The nexus between obesity, health and social care needs for older adults: a literature review

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The Nexus between Obesity, Health and Social Care Needs for Elderly:

A Literature Review

Gargi Ghosh, Hafiz T.A. Khan & Jane Thomas

The Graduate School, University of West London, UK

Abstract

Objectives: The paper aims to critically review the literature on the consequence of obesity among older adults and its association with health, wellbeing and social care need.

Methods: A search was conducted using, primarily, three databases: CINAHL Complete, MEDLINE and Academic Search Elite with the help of Boolean Operators. Inclusion and exclusion criteria were set to avoid bias in the selection of articles. Publications were reviewed to identify the impact of obesity among older people in terms of health and social care needs and to establish a relation between them.

Results: The gap of the literature has been identified concerning obesity in the elderly, their health status, wellbeing and social care need. The research questions were formulated to satisfy the gap of the literature. A conceptual model was developed to map out the theoretical threads to form a diagrammatic representation to satisfy the research questions based on existing literature.

Conclusions: The literature review established that the degree of disabilities and co-morbidities related to obesity are directly proportionate and identified the gaps in the literature, where further research work is needed. The research objectives were built according to the identified gaps, the research questions were formulated to satisfy the research objectives, and a conceptual framework was also drawn to establish the links between the research questions. This review will guide a way forward to explore the unmet care needs of the ageing society.

Introduction:

The World Health Organisation (WHO) defines obesity and overweight as a condition of unusual and excessive fat accumulation to the degree that health may be impaired. Obesity is commonly defined by Body Mass Index (BMI). It is determined as an individual's body weight in kilograms divided by the square of his/her height in meters (kg/m^2) (WHO, 2006). The BMI is defined as the body mass divided by the square of the body height and is universally expressed in units of kg/m2, resulting from mass in kilograms and height in metres. The BMI is an attempt to quantify the amount of tissue mass (muscle, fat, and bone) in an individual, and then categorise that person as *underweight, normal weight, overweight*, or *obese* based on that value (WHO, 2006).

Obesity is a global problem and is one of the biggest public health challenges today with increasing prevalence and incidence in both developed and developing countries, as stated by Marinos in 2001 (Bell et al. 2016). The Survey on Health, Well-Being, and Aging in Latin America and the Caribbean: Project SABE found that obesity of any category varied between 13.3% and 38.6% (Samper-Ternent and Al Snih, 2012). Studies using data from the Survey of Health, Ageing, and Retirement in Europe (SHARE) and the English Longitudinal Study of Ageing (ELSA) have reported an average prevalence of obesity are 16.2% for men and 17.8% for women (Samper-Ternent and Al Snih, 2012). According to Public Health England (2013), England is one of the most obese countries in the world, with one in four adults being obese. Obesity has increased from 10% to 40% in the last ten years in most European countries, whereas in England, prevalence has more than doubled (Agha and Agha, 2017). It is also estimated that by 2050, most of the UK population could be primarily obese, with some 40% obese by 2025 and almost 60% obese by 2050, as estimated by Foresight in 2007 (Haringey Council, 2013). Besides, according to Mokdad et al. in 2000 (Haomiao and Lubetkin, 2005), obesity-related co-morbidities and disabilities have been regarded as the second leading preventable cause of death after tobacco. Moreover, little is known about obesity in older adults and its impact on physical and mental health and wellbeing, in particular.

Objective:

The primary objective of this article is to provide a conceptual model that can be tested in subsequent research with the help of identified gaps from the literature review. The present article examines various evidence, data sources in measuring the effects of obesity in elderly and analyse nationally representative and more commonly used research works on health/wellbeing and social care needs due to an increased risk of obesity. The primary purpose of this article has been to critically analyse different studies carried out in the context of obesity in the elderly and its association with health, wellbeing and social care need. Moreover, the extensive literature helps to identify the research gap and accordingly, four key research questions are developed.

