation (*SD*) of 17 years. More than half of the sample (58.4%) were 65 years of age or older. The sample's most represented age group, at 44.8%, was 60–79 years old. Most of the patients in the sample (57.4%) were hospitalised at secondary hospitals (SH), while the remaining were at tertiary hospitals (TH). Patients at secondary hospitals had slightly higher average age (67.1 years old, *SD* = 17 years) in comparison to patients at tertiary hospitals (63.9 years old, *SD* = 16 years). Likewise, 61.7% of the patients in secondary hospitals were older than 65 years, compared to 54.1% at tertiary hospitals. In both secondary and tertiary hospitals, the sample's most represented age group, was 60–79 years old, with 42.7% and 47.7%, respectively.

35.1 % of patients in both types of hospitals underwent surgery during the last two weeks of the data collection period. Tertiary hospitals had 9.1% more patients who underwent surgery than secondary hospitals. Patients on end-of-life management pathways accounted for 4.2% of all patients. Secondary and tertiary hospitals had similar distributions of patients with end-of-life management pathways.

In total, there were 27 analysed medical diagnoses. The prevalence of each type of medical diagnoses differed according to the nature of the disease. The five most common diseases were: Diseases of the circulatory system (excluding strokes) 39.4%, neoplasms 20.1%, diseases of the musculoskeletal system and connective tissue 18.6%, diseases of the digestive system 18.1%, diseases of the genitourinary system 17.4%. When comparing the two types of hospitals, the diseases affecting the circulatory system (excluding strokes) and neoplasms were respectively 7% and 8.9% more prevalent in tertiary hospitals than in secondary hospitals. In secondary hospitals, diseases of the musculoskeletal system and connective tissue and diseases of the genitourinary system, respectively, were 2% and 2.1% more prevalent. The factors affecting health status and contact with health services were more prevalent in secondary hospitals (5.8%) than in tertiary hospitals (4.5%). The detailed prevalence for all medical diagnoses is shown in Table 4.

The average score of the care dependency scale (CDS) for the included sample was 66.2 points with a *SD* of 14.1 points. The majority of the sample was with 62.9% completely independent of nursing care. 16.7% of them were to a great extent independent and 11.3% were partially dependent. 5.8% were to a great extent dependent and only 3.2% of the patients were completely reliant on nursing care. Compared with tertiary hospitals, secondary hospitals had a slightly higher prevalence of completely dependent, to a great extent dependent, partially dependent and to a great extent independent patients. The distribution of care dependency in the total sample is shown in Table 4 in a more detailed manner.

Table 4: Description of sample's characteristics

Variables	Patients SH* (N=1574)	Patients TH* (N=1167)	Patients Total (N=2741)
Male	45.2%	53.3%	48.7%
Mean age in years (*SD*)	67.1 (17)	63.9 (16)	65.8 (17)
Patients ≥ 65 years old	61.7%	54.1%	58.4%
Patients between 18-39 years old	8.8%	10%	9.3%
Patients between 40-59 years old	20.9%	23.7%	22.1%
Patients between 60-79 years old	42.7%	47.7%	44.8%
Patients above 80 years old	27.6%	18.6%	23,8%
Patients who underwent surgery	31.3%	40.4%	35.1%
Patients in end-of-life-pathways	4.3%	4.1%	4.2%
Medical diagnoses			
Diseases of the circulatory system (not stroke)	36.6%	43.6%	39.4%
Neoplasms	16.3%	25.2%	20.1%
Diseases of the musculoskeletal system and connective tissue	19.5%	17.5%	18.6%
Diseases of the digestive system	18.0%	18.3%	18.1%

Diseases of the genitourinary system	18.3%	16.2%	17.4%
Diseases of the respiratory system	16.6%	17.2%	16.9%
Endocrine, nutritional and metabolic diseases (not diabetes mellitus)	14.9%	17.4%	15.9%
Diabetes mellitus	16.3%	12.5%	14.7%
Mental and behavioural disorders (i.e. depression) (not dementia or addiction)	11.6%	7.3%	9.7%
Diseases of the nervous system (not spinal cord lesions/paraplegia)	11.0%	7.3%	9.4%
Injury, poisoning, and other consequences of external causes (not addictive drug overdose)	6.5%	6.9%	6.7%
Infectious and parasitic diseases	5.3%	8.2%	6.5%
Diseases of the blood or blood-forming organs and disorders involving the immune mechanism	5.3%	7.7%	6.3%
Diseases of the skin and subcutaneous tissue	4.5%	7.6%	5.8%
Diseases of the eye and adnexa	4.1%	7.8%	5.7%
Stroke	6.0%	4.4%	5.3%
Factors influencing health status and contact with health services	5.8%	4.5%	5.2%
Symptoms, signs, abnormal clinical and laboratory findings, not elsewhere classified	4.4%	4.7%	4.6%
Addiction	4.6%	2.7%	3.8%
Dementia	4.0%	1.2%	2.8%
Diseases of the ear and mastoid process	1.2%	3.0%	2.0%
External causes of morbidity and mortality	1.5%	0.1%	0.9%
Spinal Cord lesions/paraplegia	0.6%	0.9%	0.7%
unknown/no diagnosis	1.1%	--	0.7%

Congenital malformations, deformations and chromosomal abnormalities	0.3%	0.7%	0.5%
Addictive drug overdoses	0.5%	0.1%	0.3%
Pregnancy, childbirth and the puerperium	0.1%	0.3%	0.2%
Care Dependency scale			
Mean Care Dependency score (*SD*)	65.4 (14.6)	67.3 (13.2)	66.2 (14)
Completely dependent	3.6%	2.7%	3.2%
To a great extent dependent	6.4%	5.0%	5.8%
Partially dependent	12.3%	10.0%	11.3%
To a great extent independent	17.5%	15.7%	16.7%
Completely independent	60.2%	66.7%	63.0%
*SH= Secondary hospitals *TH=Tertiary hospitals			

The distribution of BMI in both hospital types was similar. The median BMI values in secondary and tertiary hospitals were around 26 kg/m². Table 5 shows details on the distribution of BMI in both hospitals.

Table 5: BMI distribution according to the type of hospital

Distribution of BMI in kg/m²	Patients SH* (N=1574)	Patients TH* (N=1167)	Patients Total (N=2741)
Median (*SD*)	25.6 (5.75)	25.9 (5.41)	25.7 (5.61)
Maximum	55.61	53.35	55.61
Minimum	11.45	12.29	11.45
Interquartile range	6.82	6.35	6.65
*SH=Secondary hospitals *TH=Tertiary hospitals			

3.2 Prevalence of obesity in secondary and tertiary hospitals

Obesity and its respective categories were defined and classified in the data analysis based on the WHO definition. The prevalence of obesity (BMI ≥ 30kg/m²) and the subsequent classes for adult patients in the Austrian hospitals is shown in Table 6

Table 6: Prevalence of overall obesity in secondary and tertiary hospitals

Prevalence in %	Patients SH* (N=1574)	Patients TH* (N=1167)	Patients Total (N=2741)
Prevalence of Obesity	21.0%	21.6%	21.3%
Obesity class I	15.0%	15.0%	15.0%
Obesity class II	3.3%	4.8%	3.9%
Obesity class III	2.7%	1.8%	2.3%
*SH= Secondary hospitals *TH=Tertiary hospitals			

21.3% of the overall hospitalised patients had obesity. Tertiary hospitals had an almost identical prevalence of obesity with a difference of 0.6% in comparison to the secondary hospitals. 2.3% of the obese patients in both hospital types had class III obesity. Secondary hospitals had a slightly higher prevalence of class III obesity (2.7%) compared to tertiary hospitals (1.8%).

3.3 Prevalence of obesity considering different variables

The following section examines the prevalence of obesity in secondary and tertiary hospitals regarding the variables gender, age groups, medical diagnoses and care dependency.

3.3.1 Prevalence of obesity by gender

In the entire sample, 22.4% of women were classified as obese, compared with 20% of men. The biggest difference in the prevalence of obesity regarding gender, was observed in secondary hospitals. There were 23.1% of women in secondary hospitals who were obese, compared to 18.5% of men. Tertiary hospitals had a similar prevalence among both genders. Figure 1 illustrates the prevalence of obesity across genders in each setting, as well as in the overall patient sample.

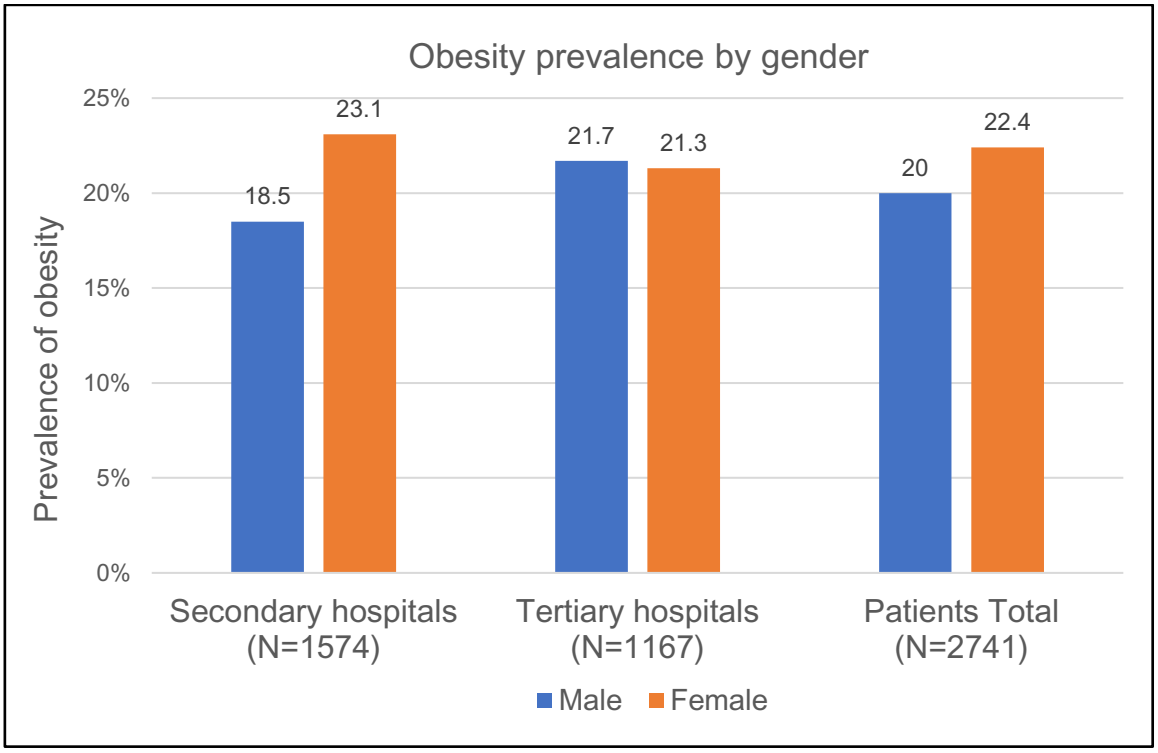

Figure 1: Prevalence of obesity by gender.

