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## PUBLIC HEALTH | RESEARCH ARTICLE

# Degree of disability among female healthcare workers who are overweight or obese

Pia Maria Ilvig<sup>1\*</sup> and Jeanette Refstrup Christensen<sup>1</sup>

**Abstract:** *Background:* The prevalence of overweight and obesity is increasing worldwide. Research has clarified that being overweight or obesity can lead to disability in everyday life. *Aim:* The present study explores the association between the degrees of experienced disability in Danish female healthcare workers with a Body Mass Index (BMI) classified as being overweight or obese, compared to female healthcare workers classified as being normal weight. *Material and methods:* 67 females with a mean age of 49.5 years and a mean BMI of 27.5 kg/m<sup>2</sup> completed a questionnaire exploring the degree of experienced disability in their everyday lives. *Results:* The degree of disability in the following activities were significantly higher among females who were obese compared to females who were normal weight; *Walking up/down two or more staircases, Pedicure, Dressing the lower body and Exercising outside the home.* No statistical differences were found between the females that were overweight and the females that were normal weight. **Conclusion:** Female healthcare workers who are obese experience a higher degree of disability, than females with a normal weight. Offering an occupational therapy intervention to reduce disability and facilitate participation in everyday life could be relevant.



Jeanette Refstrup Christensen

### ABOUT THE AUTHORS

The authors, Pia Maria Ilvig, OT, MScH and Jeanette Refstrup Christensen, OT, MScH, PhD both work for the Research Initiative for Activity Studies and Occupational Therapy, under The Research Unit of General Practice, Department of Public Health, University of Southern Denmark. Pia Ilvig as a research assistant and Jeanette Refstrup Christensen as Head of Studies for Master of Science in Occupational Therapy. Dr Christensen has published several articles concerning disabilities, musculoskeletal pain and overweight and obesity issues. Job groups have, among others been healthcare workers, as they represent a high-risk population with high physical work demands. Healthcare work is mostly performed by females with high prevalence of overweight and obesity, musculoskeletal pain, and low physical capacities. Dr Christensen's research suggests, that it may be this combination that causes the high frequency of sickness absence and early retirement. Research which underpins the correlation with overweight and obesity is therefore needed, in order to make the right recommendations regarding health promotion within this group.

### PUBLIC INTEREST STATEMENT

Overweight and obesity continues to increase worldwide. It has been argued that obesity can lead to disability and reduced quality of life. Healthcare workers are one of many job groups with high physical work demands involving manual work tasks. Like other job groups, characterized by having manual work, healthcare workers suffer from musculoskeletal symptoms, poor work ability and sickness. As education correlates with lifestyle-related issues such as overweight and obesity, some studies show that up to 95% of healthcare workers either suffer from overweight or obesity. Due to a large body frame, an optimal ergonomic work posture during activities may be challenged and disabilities can be experienced. We conducted a study to assess healthcare workers experienced disabilities. We observed that obesity lead to more disabilities when compared to normal weight healthcare workers. We hope our findings will provide indication of the relevance of offering interventions to reduce disability experienced by obese workers with manual tasks.

**Subjects: Health & Society; Disability; Women; Health Conditions; Obesity; Occupational Therapy**

**Keywords: BMI; everyday life; international classification of functioning, disability, and health; occupational therapy**

### 1. Introduction

In 2014 the World Health Organization (WHO) estimated that 39% of the world's adult population were overweight (Body Mass Index (BMI)  $\geq 25$  kg/m<sup>2</sup>) and 13% were obese (BMI  $\geq 30$  kg/m<sup>2</sup>) (WHO, 2014). Despite this high percentages, the incidence of overweight and obese adults worldwide continues to increase (WHO, 2014) and the same trend is also occurring in Denmark (Sundhedsstyrelsen, 2014). Health consequences of obesity range from serious chronic conditions which reduce the overall quality of life to increased risk of premature death (Prentice, 2006); thus, consequently imposing a financial burden on society (Højgaard, Gyrd-Hansen, Olsen, Søgaard, & Sørensen, 2008; Højgaard, Olsen, Søgaard, Sørensen, & Gyrd-Hansen, 2008; Indenrigs- og Sundhedsministeriet, 2007; von Lengerke & Krauth, 2011; Yang & Hall, 2008). A BMI of 25 increases the risk of non-communicable diseases and level of risk increase as the BMI increases (WHO, 2016a). The consequences are higher among women than men (Indenrigs- og Sundhedsministeriet, 2007).