Background:

Obesity in older adults is one of the increasingly important issues for today's society. According to the Centre for Policy on Ageing (2013), this is partly due to the rapid increase in older adults in the UK. However, there are significant variations amongst countries or ethnic groups, and even between genders. Based on mortality rates between 1982 and 2007 in the UK, life expectancy has increased by over 6 years for males to 77.2 years and over 4 years for females to 81.5 years and is expected to continue to rise in the near future and this has resulted in an 'ageing population' (Han et al. 2011). Mathus-Vliegen (2012) stated that it was likely there would be 32 million obese older adults by 2015 in the EU. As stated earlier, obesity is a severe problem in the UK, and by 2050, one in two adults might suffer from this illness (Local Government Association, 2013). However, the National Obesity Forum (2014) expressed that these approximate could be on the bright side. Consequently, this highlights that there is an indication of the growing prevalence of obesity in the ageing populations.

In England, treating obesity costs the NHS £5 billion a year and tens of billions to the UK society every year (McKinsey Global Institute, 2014). However, the broader cost to the economy is estimated at closer to £20 billion a year, if the factors such as lost productivity along with sick days are considered (Public Health England, 2013). According to Ng et al. (2014) (Djalalinia et al. 2015), obesity is evaluated to be the root source of more than 3.4 million deaths, 4% of life years lost and at least 4% of 'Disability-Adjusted Life Years' throughout the world. There are several studies; exhibited the influential factors of disability. However, there is not enough study to explore the association between obesity in older adults, complex morbidity and disability.

There are plenty of theories about obesity to explain the etiological factors behind it: which can be environmental, demographical, genetic and physiological. Along with elements that aid to reduce obesity, but none is specific to all individual. The causes and drivers of overweight and obesity are complex. Uniquely, the growing prevalence of overweight and obesity in older adults is integrated with many psychophysical health problems (Obera-Golebiowska et al. 2018). The effect of obesity is more complicated in an elderly than a young population because the ageing process itself is associated with various types of non-communicable diseases and movement limitations. On top of that, the presence of Sarcopenia in older adults, which is degenerative muscle loss adds more complexity (Gill et al. 2015). The disease burden of increasing numbers of chronically sick older adults (defined as 65+ years old by the WHO) is a significant issue (Han et al. 2011).

Despite the widely known deleterious effects of obesity on overall health, obesity in old age has to be analysed with caution due to the controversial medical hypothesis of 'obesity paradox' (Champman, 2008), which states that the increasing body weight can be positively associated with maximal survival increases with increasing age for older adults. Unlike the controversial relationship between high BMI and mortality in older adults, the link between obesity, diabetes and the metabolic syndrome is very similar in older adults compared to younger adults (Samper-Ternent and Snih, 2012).

Elderly or ageing is, therefore, a pivotal phase of developmental change in life course in terms of their own experience and prolong practice towards health behaviour, food and lifestyle, throughout the life and at the same time exposure of most chronic diseases due to not only the biological ageing process but also prolong wrong practice of health habits. Moreover, the impact of life course transformations and adaptations on behaviour have been predominantly ignored about obesity (Musingarimi, 2008). Consequently, the impact of obesity in older adults is an essential field of research. Furthermore, from the report of the Local Government Association in 2013 (Copley et al. 2017), due to the link between obesity and chronic medical condition, social care is primarily needed. Moreover, as the report stated that the obese older adults might also have a physical and social impairment and social care is needed to support them in their daily living to help the individual to live as independently as possible. However, according to the "Social care and obesity," discussion paper by Local Government Association in 2013 (Copley et al. 2017 pp.2) argued that *"there is lack of published data that directly link obesity with social care need"*, especially for older adults.

Moreover, the relationships between disability, need of help, and social services are poorly known and which is an important part of public health (Almazán-Isla et al. 2017). Although the study by Copley et al. (2017) evaluated that self-reported need for social care is positively related to the BMI, once the sociodemographic factors and limiting long-term illness were adjusted. However, the study used the secondary cross-sectional survey data of private households to measure the BMI with social care need and was modelled as the need for care rather than receipt of care. To our knowledge, there is no study so far to evaluate if there is a difference in social care need by BMI.

Methods:

The advance literature search was carried out primarily through the EBSCO database search engine and with the help of Boolean operators. EBSCO delivers a full scale of the library database resource. It can be accessed through the registered University library database search site. Three big databases were sought after- CINAHL Complete, MEDLINE, Academic Search Elite, which holds journal citations and abstracts for clinical, biomedical, social study literature throughout the world and the types of sources are: Academic Journals, Journals, Magazines, News, Reviews, Trade publications, Dissertations, CEUs, Books and Government Documents. They are published in the English language.