3.3.2 Prevalence of obesity by age groups

In the whole sample, obesity was more common in the age group 40 – 59 years old, with 25.3% of patients in this age group being obese. The second highest prevalence of obesity was seen in the 60 – 79 age group, with 23.9% of hospitalised patients being obese. Patients aged 18 to 39 came in third, with a prevalence of obesity of 21.6%. Finally, patients over the age of 80 had the lowest prevalence of obesity at 12.4%. The distribution of obesity within one specific setting differed as well. In secondary hospitals, obesity was more prevalent among patients aged 18 to 60 years old, peaking at patients aged 18 to 39 years old, where 28.3% of patients

within this age group were obese. After the age of 60, the obesity rate in secondary hospitals decreased, reaching its lowest level in patients over the age of 80 with a prevalence of obesity of 11.3%.

In comparison, the prevalence of obesity at tertiary hospitals showed a U-shaped distribution. It was highest among patients aged 40 to 59, with 24.6%, followed by participants aged 60 to 79, with 24.4%. Patients over the age of 80 had the third highest obesity prevalence, at 14.7%. The age group 18-39 years old had the lowest obesity prevalence (13.7%) among patients at tertiary hospitals. Figure 2 shows the prevalence of obesity across the age groups in both settings, as well as in the overall patient sample.

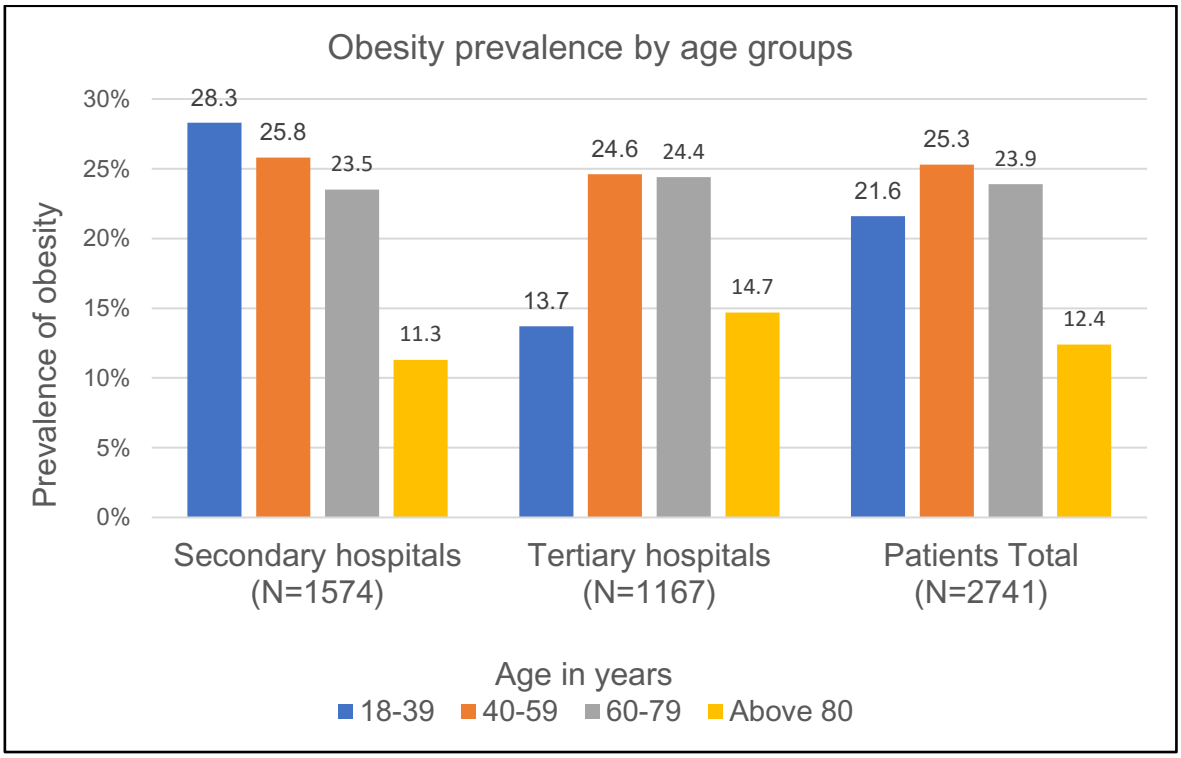

Figure 2: Prevalence of obesity by age groups.

3.3.3 Prevalence of obesity by medical diagnoses in both hospital types

Table 7 compares the prevalence of obesity by the 27 confirmed medical diagnoses between the secondary and tertiary hospitals. In total, the medical diagnoses with the highest prevalence of obesity were the following: Pregnancy, childbirth and the puerperium (40% of the affected women with this diagnosis were obese); diabetes

mellitus (31.6% of the patients living with this condition had obesity); congenital malformations deformations and chromosomal abnormalities (30.8% of the affected patients with this medical diagnoses had obesity); and spinal cord lesions/paraplegia (30% of the affected patients were obese). Other medical diagnoses like endocrine, nutritional and metabolic diseases (except Diabetes Mellitus), mental and behavioural disorders, i.e. depression, diseases of the skin and subcutaneous tissue accounted for around 27 % of the affected patients with this diagnosis having obesity. When comparing both hospital types, obese patients with diabetes mellitus were more prevalent in tertiary hospitals (35.6%) than in secondary hospitals (29%). Likewise, there were more obese patients with endocrine, nutritional, and metabolic diseases (except Diabetes Mellitus) in tertiary hospitals (30.5%) compared to secondary hospitals (24.4%). On the other hand, in secondary hospitals, 29.7% of patients with medical diagnoses of mental and behavioural disorders (excluding dementia and addiction) were obese, while tertiary hospitals accounted for 23.5% of patients with this diagnosis being obese.

Among the five most prevalent diseases in the entire sample, that included diseases of the circulatory system (excluding stroke), neoplasms, diseases of the musculoskeletal system and connective tissues, diseases of the digestive system, and diseases of the genitourinary system, (see Table 4), approximately 20% of patients with these medical diagnoses were obese. From these medical diagnoses, diseases of the circulatory system (stroke excluded) showed higher rates of obesity, with 24% of patients with these medical diagnoses being obese. When comparing both hospital types, in tertiary hospitals, 25.1% of patients with a diagnosis of the circulatory system had obesity whereas in secondary hospitals accounted for 22.9% of the patients with circulatory system disease were obese. The opposite was observed for patients with diseases of the genitourinary system, where there were more obese patients with a genitourinary system disease in secondary hospitals (23.3%) in comparison with tertiary hospitals (14.8%). The remaining three of the five most prevalent diseases in the entire sample (neoplasms, musculoskeletal and connective tissue diseases, and digestive system diseases) showed similar prevalence rates of roughly 20% across both hospital types.

Table 7: Prevalence of obesity ranked by the total diagnosis frequency.

Medical diagnoses	Patients SH* (N=1574)	Patients TH* (N=1167)	Patients Total (N=2741)
Pregnancy, childbirth and the puerperium	50.0%	33.3%	40.0%
Diabetes mellitus	29.3%	35.6%	31.6%
Congenital malformations, deformations and chromosomal abnormalities	40.0%	25.0%	30.8%
Spinal Cord lesions/paraplegia	40.0%	20.0%	30.0%
Mental and behavioural disorders (i.e. depression) (not dementia or addiction)	29.7%	23.5%	27.7%
Diseases of the skin and subcutaneous tissue	29.6%	25.8%	27.5%
Endocrine, nutritional and metabolic diseases (not diabetes mellitus)	24.4%	30.5%	27.2%
Symptoms, signs, abnormal clinical and laboratory findings, not elsewhere classified	28.6%	21.8%	25.6%
Diseases of the respiratory system	25.3%	23.9%	24.7%
Diseases of the circulatory system (not stroke)	22.9%	25.1%	24.0%
Diseases of the blood or blood-forming organs and disorders involving the immune mechanism	21.7%	23.3%	22.5%
Addictive drug overdoses	25.0%	0.0%	22.2%
Diseases of the musculoskeletal system and connective tissue	21.8%	21.6%	21.7%
Factors influencing health status and contact with health services	22.0%	21.2%	21.7%
Diseases of the eye and adnexa	34.4%	12.1%	21.3%
Diseases of the digestive system	21.1%	20.2%	20.7%
Diseases of the genitourinary system	23.3%	14.8%	19.9%
Neoplasms	19.8%	18.7%	19.2%
Stroke	20.0%	17.6%	19.2%

Diseases of the ear and mastoid process	15.8%	20.0%	18.5%
Addiction	17.8%	18.8%	18.1%
Diseases of the nervous system (not spinal cord lesions/paraplegia)	15.6%	21.2%	17.4%
Injury, poisoning, and other consequences of external causes (not addictive drug overdose)	12.6%	22.5%	16.9%
Unknown/no diagnosis	16.7%	0.0%	16.7%
Infectious and parasitic diseases	20.5%	11.5%	15.6%
Dementia	9.5%	7.1%	9.1%
External causes of morbidity and mortality	8.7%	0.0%	8.3%
*SH= Secondary hospitals *TH=Tertiary hospitals			

3.3.4 Prevalence of obesity by care dependency

In the entire sample, 18.4% of patients categorised as "completely dependent" in both types of hospitals were obese. This was followed by the prevalence of the “to a great extent dependent” patients, with 13.3% of these patients being obese. This category accounted for the lowest prevalence of obesity by care dependency in the total sample. The three remaining care dependency categories (“partially dependent”, “to a great extent independent” and “completely independent”) exhibited a similar obesity prevalence rate, with approximately 21% of patients falling into each category.