Obesity has recently been acknowledged as a disease and was included as a diagnosis code to the 2016 version of the International Classification of Diseases (ICD-10) (WHO, 2016b). The American and Canadian Medical Associations and Canadian Obesity Network have declared that obesity is a chronic disease (American Medical Association, 2016; Canadian Medical Association, 2015; Canadian Obesity Network, 2016), which is also supported by several papers (Apovian, 2010; Scheen, 2008; Yumuk et al., 2015). Similarities have been found in activity time consumption between adults who are obese and adults living with chronic health conditions (Forhan, Law, Vrkljan, & Taylor, 2011). However, adults who are obese experience even more severe disability than adults with chronic diseases (Forhan, Law, Taylor, & Vrkljan, 2012).

Healthcare workers is a predominated female job group also characterized by high prevalence of overweight or obesity (Pohjonen, 2001). Healthcare work includes tasks with high physical demands and a high body weight will impose a high biomechanical strain on joints and muscles (Ono, Lagerstrom, Hagberg, Linden, & Malke, 1995; Torgen, Nygard, & Kilbom, 1995). Furthermore, a large body frame may hinder optimal ergonomic working postures during tasks both at work and at home, increasing the risk of experiencing disabilities in everyday activities (Tsuritani et al., 2002).

According to the World Federation of Occupational Therapists (WFOT), the primary goal of occupational therapy (OT) is to promote health and well-being through occupation and enable participation in activities of everyday life (WFOT, 2010). This suggests that overweight and obese adults who experience disability would benefit from an OT intervention, like others living with chronic diseases. From the perspective of the WHO's definition of complete physical, mental and social well-being, a successful OT intervention might promote the health of overweight and obese adults (WHO, 2006).

A specific and detailed instrument for investigating possible disabilities in everyday life experienced by obese adults has been missing in research (Larsson & Mattsson, 2001; Stucki et al., 2006). The Danish Health Authority recommends using The International Classification of Functioning, Disability and Health (ICF) as a framework to measure disabilities across disciplines and sectors (MarselisborgCentret, 2005). An international ICF consensus conference in 2003 led to the establishment of the Comprehensive and Brief ICF Core Sets for patients with obesity (Stucki et al., 2004). The ICF core sets for obesity were developed from the ICF checklist, which identifies the most common disabilities (Ewert et al., 2004). Following the recommendations of using the ICF as a framework, the present study was based on the ICF Core Sets for Obesity.

Only two Scandinavian studies were identified investigating the association between being overweight or obese and disabilities in adults (Larsson, 2004; Larsson & Mattsson, 2001). The participants were obese and attended in an outpatient weight-loss intervention. According to the authors, participating in the weight-loss intervention might have influenced the degrees of experienced disability. Although the participants were already enrolled in the weight-loss program, they may have exaggerated their disabilities to show eagerness. Experienced disabilities may also have been influenced by the success of the intervention (Larsson, 2004; Larsson & Mattsson, 2001). Therefore, it is important to provide an overview of the impact on everyday life experienced by adults who are overweight or obese, even when they are not participating in a weight-loss intervention. This will provide further knowledge of the activities in which adults who are overweight or obese experience disability. This knowledge could provide an argument as to the relevance of testing an OT intervention on adults who are overweight or obese and who experience disability.

The aim of the present study was to explore the association between the degrees of experienced disability in Danish female healthcare workers with a BMI classified as being overweight or obese, compared to female healthcare workers classified as being normal weight.