The exact duplicate of literature was removed from the results, and the search limitations were: Human study, year (1995-2019), for MEDLINE (Middle-aged + Age-related: 45 + years), for CINAHL Complete (All Adult).

The identified keywords were classified into eight groups, as follows:

Keywords:

A- obesity or overweight or fat or obese or unhealthy weight or high BMI

B- elderly or aged or older or elder or geriatric or elderly people or old people or senior or ageing

C- disabilities or disability or disabled or impairment or impaired or special needs

D- co-morbidities or co-morbidity

E-health status or health

F- wellbeing or wellbeing or wellbeing or quality of life

G- social care or social care management or care need

H- unmet needs or unmet support or unmet care or unmet care need

We have looked through the "TI Title" search and "AB Abstract" search by these above keywords through CINAHL Complete, MEDLINE, Academic Search Elite. However, Keywords A, which are obesity-related words/phrases, were kept in as "TI Title" search throughout, as this whole study is revolving around this common public health hazard- obesity.

The following table shows the database search by keywords and the identified number of literature in all languages and English.

Table 1 about here

Along with database search, we have also looked through the Google Scholar search, Google search, Wiki search and finally carefully searched through PubMed.

Table 2 about here

Results:

The gaps of the literature have been identified from the background literature search in relation to obesity in the elderly, their health status, wellbeing and social care need. The research questions were formulated to satisfy the literature gaps. A conceptual model was developed to map out the theoretical threads to form a diagrammatic representation to satisfy the research questions based on existing literature.

Table 3 about here

Conceptual Framework:

A research framework is developed that is linked with the research questions to display the flow of this research. This framework is connected to research objectives to achieve the aim of this study. This framework is drawn to organise our concepts, assumptions, and expectations premised on the logic and reason to explain and inform the research. This framework is a process that involves mapping out or visualising the theoretical threads (as discussed above) to form a diagrammatic representation of inner relatedness (Sinclair, 2007). The framework elucidates the variables of interest in the study. Moreover, the structure describes the aspects, and the theoretical background supports the links between the variables of this research study and. The diagram is drawn for the reader to visualise the relationships or connections between concepts to shed light on the phenomenon of interest.

Figure 1 about here

Discussion**:**

Obesity concerning disabilities, co-morbidities, and dependencies for older adults:

It is evident that obesity is the source of many chronic diseases, particularly for older adults. The foremost concern is related to the numerous health risks, medical co-morbidities: such as metabolic syndrome, diabetes mellitus, hypertension, heart failure, obstructive sleep apnoea, pressure ulcers, and difficulty with mobility. As a result, obesity increases the healthcare

resource use, functional decline and homebound status (Jensen et al. 2006), which in turn raises expenditure associated with such conditions. According to Cancer Research UK (2016), being overweight increases the risk of developing ten different types of cancer.

Additionally, the three most common types of arthritis affecting older adults have an adverse effect on ageing, mostly due to its impact on overall physical and mental health and disability, as arthritis impairs physical activity (Samper-Ternent and Snih, 2012). Whereas obesity accelerates the deterioration of joint function in older adults with arthritis and negatively affects some outcomes from surgical interventions (Samper-Ternent and Snih, 2012). Reynolds and McIlvane (2009) found that obesity reduces the probability of recovery from disability in older adults.

Moreover, it is observed that obese older adults spend more time as hospital inpatient due to the problems associated with the skeleto-muscular system and orthopaedic procedures, which eventually increases the cost to society. The existing co-morbidities, such as hypertension and metabolic syndrome-related to overweight and obesity continues to be an essential burden to society and individual, mainly because of the costs involved in pharmacotherapy for this condition (Rössner, 2001). Consequently, it is evident that the excess utilisation of hospital resources, workforce, and expenditures associated with obesity are explained by chronic conditions and poor health status (Musich et al. 2016).