When comparing the two different types of hospitals with each other, tertiary hospitals had 22.6% of "completely dependent" patients who were obese, while secondary hospitals had 16.1% in the same category. Similarly, 24,8% of "partially dependent" patients in tertiary hospitals had obesity, compared with 19.6% in secondary hospitals. The distribution of obesity prevalence across other care dependency categories ("completely independent", "to a greater extent independent" and “to a great extent dependent”) was similar between secondary

and tertiary hospitals. Table 8 illustrates the prevalence of obesity across the care dependency scale categories.

Table 8: Prevalence of obesity according to care dependency

Care Dependency scale	Patients SH* (N=1574)	Patients TH* (N=1167)	Patients Total (N=2741)
Completely dependent	16.1%	22.6%	18.4%
To a great extent dependent	13.0%	13.8%	13.3%
Partially dependent	19.6%	24.8%	21.5%
To a great extent independent	24.3%	20.2%	22.7%
Completely independent	21.5%	22.0%	21.7%
*SH= Secondary hospitals *TH=Tertiary hospitals			

4. Discussion

This study aimed at describing the prevalence of obesity among adult patients admitted to secondary and tertiary hospitals in Austria in 2022, as well as possible differences in obesity's prevalence according to gender, age groups, medical diagnoses, and care dependency between secondary and tertiary hospitals. This chapter summarises the key findings and compares them with the current literature. Potential limitations of the study are also discussed, suggestions for future research and practice are provided, and conclusions drawn.

In total, data from 2741 patients were analysed. Overall, more than one fifth of adult hospitalised patients in Austria had obesity. Patients in tertiary hospitals had an almost identical obesity prevalence as those in secondary hospitals. Across the entire sample, there were more obese women than men.

Regarding age groups, in the whole sample, obesity was more common in the age group 40 - 59 years old. Patients above 80 years old had the lowest prevalence of obesity in the entire sample. In secondary hospitals, patients between 18 – 39 years

old had the highest prevalence of obesity, whereas the lowest obesity's prevalence in secondary hospitals was found in patients above 80 years old. Tertiary hospitals showed the highest prevalence of obesity in patients in the age group 40 – 59 years old.

The highest prevalence of obesity was demonstrated among patients with the following medical diagnoses: female patients during pregnancy, childbirth or the puerperium, diabetes mellitus, congenital malformations and spinal cord lesions/paraplegia. Among the five most common diseases in the whole sample, obesity was more prevalent in diseases of the circulatory system. Compared with secondary hospitals, tertiary hospitals had a higher prevalence of obese patients with diabetes mellitus. On the other hand, secondary hospitals presented with more obese patients with spinal cord lesions/paraplegia than tertiary hospitals. The prevalence of obesity was lower among patients who needed higher levels of care. Tertiary hospitals had a higher prevalence of "completely dependent" and "partially dependent" obese patients than secondary hospitals.

4.1 Prevalence of obesity in hospitalised patients

As shown in the results section of this master thesis, 21.3% of all adult patients in the hospital setting in Austria in 2022 were obese. This means that slightly more than one fifth of all participants were obese. First and foremost: A comparison of the prevalence of obesity in studies in hospital settings is challenging due to variations in different factors, including differences in types of hospitals, sample sizes, demographics, age groups, specialities of hospitals, socioeconomic status of patients, ethnicity of patients (especially in studies done in the US), cultural norms, accessibility to healthcare and socioeconomic conditions of the countries, where the studies were conducted. Furthermore, there are differences in study methodologies, study designs and data collection (i.e. measuring height and weight to calculate BMI, whether self-reported, taken from patients' records or an actual measurement). With those factors in mind, a comparison of the existing, recent literature shows that the prevalence of obesity among hospitalised patients, observed in this data analysis, is lower than what is reported in the scientific literature from other countries. In particular, studies from Australia and the US show a higher prevalence of obesity in

the hospital setting (Elliott et al., 2023, Di Bella et al., 2020, Dennis et al., 2017, Goh et al., 2016, Hossain et al., 2018, Dennis and Trevenen, 2016). Five out of six of these studies were conducted in Australia, and only the study of Hossain et al. (2018) was implemented in the US. Among these studies, the prevalence of obesity in the hospital setting varied between 27.5% in Elliott et al. (2023), and 39% in Dennis and Trevenen (2016). In the study by Di Bella et al. (2020), 32% of the inpatients had obesity while Goh et al. (2016) reported an inpatient prevalence of obesity at 33.5%. Finally, the study from the US showed an obesity prevalence of 31% (Hossain et al., 2018), which was higher than in the present data analysis. Possible explanations for the observed differences between this data analysis and the aforementioned studies might be due to a combination of (different) factors. One reason for this could be the overall higher prevalence of obesity in the general population of high-income English-speaking countries like Australia and the US, compared to central European countries, like Austria (WHO, 2017). On one hand, a higher prevalence of obesity in the population may translate into a higher number of obese patients in hospitals (McClean et al., 2021). On the other hand, there is the issue of underreporting obesity as a diagnosis in the administrative records of hospitals. Di Bella et al. (2020) stated in their work that only half of the actual obese patients in Queensland, Australia were identified and documented as such on administrative documentation in the hospital settings. This could imply that many obese patients are not recognised as such in the hospital inpatient setting, and may not obtain an appropriate diagnosis and subsequently, not receive proper treatment for their condition. Furthermore, the previously mentioned studies and the present data analysis had different settings, sample sizes, population and baseline characteristics. For example, the majority of these studies were conducted in single-site tertiary hospital settings (Hossain et al., 2018, Dennis et al., 2017, Dennis and Trevenen, 2016, Goh et al., 2016), while the studies from Elliott et al. (2023) and Di Bella et al. (2020) were conducted in multicentred tertiary hospitals. In contrast, the present analysis examined data collected in tertiary, as well as secondary hospitals in Austria. The sample sizes in the studies herein compared to the present data analysis also differed. They ranged from just over 500 participants in Hossain et al. (2018) and Elliott et al. (2023), to as many as 8064 participants in the study conducted by Goh et al. (2016). Moreover, three of these studies focused on a more specific hospital population, analysing data from ICU wards (Dennis et al., 2017,

Dennis and Trevenen, 2016) and cardiothoracic patients in the ICU (Goh et al., 2016), while the preset data analysis included a wider range of patients from secondary and tertiary hospitals in Austria. The narrower focus on ICU patients in these studies may explain the observed difference in the prevalence of obesity in comparison to the broader hospital patient sample included in the present analysis.

Another difference between this data analysis and the previously mentioned studies is differences in the sample's baseline characteristics. This data analysis had the lowest average BMI (25.7 kg/m²) while the average BMI of other studies ranged from 27.7 kg/m² in Elliott et al. (2023) to 29.8 kg/m² in the study conducted by Dennis and Trevenen (2016). A lower average BMI might imply a healthier study sample and potentially account for the observed prevalence difference. The distribution of gender and the mean age in the samples baseline between this data analysis and the previously mentioned studies wasn't equal as well. A nearly equal gender distribution of the sample was observed in this study that was only comparable with Elliott et al. (2023), whose sample consisted of 49% females. Other studies reported a proportion between 40% of females in the study of Dennis et al. (2017) and 43% of females in the research of Di Bella et al. (2020). The study conducted in the US had almost the same mean age (66 years) as this data analysis; nevertheless, it had a higher average sample BMI of 28 kg/m² compared to the present data analysis (Hossain et al., 2018). For the Australian studies it can be stated that, in contrast to this data analysis, the study participants were on average younger and heavier (Dennis et al., 2017, Dennis and Trevenen, 2016, Di Bella et al., 2020, Goh et al., 2016). This can be perhaps traced back to the higher prevalence of obesity among the general population in Australia compared to Austria.

The results of obesity's prevalence in this data analysis correspond, however, to other recent studies, which have shown a similar value of approximately 20%. In their study, Dennis et al. (2018) reported an obesity prevalence among adult inpatients of a single-site tertiary hospital in Western Australia of 22.5%. Two other studies from the US, examining adult inpatients, stated similar prevalence rates. Orhurhu et al. (2020), who examined patients with spinal cord stimulators in US hospitals, reported an obesity prevalence of 19.4% in 2015. Odum et al. (2016), who examined adult inpatients having a revision of total knee replacement stated that

24.5% of these patients were obese. These values correspond in the broader sense to the results of this data analysis. In another Norwegian study that examined adult patients from a single-site tertiary hospital, the authors asserted an obesity prevalence rate of 18.3% (Følling et al., 2014). Furthermore, the prevalence rate of this data analysis is in line with another study from Austria that analysed data collected from the same Nursing Quality Measurement 2.0 in Austrian ICUs in secondary and tertiary hospitals. In this study, the authors reported a prevalence of obesity at 25% among adult patients in Austrian ICU wards (Großschädl and Bauer, 2022).