## 2. Material and methods

### 2.1. Study design

The present study was a part of an on-going randomised controlled trial (RCT) named FRIDOM (FRamed Intervention to Decrease Occupational Muscle pain) (Clinical Trial Registration number: NCT02843269) (Christensen, Bredahl, Hadrévi, Sjøgaard, & Sjøgaard, 2016). FRIDOM, which is being conducted in collaboration with the University of Southern Denmark (SDU) and a Danish municipality, is primarily aimed at evaluating the effect of a workplace intervention targeted musculoskeletal pain (Christensen et al., 2016). The present investigation was a cross-sectional study exploring the degrees of experienced disability in female healthcare workers activities of everyday life.

### 2.2. Population

A total of 110 adult female healthcare employees working in the elderly care sector for Syddjurs municipality (Central Jutland, Denmark) were asked to participate in this cross-sectional study. The participants were healthcare workers who were educated as social and health service assistants or social and health service helpers. Participants were excluded if they were; pregnant, on long-term sick leave or had any kind of severe medical condition (other than being overweight or obese) that could affect their degree of experienced disability (Christensen et al., 2016).

### 2.3. Assessment of disability

The brief and comprehensive ICF core sets for obesity is developed to guide multidisciplinary assessments in people with obesity (Stucki et al., 2004). Based on the ICF checklist a total of 109 categories, grouped into four components, were included in the comprehensive ICF core set (Stucki et al., 2004). The present study focused on the component *Activity and Participation* due to relevance within OT practice. Due to ethical considerations work-related disabilities were not measured in the present study, to avoid participants feeling investigated on their work performance. In the component *Activity and Participation*, 28 categories were obtained in the comprehensive core set for obesity (Stucki et al., 2004). This study compared the 28 categories with the experiences of a female healthcare worker who was formerly obese in order to secure a relevant and comprehensive inclusion of activities with disabilities experienced by female healthcare workers who are overweight or obese. A semi-structured interview gave insight and reflection into the disabilities an adult who is obese may experience in everyday life. The 28 categories were included in an interview-guide and because of the semi-structured approach, the informant was encouraged to elaborate and add activities. The interview revealed a need for more specific categories and activities compared to the categories included in the ICF Core Set for Obesity, which resulted in a constructed questionnaire. Especially, the categories of *household* and *leisure time activities* in the Comprehensive Core Set of Obesity were unspecific and resulted in more detailed activities in these categories. This was likewise for other

categories as well and it was considered to be necessary to both modify the activities and add additional ones, in order to explore the amount and degree of disability. Some of the ICF categories were excluded because all of the participants were able to work and therefore categories like *Maintaining a body position* and *Acquiring, keeping and termination a job* were not relevant for the questionnaire. The constructed questionnaire consisted of 22 activities including the following areas; mobility, self-care, household, outdoors and leisure time activities (Table 1) (WHO, 2003).

To avoid underestimation of the experienced disabilities it was possible for the participants to add relevant activities at the end of the questionnaire. Experienced disabilities in the work setting were not measured in this questionnaire.

In the questionnaire, the severity of experiencing disability was scored using seven response options; (1) *Not at all*, (2) *To a small degree*, (3) *Somewhat*, (4) *To some degree*, (5) *To a high degree* (6) *Unable to perform* and (7) *Not relevant*. If an activity was not relevant to the participant, it led to exclusion from the disability prevalence for that specific activity. The same procedure was followed if items were left blank. If the participants were unable to perform an activity because of difficulties, they were asked if they would like to be able to perform the activity or not. Activities were treated as irrelevant, if the participants did not wish to be able to perform them. Thus, the number of participants varied across the 22 activities and the prevalence of disabilities is presented in percentage.

