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Qualitative Article

A Qualitative Study Exploring Perception and Health Behaviors Related to Sarcopenic Obesity among Thai Older Adults in Rural Community

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Abstract

Background/ problem: Sarcopenic obesity (SO) is a condition characterized by the coexistence of obesity and sarcopenia. The prevalence of SO is significantly high among seniors; a trend exacerbated by a global rise of aging populations and obesity rates. Thailand has one of the fastest aging populations in the world, and it is not immune to rise in obesity, with 38.4% of seniors being obese.
Objective/ purpose: This study explores the perceptions and health behaviors related to SO among older adults in rural communities in Thailand.
Design and Methodology: A qualitative descriptive research was used. Participants were selected through purposive and snowball sampling techniques. In-depth interviews were conducted from 25 older adults with SO. Data were transcribed verbatim and continued until data saturation was achieved. The data were verified from focus group discussions with 12 participants. Data were analyzed using content analysis.
Findings: The findings reveal that SO is largely unknown among Thai seniors, leading to poor awareness and symptom management. Many participants had chronic diseases that could improve with SO management. Contributing factors include excessive energy intake, insufficient protein consumption, low physical activity, lack of resistance exercise, and family encouraging unhealthy behavior.
Conclusion and Implications: The findings offer valuable insight for developing behaviors modification strategies including raising SO awareness and encouraging SO health literacy.

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The world is undergoing a significant transition concerning our aging populations which is driven by rising life expectancy and declining fertility rates (World Health Organization, 2023). The number of people 60 years and older is projected to grow from 1 billion in 2020 to 1.4 billion by 2030. Additional estimates suggest that by 2050, the older adults will experience a twofold increase, reaching 2.1 billion (World Health Organization, 2022). In Thailand the proportion of seniors within the general population is increasing at an alarming rate. In 1960, Thailand had 1 million people aged 60 years or over, comprising 4% of the population, yet by 2022, the proportion of individuals aged 60 and older had risen to 19.21%. As a result of this phenomenon, Thailand is projected to transition into a super aging society by 2031, characterized by a demographic composition wherein over 28% of its populace comprises elderly individuals (Department of Older Person, 2023).

The aging process is unavoidable and characterized by the deterioration of the cellular system (Cole et al., 2019). Due to age-related changes in body composition, older individuals, may experience an increase in body fat and a decrease in muscle mass. Sarcopenia refers to low muscle mass in conjunction with low

muscle strength or low physical performance. The simultaneous occurrence of excessive body fat or obesity and sarcopenia is called sarcopenic obesity (SO) (Donini et al., 2020).

Sarcopenic obesity poses a unique challenge to the health and well-being of older adults. The major consequences of SO include a higher incidence of falls and bone fractures (Ji et al., 2022). Based on the 5th Thai people's health survey, conducted through physical examinations in 2019-2020, 12.80% of Thai elderly individuals experienced limitations in performing at least one basic daily activity. These limitations stem from organ deterioration, chronic illness, and muscular conditions. Additionally, fall occurrences within the past six months were found among 15.30% of the population. Furthermore, it was noted that elderly individuals residing in rural areas exhibit a higher rate of falls compared to those living in urban areas (Aekplakorn, 2021).

Treatment of SO involves promoting activities of daily living, improving social engagement and productivity, preventing negative health consequences, and sustaining well-being. Management strategies to promote health among older adults with SO should focus on behavioral modification, including resistance training exercises combined with aerobic training (Eglseer et al., 2023). Exercise programs should be combined with adequate daily protein intake and low-caloric diet (Hsu et al., 2019). Changing health behaviors and lifestyles in the elderly is particularly challenging. Various factors related to health status and other issues specific to older adults make lifestyle changes difficult, including multimorbidity, cognitive function, depression, impaired vision and hearing, dependence on daily activity, and financial problems (Kobayashi & Steptoe, 2018). Behaviors modification in older adults necessitates the utilization of diverse techniques and approaches tailored to many factors specific to older individuals and involves gradual change. Transforming behavior to establish continuous and sustainable new behavior, which should be concerned with health perception and awareness, participation, attitude, motivation to improve health status, and addressing related problems (McGilton et al., 2018).