In terms of the distribution of obesity by type of hospital, this data analysis showed that tertiary hospitals had almost the same obesity prevalence as secondary hospitals. As explained previously, recent studies on the prevalence of obesity among hospitalised patients have focused more on single-site tertiary hospitals (Hossain et al., 2018, Dennis et al., 2017, Goh et al., 2016, Dennis and Trevenen, 2016) and multiple-site tertiary hospitals (Di Bella et al., 2020, Elliott et al., 2023) than on secondary hospitals. This disparity might be caused by tertiary hospitals having better research infrastructure, more resources and a higher priority for research than secondary hospitals. Only the study by Odum et al. (2016) could be identified as having analysed secondary and tertiary hospitals. The results of this data analysis contradict their results, which found obesity to be more prevalent in urban teaching hospitals (18.1%) than in urban nonteaching hospitals (16.9%) (Odum et al., 2016). However, directly comparing this data analysis with Odum et al. (2016) might not provide meaningful or accurate insights for a variety of reasons, including the specific focus on the revision of total knee arthroplasty on behalf of Odum et al. (2016), differences in patient populations, settings, and countries.

Another comparison worth discussing is the contrast between the prevalence of obesity in Austrian hospitals and that of the general, adult population in Austria. The results of this data analysis show a higher prevalence of obesity in hospitalised Austrian patients compared to the general population in Austria. Specifically, as mentioned in the introduction section, according to Statistik Austria in 2019, 16.6% of the adult population were obese (Statistik Austria, 2020), which is a lower figure than the result of this data analysis. A possible explanation is the special focus of

this data analysis on hospitalised patients. Ramezankhani et al. (2023) showed in their research that obese individuals have a higher hospitalization risk than normal-weight individuals. However, this comparison contrasts with those of the Australian study by Dennis et al. (2018), who reported that between 2014 and 2015 the proportion of obese patients in the hospital was lower (18.7%) than the general Australian adult population (24.6%). This might be again explained by the overall higher prevalence of obesity in the Australian general population in comparison to Austria, which in 2019 was 16.6% (Statistik Austria, 2020). Overall, it can be stated that the prevalence of obesity observed in this data analysis is neither particularly high nor low, but rather aligns with midrange results from other national and international studies.

4.2 Prevalence of obesity considering different variables

The results on obesity prevalence in relation to gender, age groups, medical diagnoses, and care dependency are discussed in the following sections.

4.2.1 Gender

This data analysis showed a higher prevalence of obesity among hospitalised women compared to men in Austria. This was especially evident in secondary hospitals, where there were 4.6% more obese women than men. This aligns with the results of Odum et al. (2016) who reported on a higher obesity prevalence among hospitalised women with a revision of total knee arthroplasty (19.9%) compared to men (13.7%). A similar figure was reported in the studies of Orhurhu et al. (2020) and Hossain et al. (2018), with 62% and 55%, respectively, of obese patients being women. Several factors might contribute to the obesity disparity between men and women. According to Kapoor et al. (2021), obesity disparities between both sexes are linked to environmental (i.e. socioeconomic status, behavioural (i.e. dietary habits or physical activity), and biological factors (i.e. hormonal differences), and women are twice as likely to be overweight or obese compared to men. This might be one of the reasons explaining the observed difference in the present data analysis in prevalence rates of obesity among hospitalised women versus men.

There are, however, other recent studies reporting a higher prevalence of obesity among hospitalised men than women. Dennis et al. (2017) and Großschädl and Bauer (2022) asserted in their study that respectively 60% and 61.7% of the obese patients were male. Likewise, the study by Goh et al. (2016) observed that 69.7% of obese patients were males. In contrast to this data analysis, these studies were conducted in an ICU setting, which often involves patients with severe or life-threatening conditions compared to normal wards. This difference in study settings limits the comparison of obesity prevalence in hospitalised men from these studies to the present data analysis, and the results should be interpreted with this context in mind.

4.2.2 Age groups

Based on this data analysis, obesity was more prevalent among hospitalised patients between 40–59 years old, followed by those 60–79 years old. Furthermore, patients aged 18–39 came in third, while patients above 80 years of age had the lowest prevalence of obesity. The fact that there is currently no gold standard for age group stratification in healthcare sciences (Diaz et al., 2021) makes it difficult to compare the variable age groups with other similar studies. Nevertheless, the results of this data analysis, for the variable age groups, are consistent with the ones reported by Følling et al. (2014). Their research utilised the same age categories as the present data analysis and the prevalence of overweight and obesity was likewise the highest among patients between 40 - 59 years old (61.2%). The age group with the second-highest prevalence of obesity and overweight were patients between 60 – 79 years old (50.5%) followed by patients between 18 – 39 years old (41.2%) being either overweight or obese. Just as in the present data analysis, patients above 80 years old had the lowest prevalence, with 30% being either overweight or obese (Følling et al., 2014). Unlike this data analysis, which only analysed obesity, Følling et al. (2014) examined both overweight and obesity, which might limit the comparison of the two studies.

The lower prevalence of obesity among hospitalised elderly patients above 80 years of age as herein demonstrated is also worth discussing. Despite the fact that identifying obesity in elderly individuals can be difficult given that BMI is frequently

used in a standardised manner as a surrogate in research (Batsis and Zagaria, 2018), several studies have indicated a lower prevalence of overweight and/or obesity in patients above 75 years old (Odum et al., 2016, Dennis et al., 2018, Følling et al., 2014). One of the reasons behind the lower prevalence of obesity among patients above 80 years of age in this data analysis might be the usage of BMI according to the definition of WHO (2023a) to define obesity. Due to decreased muscle mass and changes in body composition, traditional measures such as BMI might have a low sensitivity in determining obesity, among elderly individuals (Batsis et al., 2016). Furthermore, older adults are often affected by sarcopenic obesity (Roh and Choi, 2020), which might not be accurately assessed by BMI, possibly leading to an underestimation of obesity prevalence. Additionally, the phenomenon of central obesity in normal-weighted elderly patients (individuals with a normal BMI but with visceral and central adipose tissue concentration) might contribute to a reduced prevalence of obesity among the elderly. Bosomworth (2019) argued that with advancing age, visceral fat increases gradually, unlike subcutaneous fat. Therefore, elderly patients may be more likely to present with normal weight obesity, and BMI might detect these patients as normal/overweight and not obese. Thus, it is important to use other instruments besides BMI, especially among elderly patients, in detecting obesity, such as Waist circumference (WC), Waist-to-hip ratio (WHR), or Dual Energy X-ray Absorptiometry (DEXA), amongst others.

4.2.3 Medical diagnoses

This data analysis indicated that in total the highest prevalence of obesity was shown among patients with diabetes mellitus, female patients during pregnancy, childbirth or the puerperium, patients with congenital malformations and spinal cord lesions/paraplegia. The prevalence of the last three medical diagnoses should be interpreted with caution due to the small number of hospitalised patients within these categories, and should be considered in relation to the total number of participants. Additionally, for the diagnosis of pregnancy, childbirth, or puerperium, physiological changes cause women to weigh more during these periods (Dalfra et al., 2022), potentially leading to a misinterpretation of obesity prevalence in this group. Regarding the prevalence of obesity among hospitalised patients with diabetes mellitus, this analysis showed that obesity is common among hospitalised patients

with this diagnosis. This finding is consistent with the study by Großschädl and Bauer (2022) which reported that 30.4% of obese hospitalised patients were diagnosed with diabetes mellitus. Furthermore, the results are in line with the study by Hossain et al. (2018), who found that 35% of obese hospitalised patients had diabetes mellitus. A possible explanation for the high prevalence of obesity among hospitalised patients with diabetes mellitus might be due to their generally higher body weight (Blumentals et al., 2013). However, according to the study by Blumentals et al. (2013), a higher prevalence of obesity was observed among hospitalised diabetes mellitus patients, with 57% of these patients being obese. The discrepancy between the present data analysis and the study by Blumentals et al. (2013) could be due to the fact that they focused specifically on hospitalised diabetes mellitus patients, whereas this analysis included all hospitalised patients.

When analysing the prevalence of obesity among the five most common diseases that were cardiovascular diseases (excluding stroke), neoplasms, musculoskeletal diseases, digestive system diseases, and genitourinary diseases, approximately 20% of patients with these diseases were obese. The prevalence of obesity was highest among patients with cardiovascular diseases, where 24% of these patients were obese. These results are consistent with those of Hossain et al. (2018), which found that, among hospitalised obese patients, cardiovascular diseases such as hypertension (68%), hyperlipidaemia (36%), coronary artery disease (18%), and congestive heart failure (18%), were the most common ones. Similarly, the study by Großschädl and Bauer (2022), which used data from the Nursing Quality Measurement 2.0 survey, concluded that the most prevalent disease among obese patients was cardiovascular disease, accounting for 58.3% of obese patients suffering from these diseases. Additionally, other studies support the association between obesity and elevated risk of developing cardiovascular diseases in hospitalised patients (Gribsholt et al., 2024, Powell-Wiley et al., 2021, Barroso et al., 2017, Kim et al., 2015, Elagizi et al., 2018).

Regarding the type of hospital, the current data analysis identified that tertiary hospitals had a slightly higher prevalence of obese patients with cardiovascular diseases (25.1%) than secondary hospitals (22.9%). A possible reason for this finding might be that tertiary hospitals typically handle more severe, complicated

cardiovascular cases than secondary hospitals (Munyogwa et al., 2020). A study conducted in rural central China involving 5,342 patients with ST-Elevation Myocardial Infarction (STEMI) found that 2780 patients were treated at tertiary hospitals and 2562 at secondary hospitals during the study period (Zhang et al., 2021). As stated in the introduction, there is a significant association between obesity and cardiovascular disease, which may explain the presence of more obese patients among those with cardiovascular illness in tertiary hospitals. Another finding of the present data analysis, regarding the type of hospital, was that obese patients with diabetes mellitus were more prevalent in tertiary hospitals (35.6%) than in secondary hospitals (29%). In contrast, a study from Tanzania involving 330 patients with type 2 diabetes, reported an equal prevalence of obesity in secondary and tertiary hospitals, with 93% of patients with type 2 diabetes being obese (Munyogwa et al., 2020). The significant difference in obesity's prevalence between this data analysis and the study of Munyogwa et al. (2020) might be due to the narrow focus of the latter study, which included only patients with type 2 diabetes in the study sample. Additionally, other reasons for this difference could be variations in the study setting, sample size, and socioeconomic factors between the two countries.