#### **2.4. Data collection**

The questionnaire was handed to each participant in an envelope. Written information about the aim of the study, how to fill in the questionnaire and the deadline for returning the questionnaire was given in the beginning of the questionnaire. All 110 participants were asked to complete the paper-format questionnaire and place it in a mailbox at their workplace. If participants had not completed the questionnaire and turned it in to their workplace before the deadline, it was possible for them to send it by post in a reply envelope. Objective data from FRIDOM was then used to explore a possible association between BMI and self-reported disabilities. The participants weight in kilograms and height in centimetres to the nearest millimetre were measured by research staff (Christensen, 2013). BMI was calculated using body weight divided by the square of the height ( $\text{Weight}/\text{Height}^2$ ). BMI groups were classified according to the WHO's definition of BMI (WHO, 2000). In order to be able to cross data from the present study and BMI data from FRIDOM, full name and date of birth were collected in the questionnaire.

#### **2.5. Statistical analysis**

The statistical analysis was performed using *The STATA 14—Data Analysis and Statistical Software*. Descriptive statistics were used to describe the participants divided accordingly to BMI classification; as well as, to explore their degree of disability applied to the 22 activities. The degree of disability was the outcome variable and was measured on an ordinal scale. The non-parametric two-sample *Wilcoxon Rank Sum Test* was used to explore the differences between the group of participants who were overweight or obese and the reference group with normal weight. Based on previous evidence that adults who are overweight or obese experience more disability compared to normal weight adults, the statistical tests were one-sided with a  $p$ -value of 0.05 which was considered to be a significant difference between the groups (An, Andrade, & Chiu, 2015; Armour, Courtney-Long, Wethington, & Campbell, 2012; Backholer, Wong, Freak-Poli, Walls, & Peeters, 2012; Chen & Sloan, 2015; Ferraro, Su, Gretebeck, Black, & Badylak, 2002; Hergenroeder, Brach, Otto, Sparto, & Jakicic, 2011; Lang, Guralnik, & Melzer, 2007; Larsson & Mattsson, 2001; Lidstone et al., 2006; Nusselder, Looman, & Mackenbach, 2005; Peeters, Bonneux, Nusselder, De Laet, & Barendregt, 2004; Reuser, Bonneux, & Willekens, 2009; Wei & Wu, 2014; Wilkins & de Groh, 2005; Williams, Eastwood, Tillin, Hughes, & Chaturvedi, 2014; Wong et al., 2012).

#### **2.6. Ethical considerations**

The participants were already voluntary participants in the FRIDOM study and had agreed to receive sets of questionnaires. In relation to FRIDOM, ethics approval was obtained through the *Regional*

**Table 1. The relation between the ICF domains and the included activities in the questionnaire**

<b>ICF domains</b>	<b>Questionnaire activities</b>
Handling stress and other psychological demands	–
Changing basic body position	–
Maintaining a body position	–
<i>Mobility:</i>	<i>Mobility:</i>
Lifting and carrying objects	Lifting objects/picking up objects from the floor
Walking	Walk up/down one staircase Walk up/down two or more staircases
Moving around	–
Moving around using equipment (e.g. wheelchair, skates)	–
Using transportation (e.g. car, bus, train, plane)	–
Driving (e.g. riding bicycle and motorbike, driving car)	Riding a bicycle
<i>Self care:</i>	<i>Self-care:</i>
Washing oneself (e.g. bathing, drying, washing hands)	–
Caring for body parts (e.g. brushing teeth, shaving, grooming)	Pedicure
Toileting	–
Dressing	Dressing the lower body
Looking after one's health	–
<i>Domestic life:</i>	<i>Domestic life:</i>
Acquisition of goods and services (e.g. shopping)	Weekly grocery shopping
Doing housework (e.g. cleaning house, washing dishes laundry, ironing)	<i>Housework:</i> Cleaning the toilet Cleaning bathtub Cleaning windows Vacuuming Sweeping/washing the floor <i>Outside:</i> Shovelling snow Collecting and picking up leaves/grass/garden waste Weeding the garden Mowing the lawn
Caring for others	–
<i>Interpersonal interactions and relationships:</i>	<i>Interpersonal interactions and relationships:</i>
Basic interpersonal interactions	–
Informal social relationships	–
Family relationships	Playing with your own or others children
Intimate relationships	Sexual/intimate relationship
<i>Major life areas:</i>	
School education	–
Higher education	–
Acquiring, keeping and terminating a job	–
Remunerative employment	–
Economic self-sufficiency	–
<i>Community, social and civic life:</i>	<i>Training:</i>
Community life	–
Recreation and leisure	Participating in physical activities/sports with others Participating in exercise classes Exercising outside the home Exercising inside the home