Qualitative descriptive research focusing on understanding the individual human experience in its unique context, aiming to gain a deeper insight into the phenomenon under investigation (Kim et al., 2017). This study utilized qualitative descriptive approach, which well-suited to capture subjective experiences, to explore the perceptions and health behaviors related to SO among older adults. Information obtained from this study can be used as information to develop strategies of care for older adults with SO, which enables pinpoint problem-solving in health behavior modification.

Literature Review

Global population aging is a phenomenon with significant implications for healthcare systems. Among the elderly, health issues assume paramount importance due to bodily degeneration, rendering them more susceptible to a range of diseases. The human body composition undergoes continual alterations throughout the aging process, characterized by increases in body fat and decreases in muscle mass. The decline of muscle mass in combination with muscle strength or physical performance, is a geriatric syndrome characterized by sarcopenia (Wiedmer et al., 2021). Sarcopenic obesity (SO) includes the occurrence of both sarcopenia and obesity. These two conditions share common causes including excessive energy intake, low protein diet, sedentary life style, low physical activity, and inadequate energy expenditure or exercise (Kim, 2018). Changes in body composition contribute to falls and bone fractures, a decline in daily activity, an increased need for assistance with self-care or loss of independence, a reduction in quality of life, increased need for medical treatment, prolonged hospitalization associated with infection, and premature mortality (Gandham et al., 2021). In addition, older adults who have SO been at risk for developing cardiometabolic diseases such as cardiovascular disease (CVD), atherosclerosis, insulin resistance, and metabolic syndrome (Cruz-Jentoft & Sayer, 2019).

The data from systematic review and meta-analysis of 50 studies reported the worldwide prevalence of SO in older people in 2020 was 11% (Gao et al., 2021). In Thailand, there are no studies on the incidence or prevalence of SO. In an outpatient setting among 330 people over the age of 60, sarcopenia was shown occur among 10% of individuals (Therakomen et al., 2020). According to a survey of the health of Thai people based on physical examination in 2019-2020, 38.40% of the elderly were shown to be obese (Aekplakorn, 2021). Based on the data regarding the high prevalence of sarcopenia and obesity among Thai seniors, it is reasonable to assume a high prevalence of SO.

Lifestyle modifications including caloric restriction, high protein diet, aerobic exercise, and stretching exercise are all considered to be the cornerstones of sarcopenic obesity treatment (Poggiogalle et al., 2021; Yin et al., 2020). Appropriate management of SO helps to promote healthy aging by improving physical function and promote the ability of the elderly to perform their daily activities independently. These strategies are in accordance with both the World Health Organization's (2017) action plan and the United Nations' (2017) sustainable development goals (SDGs). Such strategies aim to facilitate the well-being of older adults by empowering them to lead fulfilling lives with dignity and autonomy. The capacity of older adults to independently carry out their daily activities contributes to overall life satisfaction, and facilitates the ability to maintain a happy and sustainable lifestyle (World Health Organization, 2021). This independence also alleviates care burdens on both families and society.

Transforming health behaviors in the elderly presents challenges due to entrenched patterns of behaviors that have evolved over time. Strategies for modifying health behaviors in the elderly should consider characteristics, experience, culture, context, health status, factors related to health issues, and supportive measures to will enhance operational efficiency, garner cooperation, and contribute to the sustainability in behaviors modification (Kobayashi & Steptoe, 2018). Health behaviors of elderly individuals residing in rural communities exhibit distinct characteristics compared to those of elderly individuals residing in more urban areas. Additionally, elderly individuals residing in rural communities encounter greater challenges in accessing healthcare information and managing health conditions compared to those residing in urban areas (Rojpaisarnkit, 2018).