4.2.4 Care Dependency Scale

The present data analysis showed that 18.4% of the "completely dependent" patients in the total sample were obese. This accounted for the second lowest proportion of obese patients by care dependency scale. With 13.3%, the lowest prevalence was observed in the category of the "to a greater extent dependent". The remaining categories of care dependency had a similar distribution of obesity with approximately 21% of patients being obese. This means that, when analysing all five care dependency categories to each other, fewer obese patients were found in the categories requiring more care than in the categories needing less care. Thus, the prevalence of obesity was lower in the categories requiring more care. In comparison to other studies, these results are inconsistent with those of Großschädl and Bauer (2022). According to their study, when comparing patient categories by their care dependency level, "completely dependent" patients had the highest prevalence of obesity, followed by "partially dependent" patients. This inconsistency may be explained by Großschädl and Bauer (2022)'s focus on ICU patients, who

may be more dependent on care than patients in normal wards. Regarding the hospital type, a comparison with the results of other studies is not possible, because no studies examining care dependency, obesity, and type of hospital were found in the literature search.

4.3 Summary of the main variables and their influence on the prevalence of obesity

Previously, the results regarding the impact of single variables (gender, age, medical diagnoses and care dependency) on the prevalence of obesity were discussed. In summary, this data analysis shows that certain groups of patients are more likely to have obesity. Specifically, hospitalised women, middle-aged patients, those with diabetes mellitus and/or cardiovascular diseases, and care-independent patients had the highest prevalence of obesity. However, in real life, it is common for different variables to interact with each other and influence a certain outcome to varying degrees. This section will aim to summarise how these variables are connected to each other and how they might influence obesity rates in hospitalised patients.

The interaction between gender, age, medical diagnoses, and care dependency is most likely uneven and heterogeneous due to biological, environmental and social factors influencing obesity. To illustrate this, gender plays an important role as middle-aged women are more likely to experience hormonal changes that influence body fat distribution compared to men (Kapoor et al., 2021). Furthermore, increasing age in adults is generally associated with a decrease in physical activity levels (Billot et al., 2020), which may contribute to weight gain (Westerterp, 2018). Additionally, certain medical conditions, like diabetes mellitus and cardiovascular diseases, share common risk factors with obesity, such as insulin resistance (Scherer and Hill, 2016) and dyslipidemia (Powell-Wiley et al., 2021). This may lead to a vicious cycle where individuals with these pre-existing conditions are more prone to obesity, while being obese also increases the chances of developing these conditions. Regarding care dependency, it is interesting to note that care-independent patients had a higher obesity prevalence than their care-dependent counterparts. The lower

obesity rates in the latter group may be due to undernutrition, particularly in in-patients over 80 years of age. Eglseer et al. (2020) reported a 22.7% risk of undernutrition among Austrian hospitalised very old patients (≥ 80 years of age), who also had high cardiovascular, musculoskeletal and genitourinary disease rates. Therefore, care dependency most likely interacts with age and medical conditions. However, since the present master thesis did not conduct further subgroup analyses, this statement is based on assumptions rather than concrete evidence. Given the limited state of research on how care dependency interacts with gender, age, and medical diagnoses in relation to obesity, no definitive conclusions can be made at this point.

4.4 Strengths and limitations

A strength of this master's thesis was that to date no similar study analysing the prevalence of obesity in secondary and tertiary hospitals across Austria has been carried out. Another strength of this data analysis is that it was not limited only to single-site hospitals. Instead, it enclosed multiple hospitals across Austria (i.e. a multicentre-study) that might entail a higher informative value on the status quo of obesity in the inpatient hospital setting.

However, inherited from the design of the Nursing Quality Measurement 2.0 survey, this scientific work is limited by its generalisability. As the collected data depicts only a snapshot within a specific time period, it is not representative of the entire hospitalised population in Austria. Hence, no generalised conclusions about hospitalised patients with obesity in Austria can be drawn. In addition, the lack of conducting significance tests is another limitation of this secondary data analysis. Although the difference in percentage might seem high at first glance, it may not be statistically significant or clinically relevant. Last but not least, the usage of BMI in the Nursing Quality Measurement 2.0 survey as the only instrument to define obesity is another limitation. The collected data did not contain any information about waist circumference or waist-to-hip ratio that is particularly important in the elderly hospitalised population. As explained in the age groups discussion section, BMI is not a perfect measure for obesity and might not be able to accurately assess the

phenomenon of sarcopenic and/or normal-weight central obesity. It was not possible to control for this effect, which might suggest that the prevalence of elderly obese patients might have been underestimated.

4.5 Recommendations for research

This study allowed a description of the prevalence of obesity among adult patients in Austrian hospitals. Future research on this topic and setting should aim to widen the instruments used to measure obesity. Besides BMI, other instruments such as waist circumference (WC), waist-to-hip ratio (WHR), and dual-energy X-ray Absorptiometry (DEXA) should be used. A better detection of abdominal and central obesity would be particularly useful in case of elderly hospitalised patients. Furthermore, regular and continuous analysis of the Nursing Quality Measurement 2.0 (or similar) data is recommended, in order to track changes in obesity prevalence over time and observe its trends in Austrian hospital settings. Last but not least, future research should examine obesity prevalence in various types of hospitals (tertiary and secondary ones) regarding care dependency sum scores and individual items, such as hygiene, mobility, daily activities, etc., especially in hospitalised elderly patients in order to gain a more precise understanding of (elderly) obese patients' care dependency in different types of hospitals.

4.6 Recommendations for practice

The results of the present data analysis are useful for clinical practice as they provide information on the current state of obesity to the multidisciplinary obesity management teams in hospitals. This secondary data analysis found that obesity was more prevalent in the hospitalised population than in the overall Austrian population, especially in hospitalised women, middle-aged patients, those with diabetes mellitus and/or cardiovascular diseases, and care-independent patients. This knowledge could be used by the multidisciplinary obesity management teams and/or healthcare decision-makers to initiate and adjust interventions, to provide the optimal care for obese patients in the Austrian hospital setting.

The multidisciplinary obesity management team plays an important part in providing counselling for obese patients in hospitals. In Austria, this is done both at tertiary and in secondary hospitals, primarily through outpatient visits. However, to date, there are two provinces (Carinthia and Vorarlberg) without an outpatient clinic for obesity counselling (Austrian Obesity Association, 2024). Several international studies have emphasised the importance of using multidisciplinary teams to improve obesity's clinical outcomes (Alkhatry, 2024, Yu et al., 2021, Fernández-Ruiz et al., 2020). Therefore, establishing multidisciplinary teams in hospitals, especially in the two aforementioned provinces, might significantly improve access to obesity treatment for patients living in those provinces. Additionally, this secondary data analysis revealed potential risk groups based on gender, age, and medical diagnoses. The identification of potential risk groups can lead to tailored interventions that support the needs of obese patients, while simultaneously benefiting healthcare professionals in their daily work. Interventions might consist of providing proper staffing, training, and equipment (i.e. blood pressure cuffs with extended range, lifting aids, bariatric beds, wider wheelchairs etc.) to manage obesity-related challenges.

Finally, the results of the secondary data analysis, combined with the newly released Austrian national guideline for obesity (Itariu, 2023), might enhance precision of public health interventions in the inpatient hospital setting across Austria. Dorner et al. (2023) describe precision public health interventions as the right intervention at the right time for the right population. By identifying specific subgroups with a higher prevalence of obesity, e.g. depending on gender, age groups, medical diagnoses and care dependency, a further preciseness of these interventions might be possible.

5. Conclusions

In conclusion, slightly more than one fifth of the adult hospitalised patients were obese. Overall, more women than men were obese. The age group with the highest rate of obesity was the one including patients aged 40 - 59 years, while the lowest was among patients above 80 years of age. Regarding medical diagnoses, the

highest prevalence of obesity was found among patients with diabetes mellitus and cardiovascular diseases. Obesity prevalence was higher in care dependency categories that required less care.

The prevalence of obesity in tertiary hospitals was almost identical to that in secondary hospitals. Tertiary hospitals had more obese patients with cardiovascular diseases and diabetes mellitus than secondary hospitals. On the other hand, secondary hospitals had more obese patients with a genitourinary system disease than tertiary hospitals. Tertiary hospitals had more "completely dependent" and "partially dependent" obese patients than secondary hospitals.

As a take-home message, addressing obesity is one of the biggest challenges that our healthcare system currently faces. In order to maintain a good situational awareness of obesity, it is highly important to continue conducting evidence-based research on its prevalence among hospitalised patients, while simultaneously implementing proactive interventions, before the condition runs out of proportion. In addition, it is equally important to provide the multiprofessional healthcare team with the appropriate tools, expertise, and continuous training to effectively manage obesity in the hospital setting. Last but not least, encouraging obese patients to take an active role in their own health with personalised interventions, can promote meaningful and sustainable change in their health and wellbeing. These approaches will likely improve the overall quality of care provided to obese patients.