*Scientific Ethical Committees for Southern Denmark* (Journal number S-20130157). The project was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2016). Informed consent was obtained and signed by all participants. The participants were informed that their data would be fully anonymous and that their written consent could be redrawn at any time and without any questions asked.

### 3. Results

Of the 110 participants who received the questionnaire, 73 completed and returned the questionnaire resulting in a response rate of 66.4%. Out of the 73 participants, 67 had available objective height and weight data and were included in the analysis.

#### 3.1. Characteristics of participants

The analysis showed that 40% ( $n = 27$ ) were categorized as normal weight (BMI 18.5–24.9), 30% ( $n = 20$ ) as overweight (BMI  $\geq 25$ ) and 30% ( $n = 20$ ) as obese (BMI  $\geq 30$ ). The mean age and BMI of the three groups are shown in Table 2.

#### 3.2. Experienced disability

In total, 41% of the normal weight group, 65% of the overweight group and 65% of the obese group experienced disability in one or more of the 22 activities. Figures 1 and 2 shows the prevalence of any degree of disability in *Mobility*, *Self-care* and *Interpersonal interaction and relationship activities* by the three BMI groups.

When comparing the obese group to the normal weight group, significant differences in the experienced degree of disability were found in the following activities; *Walk up/down two or more*

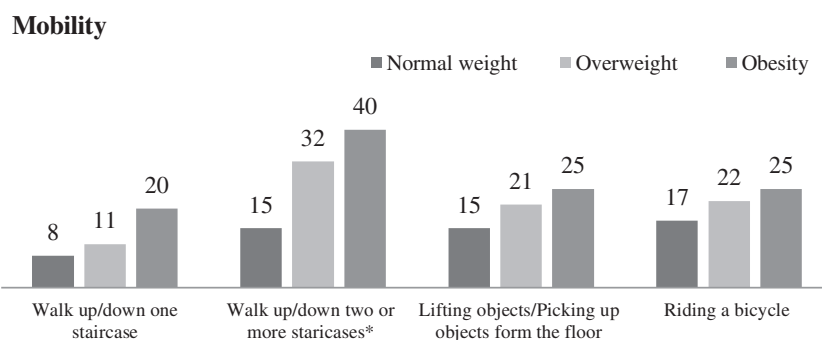
**Table 2. Characteristics of participants classified by BMI groups**

	All participants	Normal weight BMI 18.5–24.9	Overweight BMI 25–29.9	Obese BMI $\geq 30$
N	67	27	20	20
Percentage	100	40	30	30
Age (years)				
Mean (SD)	49.5 (10.7)	49.7 (11.9)	51.4 (9.2)	47.2 (10.4)
Range	23–74	26–74	25–63	23–62
BMI (kg/m <sup>2</sup> )				
Mean (SD)	27.5 (6.4)	21.9 (1.8)	27 (1.3)	35.4 (5.0)
Range	18.8–45.7	18.8–24.8	25–28.8	30.4–45.7

Notes: SD = Standard deviations; BMI = Body mass index.