The causal model of co-morbidity was proposed by Kessler and Price in 1993 (The Department of Health, 2016), of four potential causal links between comorbid disorders and all the links are associated for the design of joint preventive efforts (The Department of Health, 2016). As the model states, firstly, one disorder may directly lead to the other disease. Thus, the effect of obesity in older adults may directly lead to raising the obesity-related subclinical risk factors (e.g., increasing blood pressure or hypertension, impaired fasting glucose level and elevated level of liver enzymes), physical symptoms (e.g., dyspnoea on moderate exertion, occasional aches and pains, fatigue), psychopathology, functional limitations and /or impairment of wellbeing (The Edmonton obesity staging system) (Ording and Sorensen, 2013).

Secondly, the occurrence of co-morbidity can be due to the indirect consequences of one disorder on another. Thus, co-morbidities such as type 2 diabetes, hypertension, sleep apnea, cancer, cardiovascular diseases, osteoarthritis can be independently co-existed with obesity. Thirdly, one disorder may be related to the contexts that potentiate the possibility of another. Thus, severe disabilities from obesity-related chronic diseases may potentiate the likelihood of severe disabling psychopathology, severe functional limitations and severe impairment of wellbeing (The Edmonton obesity staging system) (Ording and Sorensen, 2013). Fourth, comorbid conditions may share a common aetiology. That is, each of the comorbid conditions may facilitate developing potential disability and risk factors. In addition, these disability and risk factors may represent the different developmental stages of new comorbid conditions (The Department of Health, 2016). Thus, the co-occurrence of obesity in older adults, along with other co-morbidities (obesity-related, or age-related), facilitate significant developing psychopathology. This leads to the potential risk factor of cognitive impairment and severe intellectual disability.

Adults with severe obesity may have physical impairments which inhibits activity with daily living. According to the social model of disability, this can have resource implications for social care services, such as housing adaptations for specialist mattresses, doors, toilet frames, hoists, and stairlifts, provision of appropriate transport and facilities like specialist leisure services (Public health England, 2013). However, these services raise the cost of health and social care service. In contrary, according to the medical model of disability, if obesity is only considered a disease or something is "wrong" with that individual, then it creates low expectations. Moreover, people will lose independence and overall control of their lives. Whereas the human rights model of disability demands fundamental human rights to the individual with disabilities and the critical disability studies model raises questions on the dualism between impairment and disability (Simon, 2013).

Seven studies use 'activities of daily living' (ADL) to define disability (Samper-Ternent and Snih, 2012), that is difficulty performing one or more activities and three studies also use 'instrumental activities of daily living' (IADL) to define disability. Each study summarises that obesity raises the risk of the identified disability, which in turn also increases the degree of dependency. Although, there is no significant association established between obesity and difficulties with learning a new task or recall (Boateng et al. 2017). In fact, according to Boateng et al. (2017), overweight older adults are less likely to have difficulties with recall or learning new tasks.

However, older adults who are morbidly obese (BMI $\geq$ 40) encounter many more complex issues and challenges (Zamboni et al. 2005). Nevertheless, the problems are faced by home healthcare providers when caring for morbidly obese clients in the home care setting (Gallagher, 1998).

Simultaneously, a normal ageing process, on top of overweight and obesity, is also associated with a different level of disabilities, especially with the presence of Sarcopenia. Currie (2016) provides information on health status, stating that when “health can be considered in terms of a person’s body structure and function and the presence or absence of disease or signs” then it is called health status.

Therefore, it is essential to examine the level of disabilities and level of dependency between obese older adults and non-obese older adults in terms of the degree of help needed with ADLs and IADLs and to examine the link with their current health status.

Research question 1: Is there any relationship between obesity, disability, and co-morbidities in older adults?

Obesity, health and the quality of life nexus:

The World Health Organisation (WHO) defines health as 'a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity' (WHO, 2006). However, there is a controversial opinion about health, and it was proposed by Huber et al. in 2011 (Health Knowledge, 2016), that health may be defined as the ability of people to adapt to their situation and ability to' self-manage.' Which contradicts the view by the traditional

medical model of health, that health is considered as the absence of illness or disease and stresses on the role of clinical diagnosis and intervention (Health Knowledge, 2016). However, the biopsychosocial model of health emphasises on the influence of social, psychological and physiological factors and the interactions between these factors on health and illness (Health Knowledge, 2016). However, in reality, the meaning of health and wellbeing differs from person to person and relies on the context and the needs, which is supported by the biomedical model of health. The model evaluates that ill-health mainly being caused by biological factors, including lifestyle choices like smoking, unhealthy diets and lack of exercise, as stated by Browne in 2011 (UK Essays, 2019). However, the biomedical model is criticised by Moore in 2008 (UK Essays, 2019), as the overall health is associated far more to environmental and social changes, rather than medical impact.