The process of transforming health behaviors in older adults should begin with cultivating perception and awareness of diseases and health, and include a recognition of the potential for behavior change. Perception is the cognitive process through which individuals arrange sensory stimuli into coherent and meaningful information (Hamlyn, 2017). The significance of health perception lies in its role as a crucial predictor of health outcomes, influencing individual behaviors related to health. In the context of health interventions, health perception plays a decisive role in decision-making, predicting the utilization of appropriate care. Factors impacting health perception encompass levels of education and cognitive skills, increased exposure to health information, and the source of such information (Schnittker & Bacak, 2014). Thus, a deeper understanding of older adults' perception of SO and related health behaviors could be used to develop management strategies of the problems effectively, efficiently, and sustainably.

Research Objective

This research aimed to explore the perception and health behaviors related to SO in older adults within a rural community in Thailand.

Method

Design

This study employed a qualitative descriptive research design. Data were collected using in-depth, semi-structured interviews among older adults with SO. Data confirmation followed the interviews, and focus group discussions provided additional opinions from all stakeholders to explore context-based phenomenon.

Participants

The researcher has specifically selected a study area based on the identified problems. The site includes a rural Muslim community in Chumphon Sub-district, Ongkharak District, Nakhon Nayok Province. The researchers anticipated the presence of SO in the community due to the high prevalence of obesity and the significant proportion of older adults. This community consists of 738 older adults (16.70%) in which 50% of them are overweight or obese (Chumphon subdistrict administration organization, 2023). The primary participant group consisted of older individuals with SO, who were directly involved and affected by this study. The secondary participant groups were stakeholders associated with SO in older adults. The secondary participant groups primarily supported the health behaviors of older adults with SO, and included: (1) family members of SO older adults; (2) registered nurse of the subdistrict health promoting hospital; (3) public health volunteers; and (4) community leader.

Sampling Procedures

The primary group of participants were recruited using purposive and snowball sampling techniques. Initially, the researcher analyzed community medical records from the sub-district health-promoting hospital to identify obese elderly individuals. Subsequently, the eligibility of the identified population was assessed during their appointments at the chronic disease clinic of the hospital based on the preliminary project criteria. During fieldwork, snowball sampling techniques were employed to identify potential participants. Participant recruiting also involved soliciting recommendations from elderly individuals to identify other community members over the age of 60 with obesity profiles who met the preliminary criteria. This facilitated the screening process to identify research participants who met the inclusion criteria. The secondary group of participants was recruited using purposive sampling technique and selected individuals based on their responsibility for caregiving or involvement with healthcare facilities for older adults with SO.

Inclusion and Exclusion Criteria

The primary participants group met the following inclusion criteria: (1) individuals aged 60 years or older; (2) diagnosed with SO based on the Asian Working Group for Sarcopenia (AWGS) diagnostic criteria 2019 and the WHO obesity criteria of body mass index (BMI) for Asian populations; and (3) no cognitive impairment, as determined by the Thai Mental State Examination (TMSE) score > 23. The exclusion criteria applied to reject participants were: (1) diagnosed with moderate to severe kidney dysfunction; (2) undergoing cancer treatment; (3) person with life-threatening comorbidities such as severe coronary heart disease; (4) have muscle problems or diseases such as myasthenia gravis; (5) hearing or vision problems that impede communication; (6) psychomotor impairment, and/or known psychiatric problems.

The secondary participants group were responsibility for caring or involvement with healthcare facilities for the older adults with SO and willing to participate in research.

Instrument

The tools used for screening participants and checking eligibility included body composition (body fat and muscle mass) and body weight were measured using bioelectrical impedance analyzes (BIA). Heights and weights were used to calculated BMI. Handgrip strength was measured by a dynamometer. Participants were assessed for ability to do daily activities using the ADL. Cognitive function was assessed using the Thai Mental State Examination (TMSE), a modified and enhanced tool designed for assessing cognitive status, specifically tailored for the Thai population. The reliability, as indicated by Cronbach's alpha coefficient was 0.77 (Kanjananopinit et al., 2014). Sociodemographic surveys were also given to participants. Interviews followed both in-depth interview guidelines and focus group discussion guidelines, which were validated by a panel of five experts. Before data collection, the researcher studied documents and health reports of the participants. In the process of in-depth-interview and focus group discussion, field notes were taken, and the researcher used observation techniques between data collection.