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7. Supplementary appendix

7.1 Overview of prior published research

Table 9: Previously published research

Study	Prevalence of obesity	Characteristics	Gender	Age groups	Medical diagnoses	Care dependency	Other
Hossain et al. (2018)	31% of patients were obese	N=540 patients Tertiary Hospital – New Jersey US. Design: retrospective chart review. Sample's gender: 56% female, 44% male. Mean age 66 years. Average BMI 28kg/m². Data collection: September-October 2017.	55% obese female. 45% obese male.	Not analysed	Hypertension (68%), diabetes mellitus (35%), hyperlipidemia (36%), coronary artery disease (18%), chronic kidney disease (17%), congestive heart failure (18%) and COPD (24%).	Not analysed	2% of patients were given appropriate counselling and referral for obesity management during the hospitalisation.

Dennis and Trevenen (2016)	39% of ICU patients were obese	N= 230 ICU patients of a tertiary hospital in Australia. Design: retrospective observational study. Sample's gender: 42% female, 58% male. Mean age 56.8 years. Average BMI 29.8kg/m². Data collection: November 2012 - August 2013.	55.6% obese male. 44.4% obese female.	Mean age obese patients 58.7 years	Not analysed	Not analysed	
Dennis et al. (2017)	36.5% obesity prevalence	N=735 adult patients. ICU department, single site tertiary	60% male obese, 40% female obese	Not analysed	Not analysed	Not analysed	Compared to the general Australian population there

		hospital, Australia. Design: Observational study. Sample's gender: 40% female, 60% male. Mean age: 58 years Average BMI 27.9kg/m². Data collection: November 2012 – June 2014					was a higher proportion of obese patients within the Cohort (30.9% in ICU vs 27.2% in the general population
Dennis et al. (2018)	22.5% obesity prevalence	N=435 adult patients, single site tertiary hospital, in Western Australia. Design: Single-centre cross-section study. Sample gender: 55% males and 45% females.	60.8% of men were either overweight or obese 47.5 % of women were either overweight	68.3% of patients between 65-74 years were either overweight or obese. The age ≥85 group had	Not analysed	Not analysed	The proportion of patients in the hospital who were overweight or obese was lower than the general Australian population.

		Mean age: 64 years. Average BMI 26.6kg/m². Data collection: 5 February 2015	or obese	the lowest prevalence of overweight and obese at around 30%.			
Følling et al. (2014)	18.3% obesity prevalence	N=497 adult patients, single site tertiary hospital, Norway. Design: cross-sectional. Obesity classification according to WHO. Average BMI 25.4 kg/m². Data collection: spring 2007	47.3% of males were either obese or overweight, 42.9% of females were either obese or overweight	41.2% of patients 18-39 years were either obese or overweight. 61.2 % of patients 40-59 years were either obese or overweight. 50.5% of patients 60-79 years were either	Not analysed	Not analysed	Obesity-related conditions were more pronounced in 60–79 year olds and ≥ 80 year olds, for both male and female patients.

				obese or overweight. 30.0% of patients above 80 years were either obese or overweight.			
Goh et al. (2016)	33.5% obesity's prevalence	N=8064 adult cardiothoracic ICU patients Setting: single-site tertiary hospital in Melbourne, Australia. Design: retrospective data analysis. Mean BMI=28.5 kg/m². Mean age=64.9 years.	30.3% of the obese participants were female – the rest were male!	Not analysed	42.3% of obese CARDIOTHORACIC patients had diabetes, with 79.4% of obese patients had high cholesterol, 83.8% of obese patients had hypertension, 12% of obese patients had cerebrovascular diseases.	Not analysed	

		Data collection: 1 January 2002 to 31 December 2014					
Großschädl and Bauer (2022)	25% obesity prevalence among ICU patients	N= 460 adult ICU patients. Setting: ICU patients in entire Austria in secondary and tertiary hospitals. Mean BMI=26.3 kg/m². Mean age=68 years. Sample Gender: 40.7% were female, 59.3% were male. Data collection: 2009 to 2018.	38.3% of obese patients were female. 61.7% of obese patients were male.	Obese patients had a mean age of 68 years old (IQR - >59-74)	58.3% of obese patients had Diseases of the circulatory system. 33.0% of obese patients had Diseases of the respiratory system. 30.4% of obese patients had Diabetes mellitus. 22.6% of obese patients had Endocrine, nutritional, or metabolic diseases	29.6% of the obese patients were care dependent.	
Odum et al. (2016)	24.57% obesity prevalence among revision of total knee	N= 451,982 with revision of total knee arthroplasty. Setting:	Obesity prevalence among females	Age group 45-64 had the highest proportion	Having ≥ 3 comorbidities increased the risk of being obese 30 times.	Not analysed	Obesity rates were higher among tertiary hospital

	arthroplasty in 2012	hospitalised patients in the US in tertiary, secondary and rural hospitals. Sample average age: 65.6 years. Sample gender: 59% female and 41% male. Data collection: 2002-2012	19.94% and among males 13.75%. Females had a 53% higher chance of being obese than men.	(22.26%) of obesity. Age group ≥75 years had the lowest prevalence of obesity (8.99%)			(18.18%) compared to secondary hospitals (16.93%).
Orhurhu et al. (2020)	19.36% obesity prevalence among patients spinal cord stimulator in 2015.	N= 3893 patients with spinal cord stimulator in US hospitals Sample's average age: 56.2 years. Sample's gender: 42.3% males and 57.7% females. Data collection:	62.0% of obese patients were female. 38.0% of obese patients were male.	Obese patients had a mean age of 55.2 years, *SD* (14.7 years) Age groups not analysed	Not analysed	Not analysed	

		January 2011 to June 2015					
Elliott et al. (2023)	27.5% obesity prevalence	N= 513 patients across seven hospital sites in Melbourne, Australia. Design: multi-site cross-sectional study Sample's average age: 73 years (IRQ: 59–83 years). Sample's average BMI: 27.7 kg/m² Sample's gender: 49.7% female. Data collection: October 2021	Not analysed	Not analysed	Not analysed	Not analysed	The majority of obese patients received acute medical care.
Di Bella et al. (2020)	32% total obesity	N= 1327 in 3 different tertiary	Not analysed	Not analysed	Not analysed	Not analysed	Obese patients with a BM≥ 30

	prevalence	hospitals in Queensland, Australia. Design: multi-site cross-sectional study Sample's average age: 61 (*SD*: 19) years. Sample's average BMI: 28 kg/m². Sample's gender: 57% male, 43% female. Data collection: December 2016					kg/m² received a diagnosis of obesity in only half of cases.

7.2 Nursing Quality Measurement 2.0 Survey

PLPZ
Pflegequalitätserhebung 2.0

Code der Einrichtung ☐☐☐☐ *Code der Station/Wohnbereich* ☐☐☐

Angaben zur PatientIn

Station/Wohnbereich/Team _____

Code der PatientIn _____

3

Fragen, die mit folgendem Symbol gekennzeichnet sind (👁), müssen direkt am Bett der PatientIn erfasst werden.

👁 **1 Hat die PatientIn an der Erhebung teilgenommen?**
- Ja *(Bitte mit Frage 3 fortfahren)*
- Nein

👁 **2 Was war der ausschlaggebende Grund nicht an dieser Erhebung teilzunehmen?**
- Teilnahme verweigert
- Nicht anwesend während der Erhebung
- Komatös
- Kognitive Beeinträchtigung
- Terminal/Zustand zu schlecht
- Versteht oder spricht die Sprache nicht
- Anderer Grund

---

3 Geburtsdatum Tag ☐☐ Monat ☐☐ Jahr ☐☐☐☐

4 Geschlecht männlich ☐ weiblich ☐ PatientIn möchte keine Angaben zum Geschlecht machen ☐

5 Aufnahmedatum Tag ☐☐ Monat ☐☐ Jahr ☐☐☐☐

6 Wurde die PatientIn innerhalb der letzten zwei Wochen operiert?
- Ja
- Nein

7 Wird bei dieser PatientIn ein Pflege- und Behandlungspfad für PatientInnen am Ende des Lebens befolgt?
- Ja
- Nein

8 Welche medizinischen Diagnosen wurden bei der PatientIn gestellt?

(Mehrfachantworten möglich)

- Bestimmte infektiöse und parasitäre Krankheiten
- Bösartige Neubildungen
- Krankheiten des Blutes und der blutbildenden Organe sowie bestimmte Störungen mit Beteiligung des Immunsystems
- Endokrine, Ernährungs- und Stoffwechselkrankheiten (ohne Diabetes mellitus)
  - Diabetes mellitus
- Psychische und Verhaltensstörungen (ohne Demenz, Störungen durch psychotrope Substanzen, Sucht)
  - Demenz
  - psychotroper Substanzmissbrauch/Sucht
- Krankheiten des Nervensystems (ohne Verletzungen des Rückenmarks/Querschnittlähmung)
  - Verletzungen des Rückenmarks/Querschnittlähmung
- Krankheiten des Auges und der Augenanhangsgebilde
- Krankheiten des Ohres und des Warzenfortsatzes
- Krankheiten des Kreislaufsystems (ohne Schlaganfall)
  - Schlaganfall
- Krankheiten des Atmungssystems
- Krankheiten des Verdauungssystems
- Krankheiten der Haut und der Unterhaut
- Krankheiten des Muskel-Skelett-Systems und des Bindegewebes
- Krankheiten des Urogenitalsystems
- Schwangerschaft, Geburt und Wochenbett
- Angeborene Fehlbildungen, Deformitäten und Chromosomenanomalien
- Symptome und abnorme klinische und Laborbefunde, die anderenorts nicht klassifiziert sind
- Verletzungen, Vergiftungen und bestimmte andere Folgen äußerer Ursachen (ohne Überdosis)
  - Überdosis
- Äußere Ursachen von Morbidität und Mortalität
- Faktoren, die den Gesundheitszustand beeinflussen und zur Inanspruchnahme des Gesundheitswesens führen
- Unbekannt/keine Diagnose

Pflegeabhängigkeitsskala

Frage 9 bitte nur für PatientInnen über 18 Jahren ausfüllen.