**Figure 1. Prevalence (%) of disabilities (degree 2–6) in Mobility activities by BMI groups and test of significant differences in degree of disability with normal weight as reference.**

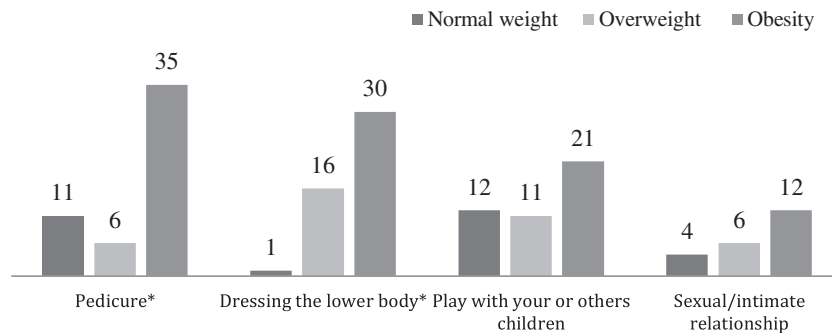
Notes: Disability degrees = 2: To a small degree, 3: Somewhat, 4: To some degree, 5: To a high degree, 6: Unable to perform.  
 \*Significant differences between groups.



**Figure 2. Prevalence (%) of disabilities (degree 2–6) in Self-care and Interpersonal interaction and relationship activities by BMI groups and test of significant differences in degrees of disability with normal weight as reference.**

Notes: Disability degrees = 2: To a small degree, 3: Somewhat, 4: To some degree, 5: To a high degree, 6: Unable to perform.  
 \*Significant differences between groups.

**Self-care and Interpersonal interaction and relationship**



staircases ( $p = 0.026$ ), *Pedicure* ( $p = 0.017$ ), *Dressing the lower body* ( $p = 0.041$ ) and *Exercise outside the home* ( $p = 0.037$ ). Thus, the obese group experienced a higher degree of disability in four activities. No significant differences were found in the degrees of disability between the overweight and normal weight group.

The large age-range of the participants increases the risk of age being a confounder for the experienced disability. The mean age of menopause is 51.4 years in Danish women. Age as a confounder was tested in the activities in which significant differences were found when comparing experienced disability in the BMI groups. No significance was found in the four activities showing that age did not confound the results.

**4. Discussion**

In the present study the obese group, when comparing to the normal weight group, experienced a significantly higher degree of disability in the following activities; *Walking up/down two or more staircases*, *Pedicure*, *Dressing the lower body* and *Exercising outside the home*. When the overweight group was compared with the normal weight group, no such findings were found. This study's findings are in agreement with Larsson and Mattsson's study, which found significant differences in experienced disability when females who were obese were compared with females of normal weight in the following activities; *Walk upstairs*, *Pedicure* and *Sports activities* (Larsson & Mattsson, 2001). Using the ICF categories, Raggi, Sirtori, Brunani, Liuzzi, and Leonardi (2009) highlighted *Mobility* and *Self-care* as the most represented domains of disability in adults who are obese. Armour et al. (2012) found that movement difficulties and complex-activities (including personal and instrumental activities of daily living (PADL and IADL)) were more prevalent in obese women and men compared with normal weight women and men. Furthermore, a study concluded that having a high BMI over a 10-year follow-up period was significantly associated with more lower-body disabilities (Ferraro et al., 2002). These findings are similar to the findings in the present study. Forhan, Law, Vrkljan, and Taylor (2010) found that in relation to sports, fitness and physical activity; obese people experienced anxiety when going to the gym, which might be the reason the present study found a higher degree of disability in exercising outside the home. Although another study found significant difference between the BMI groups in the category of *Interpersonal interaction and relationship*, no significant difference was found in the present study (Raggi et al., 2010). The prevalence of experienced disability in at least one activity was 65% in both the overweight and obese group and 41% in the of the normal weight group. Previous studies have found similar results in prevalence (An et al., 2015; Armour et al., 2012; Backholer et al., 2012; Ferraro et al., 2002; Hergenroeder et al., 2011; Imai et al., 2008; Lidstone et al., 2006; McDowell, Hughes, & Borrud, 2006; Peeters et al., 2004; Peterson, Al Snih, Stoddard, Shekar, & Hurvitz, 2014; Sirtori et al., 2012).