Data Processing and Analysis

The researcher conducted individual in-depth interviews with older adults who met the inclusion criteria and were willing to participate. The interview questions were open-ended, comprising 21 probing questions created based on individual behaviors relevant to the risk of sarcopenic obesity (SO) and non-pharmacological strategies for SO management among older adults. Data collection continued until data saturation was reached, and 25 older adults with SO were interviewed. Focus group discussion was conducted among the five older adults with SO who did not participate in in-depth interviews, two family members, 1 registered nurse, three public health volunteers, and one community leader. This process helped to validate data and provide additional opinions. The researcher transcribed and utilized interview recordings for content analysis using the ATLAS.ti program. The qualitative analysis followed the approaches outlined by Miles and Huberman (2020).

Data Rigor

According to Guba and Lincoln (1994), trustworthiness is based on four criteria: credibility, dependability, transferability, and confirmability. Credibility was maintained by triangulation and regular participation in various community activities to eliminate bias and understand the important issues of the participants. Data triangulation was maintained by obtaining data from different groups, including older adults with SO, family members, registered nurses, public health volunteers, and community leaders. Investigator triangulation was maintained by consulting and reflecting their responses throughout the process of data collection. Methodological triangulation was maintained by using multiple data sources, including in-depth interviews, focus group discussion, field notes, observation, and documentation. Dependability was maintained by checking and confirming that the research process was followed correctly with the research advisors. Confirmability was maintained by checking the peer debriefing at every stage of the research, taking notes on every detail and asking a qualitative expert advisor to critique, and comment on the findings. Transferability was maintained by explaining the findings clearly with detailed descriptions based on information drawn from the perspectives and experiences of participants, research methods, interpretations of study results, and peer debriefs.

Results

Demographic Data

In-depth interviews were conducted with 25 older adults with SO and 12 participants from the focus group discussions. Older adults with SO who participated in the in-depth interviews were predominantly female (86.70%). The majority of the participants (n = 17) were 60 – 69 years old. The youngest participant was 62 years old and the oldest was 88 years old. The majority of participants were Muslim (93.30%). Most of the participants completed primary education (86.70%). It was found that the majority of participants had chronic diseases (96.70%), including dyslipidemia (89.70%), hypertension (82.80%), diabetes mellitus (55.20%), heart disease (10.30%), and other diseases (2.70%), respectively.

Main Findings

The research findings from the in-depth interviews and focus group discussions regarding the perception of health can be summarized into five categories. The content analysis results are described further.

Lack of Sarcopenic Obesity Perception and Awareness

Sarcopenic obesity is a combination of sarcopenia and obesity, which not widely known in Thailand among healthcare professionals and the general public.

General Awareness of Obesity. This study found that all of the participants with whom in-depth interviews were conducted had abdominal obesity, and were aware of this problem. They understood the risk factors, impacts of obesity, and managing approaches very well. The participants got information via

publications and from follow up visits to the doctor for non-communicable diseases. The participants felt that obesity made them less agile while doing activities, and making additional chronic diseases more difficult to control. Many of participants tried to lose weight, but their activities could not be consistently maintained, hindering the achievement of the desired weight goal.