9 Bitte geben Sie für jeden Aspekt den Grad an, inwieweit die PatientIn von Pflege durch andere Personen abhängig ist.

	1*	2*	3*	4*	5*
Essen und Trinken: Ausmaß, in dem eine Person in der Lage ist, alleine zu essen und zu trinken sowie Nahrung und Getränke zuzubereiten.	☐	☐	☐	☐	☐
Kontinenz: Ausmaß, in dem eine Person in der Lage ist, ihre/seine Urin- und/oder Stuhlausscheidungen willkürlich zu kontrollieren und angemessen darauf zu reagieren.	☐	☐	☐	☐	☐
Körperhaltung: Ausmaß, in dem eine Person in der Lage ist, bei bestimmten Aktivitäten die richtige Körperhaltung einzunehmen (z.B. Muss Person gelagert werden? Braucht die Person Hilfe beim Transfer?).	☐	☐	☐	☐	☐
Mobilität: Ausmaß, in dem eine Person in der Lage ist, sich alleine fortzubewegen und bestimmte Hilfsmittel zu benutzen.	☐	☐	☐	☐	☐
Tages- und Nachtrhythmus: Ausmaß, in dem eine Person einen angemessenen Tag-/Nachtrhythmus aufrechterhalten kann.	☐	☐	☐	☐	☐
An- und Auskleiden: Ausmaß, in dem eine Person in der Lage ist, sich allein an- und auszukleiden.	☐	☐	☐	☐	☐
Körpertemperatur: Ausmaß, in dem eine Person in der Lage ist, ihre/seine Körpertemperatur gegen äußere Einflüsse zu schützen (z.B. Die Person bemerkt Temperaturunterschiede (Es ist kalt.) und kann angemessen darauf reagieren (Person zieht eine Weste an, fragt nach einer Weste, o.ä.).	☐	☐	☐	☐	☐
Körperpflege: Ausmaß, in dem eine Person in der Lage ist, sich selbständig zu waschen und zu pflegen.	☐	☐	☐	☐	☐
Vermeiden von Gefahren: Ausmaß, in dem eine Person in der Lage ist, selbständig für ihre/seine Sicherheit zu sorgen, Gefahren in der Umgebung zu erkennen und angemessen darauf zu reagieren.	☐	☐	☐	☐	☐
Kommunikation: Ausmaß, in dem eine Person in der Lage ist, verbal (Sprache) und nonverbal (Gestik, Mimik) zu kommunizieren.	☐	☐	☐	☐	☐
Kontakte mit Anderen: Ausmaß, in dem eine Person in der Lage ist, soziale Kontakte mit Anderen (z.B. ZimmernachbarIn, Freunde, Familie) aufzunehmen, aufrechtzuerhalten und zu beenden.	☐	☐	☐	☐	☐
Sinn für Regeln und Werte: Ausmaß, in dem eine Person in der Lage ist, Regeln und Werte (z.B. Hausordnung) einzuhalten und Wert auf ihre/seine Privatsphäre legt.	☐	☐	☐	☐	☐
Alltagsaktivitäten: Ausmaß, in dem eine Person in der Lage ist, tägliche Anforderungen und Aktivitäten innerhalb der Einrichtung zu bewältigen (z.B. merkt sich Termine (Therapien, Essenszeiten, Bastelstunde) und nimmt diese selbständig wahr). Auch die Organisation des Haushaltes gehört zu den Alltagsaktivitäten.	☐	☐	☐	☐	☐
Aktivitäten zur sinnvollen Beschäftigung: Ausmaß, in dem eine Person in der Lage ist, durch sinnvolle Beschäftigung (z.B. Lesen, Fernsehen, Basteln) ihre/seine Zeit während des stationären Aufenthaltes zu gestalten.	☐	☐	☐	☐	☐
Lernfähigkeit: Ausmaß, in dem eine Person kognitiv in der Lage ist, Kenntnisse und/oder Fähigkeiten/Fertigkeiten zu erwerben und/oder Dinge zu behalten, die sie/er früher gelernt hat (z.B. Umgang mit Gehhilfen, Befolgen eines Diätplanes).	☐	☐	☐	☐	☐

*** 1 = Völlig abhängig; 2 = Überwiegend abhängig; 3 = Teilweise abhängig; 4 = Überwiegend unabhängig; 5 = Völlig unabhängig**

10 Wurde in der PatientInnendokumentation seit der Aufnahme in die Einrichtung (Akutbereich) oder innerhalb der letzten 6 Monate (Langzeitbereich) eine Risikobeurteilung in Bezug auf einer der nachfolgenden Indikatoren durchgeführt und vermerkt?

	Risikobeurteilung vorliegend	
	Ja	Nein
Dekubitus	☐	☐
Mangelernährung	☐	☐
Stürze	☐	☐

Dekubitus

11 Risikoskala *(Bradenskala, ab 8 Jahren auszufüllen)*

Sensorisches Empfindungsvermögen
1 Fehlt
2 Stark eingeschränkt
3 Leicht eingeschränkt
4 Vorhanden

Ernährung
1 Sehr schlechte Ernährung
2 Mäßige Ernährung
3 Ausreichende Ernährung
4 Gute Ernährung

Mobilität
1 Komplett immobil
2 Stark eingeschränkt
3 Gering eingeschränkt
4 Mobil

Aktivität
1 Bettlägerig
2 Sitzt auf einem Stuhl
3 Geht wenig
4 Geht regelmäßig

Feuchtigkeit
1 Ständig feucht
2 Oft feucht
3 Manchmal feucht
4 Selten feucht

Reibe- und Scherkräfte
1 Aktuelles Problem
2 Potentielles Problem
3 Kein Problem zurzeit

12 Ist diese PatientIn Ihrer Meinung nach momentan dekubitusgefährdet?
Ja
Nein

13 Wurde bei der PatientIn basierend auf einer Hautinspektion ein Dekubitus festgestellt?
Ja
Nein
PatientIn lehnt Hautinspektion ab

14 Welche Maßnahmen wurden in dieser Einrichtung bei dieser PatientIn durchgeführt, um einen Dekubitus zu vermeiden oder zu behandeln? *(Bitte kreuzen Sie alle durchgeführten Maßnahmen an)*
Regelmäßige Hautinspektion
Passive druckverteilende Matratze oder Auflage
Aktive druckverteilende Matratze oder Auflage
Sitzauflage
Pflegerollstuhl
Wechsellagerung/Positionswechsel im Liegen gemäß einem Zeitplan
Freilagerung der Fersen/Anheben der Fersen
Druckentlastung anderer Körperstellen
Gezielte Bewegungsförderung/Mobilisation
Feuchtigkeits- oder Hautschutzcremes/-Produkte
Prävention oder Behandlung von Flüssigkeits- und/oder Ernährungsdefiziten
PatientInnenedukation zur Prävention und/oder Behandlung von Dekubitus
Andere Maßnahmen
Keine Maßnahmen
PatientIn lehnt alle Maßnahmen bezüglich Dekubitus ab

15 Wenn die PatientIn einen Dekubitus hat, ist die nachstehende Tabelle auszufüllen

Dekubituskategorie:	Sakrum	Trochanter		Ischium		Ferse		Knöchel		Ellbogen		Kopf (inkl. Ohren, Nase, Gesicht)			
		L	R	L	R	L	R	L	R	L	R	L	R	Andere 1	Andere 2
Kategorie 1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kategorie 2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kategorie 3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kategorie 4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Dekubitus nicht kategorisierbar: Tiefe unbekannt	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Vermutete tiefe Gewebeschädigung: Tiefe unbekannt	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Entstehungszeitpunkt:															
Vor der Aufnahme (in diese Einrichtung)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Auf dieser Station	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Auf einer anderen Station	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Nach der Aufnahme in diese Einrichtung, Station unbekannt	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Nach der Aufnahme, aber in einer anderen Einrichtung	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Inkontinenz

16 Ist die PatientIn harninkontinent?

Ja
Nein *(Bitte mit Frage 21 fortfahren)*

17 Hat die PatientIn aufgrund der Harninkontinenz einen Katheter?

Ja
Nein

18 Begann die Harninkontinenz nach der Aufnahme in diese Einrichtung?

Ja
Nein

19 Welche Maßnahmen wurden in dieser Einrichtung bei dieser PatientIn zur Kontinenzförderung und/oder Behandlung der Harninkontinenz durchgeführt?

(Bitte kreuzen Sie alle durchgeführten Maßnahmen an)

Assessment der Harninkontinenzform
Blasentagebuch
Anpassung der Umgebung/Bekleidung
Lebensstilanpassung
Blasentraining
Beckenbodentraining
Individueller Zeitplan mit fixen Zeiten für Toilettengänge
Stationsplan mit fixen Zeiten für Toilettengänge
Überweisung zur/zum ExpertIn
Absorbierende Produkte/ableitende Hilfsmittel
Evaluierung der Medikation
Medikation
Andere Maßnahmen
Keine Maßnahmen
PatientIn lehnt alle Maßnahmen bezüglich Harninkontinenz ab

20 Ist die PatientIn stuhlinkontinent?

Ja
Nein

Wenn die PatientIn harninkontinent aber nicht stuhlinkontinent ist, gehen Sie bitte weiter zu Frage 24.
Wenn die PatientIn weder harn- noch stuhlinkontinent ist, gehen Sie bitte zu Frage 25.

21 Begann die Stuhlinkontinenz nach der Aufnahme in diese Einrichtung?

Ja
Nein

22 Wurde bei der PatientIn basierend auf einer Hautinspektion eine inkontinenzassoziierte Dermatitis (IAD) festgestellt?

Ja:
Kategorie 1a
Kategorie 1b
Kategorie 2a
Kategorie 2b
Nein
PatientIn lehnt Hautinspektion ab

Mangelernährung

23 Aktuelles Gewicht der PatientIn: in kg

☐☐☐,☐

Unbekannt

24 Aktuelle Körpergröße der PatientIn: in cm

☐☐☐

25 Hat die PatientIn ungewollt Gewicht verloren?

Ja
Nein
Unbekannt

25a. Wenn ja, wie viel Gewicht hat die PatientIn ungewollt verloren?