When comparing the participants in groups of before and after mean age of menopause, age was not a significant confounder.

Researchers have suggested that overweight and obese people may have adapted strategies for participating in everyday life, including increased time to complete activities, using assistance from others and having a lower degree of ambition in their occupational performance (Forhan et al., 2010; Forhan et al., 2011; Larsson & Mattsson, 2001; Sirtori et al., 2012). This could explain the lack of significance in the present study, where the overweight and obese participants did not experience disability in certain activities due to adapting their activities or receiving assistance from others to perform activities in the context of their environment. Furthermore, if the participants have been overweight or obese for a long period of time, they might not recognize their actual disability because they do not have a normal-weight reference point (Forhan et al., 2010). This might provide a lower estimate as to the degree of disability. Moreover, due to the nature of the participants work in which they help elderly citizens who are unable to take care of themselves, they might have knowledge of strategies or adaptations used to perform everyday life activities, which they can transfer over to their own everyday life allowing them to overcome any disability.

#### **4.1. Strengths and limitations**

The nature of the cross-sectional design makes defining a causal relationship between BMI and disability impossible. Further, the sample size could be preferably larger and a risk of type II errors exists (Juil, 2004). A study of 97,636 civilian non-institutionalized US women found a disability prevalence in 46.9% of the women who were obese, 32.3% for overweight and 26.8% for normal weight participants (Armour et al., 2012), which support the association between BMI and disability. All participants in the present study came from the same region, making it a homogenous group; thereby, avoiding some bias which strengthens the results.

It has been documented that being overweight or obese is associated with early retirement (Houston, Cai, & Stevens, 2009). Thus, the participants are an important target-population, due to their poor health status and experienced disability. Furthermore, an earlier retirement would increase the need of more healthcare workers because of the increasing burden of older citizens who need healthcare services.

A limitation due to the design of the study as part of a larger study was access to BMI data. As FRIDOM is an on-going project the available data on weight and height was measured at baseline in 2014. The aim of FRIDOM was not for the participants to lose weight but to reduce neck and shoulder pain. In the follow-up measures within the FRIDOM project, the participants did not decrease their weight or BMI significantly. In a 12-month feasibility intervention within the FRIDOM project, the participants only slightly reduced their body weight. This indicates that despite the two-year difference between when measured height and weight was recorded and when the participants answered the questionnaire, the risk of incorrectly classifying participants into the BMI groups was minimal.

The BMI groups was classified according to the WHO's definition of BMI (WHO, 2000). This is the most common way to classify weight categories in the research literature. The present study investigated adults with high physical work demands and their experienced disabilities in activities in everyday life. To the knowledge of the authors this association has not been identified before. The WHO's classification of weight groups was used in order to more accurately compare the results of the present study to other research. In future research with a higher number of participants, it will be relevant to use different classifications or the numerical value of BMI in the statistical analysis.

The construction of the questionnaire in the present study was based on the ICF Core Sets for Obesity for two main reasons; Firstly, the ICF has been developed through consensus on a global level and secondly it helps identify factors that limit participation in occupations (Forhan, 2009; Üstün, Chatterji, Bickenbach, Kostanjsek, & Schneider, 2003). It has been identified that the ICF Core Sets for Obesity did not include all relevant categories used to describe disability experienced by

obese adults, indicating the need for an extended list of categories (Raggi et al., 2009). To ensure sensibility and prevent an underestimated degree of disability, the activities in the ICF Core Sets for Obesity were specified and modified, through knowledge gained by interviewing a formerly obese female healthcare worker. Only four participants added extra activities at the end of the questionnaire. None of the participants chose all of the 22 activities as being irrelevant to them, indicating the relevance of adding activities to the ICF Core Sets for Obesity. The findings indicate that only using the original ICF Core Sets for Obesity, without added activities, could have failed to expose the differences in degree of experienced disability in some activities.