Unfamiliarity with SO. All participants had not previously known or heard of sarcopenia or SO. Consequently, the participants lacked awareness regarding their health status and perception of SO, which shows that the population's access to information was inadequate. The statements indicating participants' unfamiliarity with SO were from the participants were, "I have never heard the term sarcopenic obesity before. I have also never encountered the term sarcopenia. I am not familiar with this disease at all." (P02). Another participant said, "I've heard of obesity before. Doctors often mention it. However, I've never heard of sarcopenia, what is it exactly?" (P08)

Perceptions of SO Symptoms. All participants had problems associated with SO included decreased ability to perform activities, knee pain, leg pain, back pain, and aches when walking or doing activities, poor balance, loss of strength to lift legs or move, exhaustion or fatigue when walking or moving, and lack of dexterity when doing activities. However, the participants had not previously known that these resulted from SO, and thought they were due to increased age or from working hard when they were young. The statements from the participants were as follows: "It's hard to walk. I feel tired when I walk, unlike before. I feel like I don't have a lot of strength. My legs feel weak and I need to take breaks." (P21), "It's a problem to walk. I'm not agile. I feel so clumsy and heavy." (P24), "It's worse this year than last year. My legs ache and I can't walk far. I could walk a long way last year. On a long walk I'd need to stop for a while before continuing. My legs ache. Both of my knee ache." (P07)

Wellness Literacy Deficiency

Almost all of the participants who were older adults with SO suffered from at least one chronic disease (96.67%) including dyslipidemia, hypertension, and diabetes mellitus. Information related to literacy of chronic disease as follows:

Health Information Access and Understanding. All of the participants were aware of the problems caused by chronic diseases and had knowledge and understanding of how to control these diseases by regularly receiving knowledge from healthcare providers, especially regarding diet and exercise, as shown by the participants' statement as follows:

> "I went to the doctor once and my blood sugar was high. The doctor asked what I ate. I told him straight out that I ate mango sticky rice. He said not to eat a lot because mango contains a lot of sugar, not to mention the sticky rice. My blood sugar went up so high, I haven't eaten it since. I stopped eating it." (P08)

> "The doctor forbade eating salty food. The doctor told me to eat plain food. I do what the doctor says. I don't eat salted fish. I used to eat some, but I don't want to eat it now after doctor said not to it." (P07)

Information Appraisal and Application. Regarding compliance after receiving health advice from healthcare professionals, some participants tried to follow the advice and some were not prepared to follow the advice, according to one participant said, "I've never thought about losing weight. When the doctor told me to lose it, I didn't want to. My aching legs are normal for an older person. It's not related to being fat or thin." (P24).

Another participant said, "Nowadays, when I eat something, I always think first whether it will be good for me or not. I'm afraid of gaining a lot of weight. Sometimes I want to eat as well, but when I think about it, if it's not beneficial, and it might be harmful, so it's better not to eat it." (P14)

Behaviors Leading to Poor Health Outcomes

The behaviors which the risk factors of SO consist of inappropriate eating behavior and low physical activity and energy expenditure. The detail of each risk factors as follows:

Inappropriate Eating Behavior. The information obtained from the participants revealed that the eating habits related to SO in older adults included excessive energy intake, insufficient of protein intake, and issues related to tooth loss as follows:

Excessive Energy Intake. Excessive energy intake is due to eating large amounts of food and energy rich diet, sugary drinks or desserts, fruits, and fatty foods. Most of the participants ate desserts almost every day. The food or snacks usually contain oil or coconut milk as an ingredient, such as biryani, green curry, massaman curry, *lod chong* dessert with coconut milk, dumplings in coconut cream, mango sticky rice, etc. Some participants ate fruit without controlling the amount. As a result of such eating patterns, the older adults were receiving more energy than their requirement and accumulated excess energy in their bodies, which is a cause of obesity, as shown in the participants' statements as follows:

> "The desserts… Right after eating a meal, I have to find some sweets to eat. Just a little bit is better than nothing. I eat egg cake, roti, or something like that. I eat dessert with every meal." (P07)

> "I eat snack all day. My daughters buy them and I eat them all day. When I'm bored, I just turn around and eat a snack. Sometimes I pour syrup on ice and eat that." (P17)

> "I eat three kilograms of ripe mangoes over two or three days. About one kilogram per day. I eat that alone without sharing. When my sons go to the market and see nice ones, they buy them. There are lots of other kinds of fruits each day, not just mangoes. I eat two kilograms of longan at a time. I even turn around to eat it when I work." (P24)