☐☐,☐ kg im letzten Monat
☐ Unbekannt

☐☐,☐ kg in den letzten 3 Monaten
☐ Unbekannt

☐☐,☐ kg in den letzten 6 Monaten
☐ Unbekannt

26 Ist die PatientIn akut erkrankt und hat die PatientIn mehr als 5 Tage wenig oder nichts gegessen oder wird die PatientIn in den kommenden 5 Tagen weniger oder nichts essen?

Ja
Nein

Fragen 27 und 28 werden nicht angezeigt, diese sind ausschließlich für Pflegeheime.

29 Welche Ernährungsmaßnahmen wurden in dieser Einrichtung bei dieser PatientIn durchgeführt? *(Bitte kreuzen Sie alle durchgeführten Maßnahmen an)*

Mangelernährungs-Screening
Überweisung zur/zum DiätologIn
Energie- oder proteinangereicherte Kost
Energie- oder proteinangereicherte Zwischenmahlzeiten
Anpassung der Nahrungskonsistenz
Wunschkost
Anpassung des Ambientes bei den Mahlzeiten
Unterstützung während den Mahlzeiten
Information für PatientInnen und Angehörige bezüglich Ernährungsproblemen und Maßnahmen
Überwachung der Flüssigkeitsaufnahme durch Führen eines Trinkprotokolls
Orale Trink- oder Zusatznahrung
Sondennahrung
Parenterale Ernährung
Überwachung der Nahrungszufuhr (z.B. mit einem Tellerprotokoll)
Andere Maßnahmen
Keine Maßnahmen
PatientIn lehnt alle Maßnahmen bezüglich Mangelernährung ab

Stürze

30 Ist die PatientIn in den letzten 30 Tagen in dieser Einrichtung gestürzt?

Ja
Nein *(Bitte mit Frage 34 fortfahren)*
Unbekannt *(Bitte mit Frage 34 fortfahren)*

31 Hat der schwerste Sturz in den letzten 30 Tagen in dieser Einrichtung (wenn mehr als ein Sturz passiert ist) körperliche Verletzungen verursacht?

Ja:
- Leichte Verletzungen (Hämatome, Schürfwunden, o.ä., welche keine medizinische Behandlung erfordern)
- Mittelschwere Verletzungen (Prellungen, Quetschungen, Schnittwunden, die genäht werden müssen oder schwere Schürfwunden, welche eine Wundbehandlung erfordern)
- Ernste Verletzungen (Kopfverletzung, Frakturen)

Nein
Unbekannt

32 Ist die PatientIn in den letzten 12 Monaten vor der Aufnahme in das Krankenaus gestürzt?

Ja
Nein
Unbekannt

33 Nimmt die PatientIn sedierende und/oder psychotrope Medikamente ein?

Ja
Nein
Unbekannt

34 Welche Maßnahmen wurden <u>in dieser Einrichtung</u> bei dieser PatientIn zur Prävention von Stürzen und/oder sturzbedingten Verletzungen durchgeführt?

(Bitte kreuzen Sie alle durchgeführten Maßnahmen an)

Evaluierung der aktuellen Medikation
Evaluierung des Sehvermögens/der Sehkraft
Evaluierung des Schuhwerks
Evaluierung der Hilfsmittel
Evaluierung des Tagesprogramms/der Aktivitäten
Therapeutische Übungen/Training
Eins-zu-eins-Betreuung
Begleitung beim Gehen
Hilfsmittel zur Sturzprävention
Sicherheitsanpassung der Umgebung
Verwendung eines Niederflurbettes/Matratze am Boden und/oder neben dem Bett
PatientInnenedukation
Vereinbarung mit PatientIn und/oder Angehörigen über präventive Maßnahmen
Anwendung anderer freiheitsein-/beschränkender Maßnahmen
Andere Maßnahmen
Keine Maßnahmen
PatientIn lehnt alle Maßnahmen bezüglich Sturz und sturzbedingten Verletzungen ab

Freiheitsein-/beschränkende Maßnahmen

35 Wurden bei der PatientIn in den letzten 30 Tagen <u>auf dieser Station</u> freiheitsein-/beschränkende Maßnahmen angewendet?

Ja
Nein *(Bitte mit Frage 40 fortfahren)*

36 Wenn bei der PatientIn in den letzten 30 Tagen <u>auf dieser Station</u> freiheitsein-/beschränkende Maßnahmen angewendet wurden, ist die nachstehende Tabelle auszufüllen:

	Mechanische Maßnahmen					Körperliche Maßnahmen	Pharmakologische Maßnahmen	Psychische Maßnahmen	Elektronische Überwachung	Eins-zu-eins-Überwachung	Einschließen in einem Raum/ Deprivation	Verschlossene Abteilung oder Gebäude	Andere Maßnahmen
	Seitenteile	Fixiergurte	(Roll-)stuhl mit Tisch	PatientInnenschutzdecke	Andere mechanische Maßnahmen	(Festhalten einer PatientIn mit körperlicher Kraft einer anderen Person)	(Sedativa, Tranquilizer, Neuroleptika etc.)	(Belohnungen, um erwünschtes Verhalten zu fördern)	(Videoüberwachung, Alarmsysteme, Sensormatten etc.)			(permanent oder temporär; PatientIn kann die Station nicht ohne Erlaubnis verlassen)	
Ausschlaggebendes Motiv:													
Auf Wunsch der PatientIn	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Auf Wunsch der Angehörigen	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Sturz(prävention)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Umherirren der PatientIn (verhindern)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Aggressives Verhalten (verhindern)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Verwirrtheit/ delirantes Verhalten (verhindern)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Agitation	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Verweigerung der Behandlung/ Vermeiden von Behandlungs-unterbrechungen	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Andere Motive	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Unbekannt	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

37 Welche der nachfolgenden Begleitmaßnahmen wurden durchgeführt? *(Bitte kreuzen Sie alle durchgeführten Begleitmaßnahmen an)*

In erster Linie wurden Alternativen zu ein-/beschränkenden Maßnahmen angewendet
In jeder Arbeitsschicht ist eine Person/Pflegende gemäß Vorschrift, zur Überwachung der freiheitsein-/beschränkten PatientIn, eingesetzt
Die ein-/beschränkenden Maßnahmen wurden in der PatientInnendokumentation festgehalten
Die PatientIn und/oder die Angehörigen wurden über den gesamten Ablauf der ein-/beschränkenden Maßnahmen informiert
Die ein-/beschränkenden Maßnahmen wurden mit allen beteiligten Personen regelmäßig evaluiert (einschließlich der PatientIn)
Keine der oben genannten Begleitmaßnahmen

Schmerzen

38 Hat die PatientIn während der letzten 7 Tage unter Schmerzen gelitten?

Keine Schmerzen *(Bitte mit Frage 43 fortfahren)*
Schmerzen vorhanden, aber nicht täglich
Tägliche Schmerzen

39 Geben Sie die durchschnittliche Stärke der Schmerzen während der letzten 7 Tage an:

Leichte Schmerzen
Mäßige Schmerzen
Starke Schmerzen
Sehr starke Schmerzen
Unerträgliche Schmerzen

40 Sind die Schmerzen chronisch oder akut?

Chronisch
Akut

41 Geben Sie die Stärke der momentanen Schmerzen an:

Keine Schmerzen
Leichte Schmerzen
Mäßige Schmerzen
Starke Schmerzen
Sehr starke Schmerzen
Unerträgliche Schmerzen

42 Welche Maßnahmen wurden in dieser Einrichtung bei dieser PatientIn während der letzten 7 Tage/ im Moment durchgeführt, um Schmerzen zu lindern?
(Bitte kreuzen Sie alle durchgeführten Maßnahmen an)

Nicht-medikamentöse Maßnahmen
- Physiotherapie
- Transkutane elektrische Nervenstimulation (TENS)
- Akupunktur
- Ruhigstellen
- Psychotherapie und Verhaltenstherapie
- Ergotherapie
- Musiktherapie
- Kälte- und Wärmetherapie
- PatientInnenedukation
- Entspannungstherapien (Yoga, Achtsamkeit, etc.)
- Andere nicht-medikamentöse Maßnahmen

Medikamentöse Maßnahmen
- Nicht-Opioide
  - Paracetamol
  - Nichtsteroidales Antirheumatikum (NSAR)
  - Antidepressiva
  - Antiepileptika (Gabapentin, Pregabalin, etc.)
  - Andere Nicht-Opioide
- Opioide
  - Schwachwirksame Opioide (Codein oder Tramadol)
  - Starke Opioide

Andere Maßnahmen
Keine Maßnahmen
PatientIn lehnt alle Maßnahmen zur Schmerzreduktion ab

43 Die obengenannten Schmerzeinschätzungen (Frage 40-43) wurden angegeben von:

Der PatientIn
Der Pflegeperson

Einrichtungsinterne Fragen und Antwortkategorien

Frage 1:

Antwortoption 1
Antwortoption 2
Antwortoption 3
Antwortoption 4
Antwortoption 5

Frage 2:

Antwortoption 1
Antwortoption 2
Antwortoption 3
Antwortoption 4
Antwortoption 5

Frage 3

Antwortoption 1
Antwortoption 2
Antwortoption 3
Antwortoption 4
Antwortoption 5

Frage 4:

Antwortoption 1
Antwortoption 2
Antwortoption 3
Antwortoption 4
Antwortoption 5

Frage 5:

Antwortoption 1
Antwortoption 2
Antwortoption 3
Antwortoption 4
Antwortoption 5