According to Bottone et al. in 2014 (Giuli et al. 2014), obesity affects the quality of life among older adults. Although the elderly population, in general, goes through different transitional phases of life, such as retirement, financial hardship (Conklin et al. 2013), widowhood and empty nest syndrome. Conklin et al. (2013) explored these transitional phases of life which can force older adults to change their lifestyle and behaviour in respect of healthy eating and physical activity, which eventually leads to either malnutrition or obesity.

Numerous studies have established the fact that obese persons experience significant impairments in quality of life as a result of their extra weight gain, with greater impairments associated with higher degrees of obesity (Koloski et al. 2001). However, old age and different transitional phases associated with this stage of life may have added extra burden and complications, which in turn deteriorates an individual's quality of life and wellbeing.

Therefore, no doubt, adding obesity-related disabilities on top of this transitional phase of life, would reduce the quality of life for older adults.

On the contrary, interestingly, Doll et al. (2000) explored that physical wellbeing can be deteriorated markedly with the increasing degree of overweight. However, that is not always true in terms of emotional wellbeing, especially in individuals, who were obese without any chronic condition. Whereas, they also agreed that individual with obesity along with two or three chronic illnesses is particularly vulnerable in both dimensions of physical and emotional wellbeing. Consequently, from their research (Doll et al. 2000), it is significantly mentionable that the added burden of obesity is connected with a significant deterioration in physical wellbeing. However, emotional wellbeing can be stable or unaffected for individuals with similar levels of chronic illness (Doll et al. 2000).

Also, according to Health Knowledge (2016), traditionally, health-related quality of life was being connected to patient outcomes and was generally showcased on deficits in functioning (e.g., pain, negative affect). In contrast, it is evident from the above discussion, "wellbeing focuses on assets in functioning, including positive emotions and psychological resources (e.g., positive affect, autonomy, mastery) as key components" (Health Knowledge, 2016).

However, according to the 2016 Health Survey for England (2017) mental wellbeing is not just the lack of mental ill-health, it is a measure of the overall health status, where loneliness,

depression, anxiety, self-confidence and sleep disturbance. Each of which or all can contribute to a poor wellbeing status. Obese adults may also experience mental health problems as a result of stigma and bullying or discrimination in the society or workplace due to their impairment, as described by Puhl and Heuer in 2009 (National Institute for Health and Care Excellence (NICE), 2015).

Simultaneously, wellbeing is perceived as life positivity, the presence of positive emotions and moods, the absence of negative emotions, positive functioning, overall satisfaction or fulfilment with life (Centers for Disease Control and Prevention, 2016). There are plenty of differential opinions about wellbeing, quality of life or life satisfaction. However, according to Diener and Biswas-Diener in 2008 (Centers for Disease Control and Prevention, 2016), it is evident in many studies that wellbeing is the combines effect of mental health (mind) and physical health (body). Moreover, these higher levels of welfare are considered to influence in reducing risk of injury, disease, illness as well as increased longevity, better immune functioning and speedier recovery (Centers for Disease Control and Prevention, 2016). Besides, Fayers and Machin in 2000 (Health Knowledge, 2016) stated, "Quality of life is a measure of the difference between the hopes and expectations of the individual and the individual's present experience." Therefore, from the definition of quality of life, it is apparent that wellbeing usually needs to be determined to evaluate the degree of quality of life or overall life satisfaction. However, in public health, only physical wellbeing (e.g., full of energy or feeling very healthy) can be judged as critical to overall prosperity (Health Knowledge, 2016) and the concept of emotional wellbeing is not well determined than that of physical wellbeing. NICE guidelines (2015) on obesity management emphasised on the overall satisfaction of people using services with their care to ensure that people have a positive experience of care and support as part of the 'Adult Social Care Outcomes Framework 2015–16'.