#### **4.2. Significant findings for OT**

Investigation of how being overweight or obese influences ones disability has mainly been conducted outside of Scandinavia and the majority of research available is on US populations. Furthermore, no studies linking OT and the obese population have been identified in Scandinavia. This underlines the relevance of investigating the association between BMI and experienced disability in a Scandinavian context.

The results of the present study indicates that a large body frame can lead to incorrect ergonomic working postures experienced as disabilities in activities of everyday life. It is very likely that this would be relevant in activities at work as well, resulting in work-related disabilities, which may consequently reduce the healthcare workers work performance. One of the aims of OT is to enable participation in activities the clients are expected to do, in example paid or unpaid work (WFOT, 2010). When obese healthcare workers experience disabilities in activities, it indicates the relevance of offering an OT intervention to reduce disability and facilitate participation in activities of everyday life; thereby, promote health and wellbeing (Forhan et al., 2012; Pizzi, 2013; WFOT, 2010). The relevance of an OT intervention has been recognized internationally (Blanchard, 2012; Blanchard & Mosley, 2010; Clark, Reingold, & Salles-Jordan, 2007; Mosley, Jedlicka, Lequieu, & Taylor, 2008; Pizzi, 2013). A study concluded that obese adults, who reduced their BMI to normal weight, did not decrease in their experience of disability (Ferraro et al., 2002). This indicates that an intervention should not only aim to reduce weight but also to reduce disability in activities at the current weight (Forhan et al., 2010). Further, research specifies that an intervention could include adaptation of activities or the environment (Forhan et al., 2010; Forhan & Gill, 2013; Haracz, Ryan, Hazelton, & James, 2013; Lang et al., 2013). The activities in which the obese participants in the present study experienced a significantly higher degree of disability can be considered in the beginning of the intervention. It is important to clarify that OT is a client-centred health profession requiring an individual intervention; thus, ensuring that the client's needs and disabilities are the focus of the intervention (WFOT, 2010).

As this paper presents a correlation between body composition and every day disabilities, the findings also indicate that healthcare workers may experience work-disabilities because of the larger body frame, the higher body weight and the fact that a great part of health care work is similar to the work carried out in a normal personal household. Present research thus point for a study exploring work-disabilities. If similar significance is found, a health promoting intervention with the aim of reducing body weight and body volume should be carried out, and work related disabilities should be tested. Future workplace interventions should focus on reducing experienced disabilities and thereby enable obese healthcare workers to participate in activities of everyday life. Due to the skills of the OT it will be advantageous to include this profession in future interventions.

Future research should focus on validating a more specific self-reported questionnaire for adults who are overweight or obese with the purpose of exploring disability in everyday life. Other standardized instruments for measuring disabilities could also be considered. The *Assessment of Motor and Process Skills* (AMPS) is one such standardized observation tool, which evaluates a person's PADL or IADL performance quality (Fisher, 1993). Since this tool is very time-consuming, it will be relevant to develop a tool, which is quick and easy to use in clinical practice. Furthermore, an OT intervention should be tested in a RCT, to document the effect of OT on reducing disability among an adults obese population.

## 5. Conclusion

The participants who were categorized as being obese experienced a significantly higher degree of disability compared to normal weight participants in the following activities; *Walking up/down two or more staircases, Pedicure, Dressing the lower body and Exercising outside the home*. No statistical differences were found when comparing overweight participants to normal weight participants. The findings provide a preliminary indication of the relevance of offering interventions to reduce disability experienced by obese female healthcare workers. These interventions could advantageously involve an occupational therapist who can facilitate participation in activities of everyday life when being overweight or obese (Forhan et al., 2010). Due to the knowledge of strategies and adaptation, healthcare workers may experience fewer disabilities than other women. The potential group of clients who are obese is a new target population in the Scandinavian context of OT.

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## Competing Interest

The authors declare no competing interests.

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