The 'Obesity Care Pathway Toolkit', developed by National Obesity Forum (2005), 'Care pathway for the management of overweight and obesity' by National Health Service (2006), NICE guidance on obesity (2014), 'Wandsworth Healthy Weight Care Pathway Toolkit' by Public Health Wandsworth Council (2018) and The 'Report of the working group into: Joined-up clinical pathways for obesity' by a joint working group with representation from various health regulatory bodies of England (NHS England, 2014), fail to address the care pathway for older adults for all aspects of their wellbeing and quality of life related to current health status, as Amarya et al. (2014) analysed quality of life may be the most important goal of therapy in older adults. Bell et al. (2016) stated: "care of older adults should be designed to better respond to a broader perspective of patient-centred concerns, and target not only improved longevity, but improved function, independence, and quality of life." It is essential to explore the link between current health status and wellbeing among older adults with obesity; consequently, it is crucial to examine the following;

Research question 2: Is there any link between current health status and overall wellbeing of obese older adults in England?

Social care needs of obese older adults:

Obesity and social care are directly related, as discussed earlier that obesity is responsible for the development of numerous long-term conditions along with physical and social disabilities, depending on the degree of obesity and this highlights the implications for health and social care. According to Public Health England (2013), dramatically increasing obesity prevalence in older adults along with the growing demand of ageing population reveal serious challenges and cost implications to both the health and social care systems. The Health and Social Care Bill in 2011 (Public Health England, 2013, pp. 3) stated adult social care as, "all forms of personal care and other practical assistance for individuals who by reason of age, illness, disability, pregnancy, childbirth, dependence on alcohol or drugs, or any other similar circumstances".

The role of carers in supporting individuals with disabilities, especially obese older adults with intellectual disabilities has been recognised as an essential factor in meeting the need of individuals, as evaluated by NHS Health Scotland in 2004 (Spanos et al. 2013). Therefore, carers may have a strong influence on an individual's health behaviour. However, according to Smyth and Bell in 2006 (Spanos et al. 2013), if carers have poor knowledge about the individual's health condition, that they are caring for, may impact on the health risks of individuals they support.

Moreover, as Spanos et al. (2013) have explored, sometimes, for the family carers to provide care and support for the obese older individual can be stressful. In addition, the family carers may have difficulties to cope up with their busy lives. However, due to the controversial medical hypothesis the 'Obesity Paradox' (as discussed earlier), it is not established if high body mass index is associated with social care needs in older adults in England. Therefore, it is crucial to investigate this;

Research question 3: Is there any association between high body mass index and social care needs in older adults?

A study by Bień et al. (2013), established that older people in the United Kingdom uses a more balanced profile socio-medical services than other European countries. However, according to the study, there is a negative relationship between the number of varying services used and the number of different areas of unmet care needs across the country. Furthermore, from the results of Health Survey of England (HSE) in 2013, Copley et al. (2017) evaluated the that "*the number reporting a need for help with social care in the HSE is higher than the number reporting that they received help with care"* (Copley et al. 2017 pp.3). Moreover, the results from this survey suggested that there is a shred of clear evidence to underpin the unmet need for care and support for older adults with obesity. To justify this unmet need for care and support more clearly, Copley et al. (2017) stated that "the determinants of need for care differing from the determinants of the amount of help actually received". Although there are some proposals by Haringey Council (2013) regarding "unmet needs and service gaps", but those are mainly related to the gaps in delivering health service as part of the obesity prevention programme. To our knowledge, there is no study so far exploring unmet social care needs as an effect of obesity among older adults. Therefore, it is important to evaluate this;

Research question 4: What are the unmet needs for the social care of obese older adults?

Limitations:

The article would have been benefitted by scoping review or systematic review. However, the main objective of this paper is to provide a conceptual model that can be tested in subsequent research with the help of identified gaps from the literature review within a certain word limit.

Conclusion:

Both obesity and ageing lead to the conditions that steer up the health hazards significantly and growing threat for disease and death. However, very little is known about the nexus between obesity, complex morbidity, disability and health and wellbeing for the older population on health and social care need. It is reasonable to shed light from the above discussion that obesity is an increasingly prevalent health risk in the UK, particularly for older adults. The degree of disabilities and co-morbidities related to obesity are directly proportionate. Moreover, the above literature review identified the gaps in the literature where further research work is needed. The research objectives were built according to the identified gaps, the research questions were formulated to satisfy the research objectives, and a conceptual framework was also drawn to establish the links between the research questions.

The increasing life expectancy and obesity jointly lead us towards disability and dependencies. As a result, obesity in seniors is becoming a significant burden to family and society. The country is under increasing financial pressure, as the obese older adult's demand for health and social care increases. However, older adults with or without obesity have the right to live a well-supported and dignified life at the very end of their life journey, and it is our responsibility to find out the factors that would promote their health and wellbeing. Moreover, encouraging healthy behaviour is essential to minimise the obesity burden for elderly despite their obesity-related disability, notably functional impairment. Disability-free old age is the key to facilitating wellbeing, especially physical wellbeing, for this group of people. Finally, this review will guide a way forward to explore the unmet care needs of the ageing society.

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Table 1- A database search by keywords

Keywords	"TI Title" search			"AB Abstract" search		
	All languages	**English**	**No. of papers obtained from each database**	**All languages**	**English**	**No. of papers obtained from each database**
A	136,447	131,563	CINAHL- 2,728 MEDLINE- 34,450 Academic Search Elite- 91,084			
A + B	4,475	4,307	CINAHL- 256 MEDLINE- 1,807 Academic Search Elite- 1,880	17,805	17,035	CINAHL- 669 MEDLINE- 6.799 Academic Search Elite- 8,670
A+B+C	177	174	CINAHL- 12 MEDLINE- 72 Academic Search Elite- 75	1,327	1,295	CINAHL- 55 MEDLINE- 565 Academic Search Elite- 601
A+B+D	2	1	CINAHL- 0 MEDLINE- 0 Academic Search Elite- 1	134	131	CINAHL- 0 MEDLINE- 0 Academic Search Elite- 66
A+B+C+D	0	0	CINAHL- 0 MEDLINE- 0 **Academic Search Elite- 0**	7	7	CINAHL- 0 MEDLINE- 6 Academic Search Elite- 5
A+B+E	317	307	CINAHL- 25 MEDLINE- 127 Academic Search Elite- 125	5,973	5,726	CINAHL- 297 MEDLINE- 2,241 Academic Search Elite- 2,877
A+B+F	70	67	CINAHL- 4	673	633	CINAHL- 34

			MEDLINE- 29 Academic Search Elite- 25			MEDLINE- 239 Academic Search Elite- 319
A+B+E+F	22	20	CINAHL- 3 MEDLINE- 13 Academic Search Elite- 14	467	445	CINAHL- 27 MEDLINE- 165 Academic Search Elite- 221
A+B+C+F	2	2	CINAHL- 0 MEDLINE- 1 Academic Search Elite- 1	139	136	CINAHL- 7 MEDLINE- 62 Academic Search Elite- 56
A+B+G	2	2	CINAHL- 0 MEDLINE- 2 Academic Search Elite- 1	50	30	CINAHL- 4 MEDLINE- 17 Academic Search Elite- 24
A+B+C+G	0	0	CINAHL- 0 MEDLINE- 0 Academic Search Elite- 0	6	6	CINAHL- 2 MEDLINE- 3 Academic Search Elite- 6
A+B+E+G	0	0	CINAHL- 0 MEDLINE- 0 Academic Search Elite- 0	27	26	CINAHL- 3 MEDLINE- 13 Academic Search Elite- 20
A+B+F+G	0	0	CINAHL- 0 MEDLINE- 0 Academic Search Elite- 0	4	4	CINAHL- 1 MEDLINE- 2 Academic Search Elite- 3
A+B+H	0	0	CINAHL- 0 MEDLINE- 0 Academic Search Elite- 0	3	3	CINAHL- 0 MEDLINE- 3 Academic Search Elite- 3
A+B+E+H	0	0	CINAHL- 0 MEDLINE- 0	2	2	CINAHL- 0 MEDLINE- 2

			Academic Search Elite- 0			Academic Search Elite- 2

(Keywords: A-obesity or overweight or fat or obese or unhealthy weight or high BMI, B-elderly or aged or older or elder or geriatric or elderly people or old people or senior or ageing, C-disabilities or disability or disabled or impairment or impaired or special needs, D-co-morbidities or co-morbidity, E-health status or health, F-wellbeing or well-being or wellbeing or quality of life, G-social care or social care management or care need, H-unmet needs or unmet support or unmet care or unmet care need).

Table 2: Inclusion and Exclusion criteria for article selection

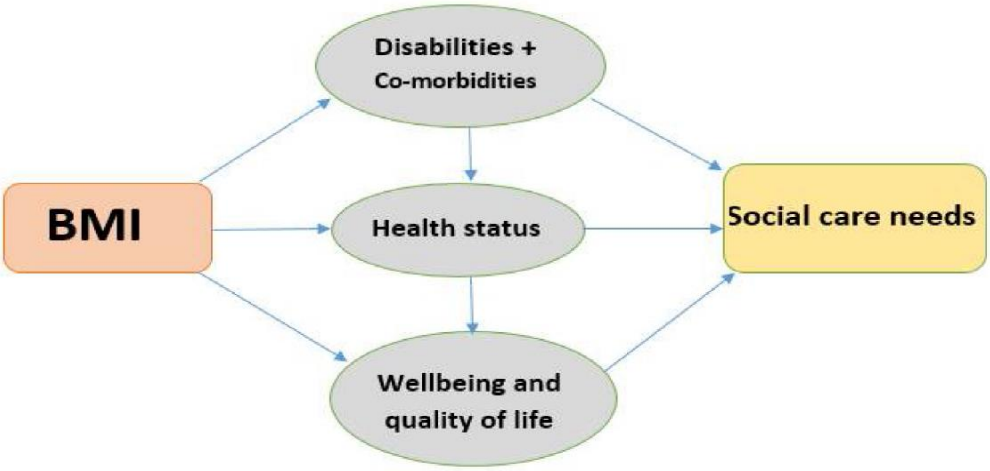
Inclusion Criteria	Exclusion Criteria
• The literatures which were available in English, were included in the study. • For MEDLINE (Middle-aged + Age-related: 45 + years), for CINAHL Complete (All Adult). • The key words that were combined together with A&B keywords were included.	• Any other languages than English were excluded. • The studies other than 50yrs or over older adults, were excluded.

Table 3: Development of the research objectives and research questions according to the gaps in the literature

Background	Gaps in the literature/ ideas	Objectives	Research questions
The effect of obesity is more complex in an elderly than a young population, because the ageing process itself is associated with various types of non-communicable diseases and movement limitations. On top of that, the presence of Sarcopenia in older adults adds more complexity (Gill et al. 2015). Unlike the controversial relationship between high BMI and mortality in older adults, the relationship between obesity, diabetes and the metabolic syndrome is very similar in older adults compared to younger adults (Samper-Ternent and Snih, 2012).	Therefore, the impact of obesity in older adults is an important field of research.	To investigate the links between obesity, disability status, co-morbidities in older adults.	Is there any relationship between obesity, disability, and co-morbidities in older adults?
The 'Obesity Care Pathway Toolkit', developed by National Obesity Forum in 2005, NHS document: Care pathway for the management of overweight and obesity in 2006, NICE guidelines on obesity (2014), The report of the working group into: Joined up	Fails to address the care pathway for older adults with obesity for all aspects of their wellbeing and quality of life related to current health status.	To determine the association between current health status and wellbeing in older adults with obesity.	Is there any link between current health status and overall wellbeing of obese older adults in England?

clinical pathways for obesity by representations from various health regulatory bodies (NHS England, 2014) and Wandsworth Healthy Weight Care Pathway Toolkit' by Public Health Wandsworth Council (2018)			
The controversial medical hypothesis the 'Obesity Paradox', which states that the increasing body weight can be positively associated with maximal survival increases with increasing age for older adults.	However, it is not clearly established if high body mass index is associated with social care needs in older adults in England.	To explore the differences in social care received by degree of obesity.	Is there any association between high body mass index and social care needs in older adults?
The Health Survey for England 2016, suggested that there is a clear evidence to underpin unmet need for care and support for older adults with obesity.	However, this survey does not report on the particular types of unmet care needs for obese older adults.	The role of obesity in determining unmet social care needs.	What are the unmet needs for social care of obese older adults?

Figure 1: Conceptual Framework



Source: Constructed by Author