Insufficient Protein Intake. Most of the participants ate two main meals a day, a late morning meal and an afternoon or evening meal. During the day they ate fruits or desserts. The main meals included cooked rice and a side dish of curry or chili dip. Curry or vegetables were eaten, but meat or food high in protein was rarely eaten. Fish is the most abundant food that is high in protein in the community as the area is a lowland with several natural canals or water sources. Fish is the main source of protein for the population in this community including older adults. Most of the participants ate about .5 to 3 portions of fish per meal. The majority of the participants did not eat pork because they were Muslim. Most of the participants did not like to eat chicken and beef due to chewing difficulties. Sometimes, even after eating minced or tendered meat, they felt bloated after eating. Otherwise, they felt bored of it or did not like the smell or did not want to eat meat. Eggs are an easy source of protein, they are inexpensive and simple to cook, but are not often consumed. Seafood is a source of protein that the participants rarely eat because it is expensive. The older adults abstained from consuming cow's milk due to their dislike for its flavor. Dairy products such as yogurt or cheese were never eaten and were unfamiliar. The participant occasionally consumed tofu, and some individuals drank soy milk, but not on a daily basis. Information gathered from the interviews indicated that the participants had a limited intake of protein, failing to meet the body's requirements. In some instances, meals lacked any protein content due to a lack of awareness regarding the significance of a protein-rich diet for health, as evidenced by statements provided during the interviews:

> "I don't eat any chicken. I'll eat beef once a month. I don't eat much fish, it kind of stinks. I eat eggs sometimes, but not often. I drink milk once in a while. I don't drink it much because I'm afraid of getting diarrhea. I never know if I'm going to get it." (P11)

> "Nowadays, I pound some chili paste. Sometimes, my daughter buys bottled fermented fish sauce, and then add chili powder and mix it with rice for eating. Sometimes I chop some fresh mangoes, add fish sauce, chili and sugar, and mix them in rice and eat like that all day. Sometimes I eat ripe mango or banana with rice. I don't eat complicated meals. I don't emphasize soups. When my daughter buys me a bag of a side dish, I can eat it for three meals." (P14)

> "Older people don't emphasize on side dishes, like my mother. One mackerel could last her three meals. Although, I told her to eat a lot of side dishes, but still she insisted that she was used to it." (VHV3)

Issues related Tooth Loss. Tooth loss is prevalent among the majority of elderly individuals in the community. Poor dental health led to a reluctance to consume meat. Some participants use boiling or stewing methods to soften their food, while others prefer a mortar and pestle to pound the food before consumption. For older individuals who had not undergone tooth replacement, these methods were described as the approach to eating when faced with chewing difficulties, as indicated by the participants' statements:

> "I only have four teeth here, and only three here. I eat whatever I can. Cucumber can be sliced thinly. If it's eggplant or bitter gourd, I'd boil them. I boil vegetables until they're very tender because I don't have teeth to chew with. Fried fish or fish jerky would be pounded until soft before eating. I can't eat anything hard. Sometimes I'd have to spit it out." (P21)

> "I have no teeth and don't wear dentures. I pound the food if I want to eat. It's not hard. I have a mortar and pestle to do it. After frying, I pound it until it's soft enough to eat. If I go somewhere without soft food, I'd just eat soup mixed with rice." (P24)

The participants could make an appointment for treatment or consultation with dental problems. There are tools for tooth extraction, filling, and scaling, and a team of dentists is available at the Subdistrict Health Promotion Hospital. However, specialized treatment or dental replacement treatment is available at H.R.H. Maha Chakri Sirindhorn Medical Center, which far from the community. Most of the participants had problems with tooth loss but did not want a dental replacement because they did not see the need for it, or it was not convenient to go to the hospital, or they felt that tooth replacement would make it difficult to chew food. The problem with chewing was a factor that encouraged most of the participants to eat rice, sugar, fruit and fatty foods in high amounts, and to have inadequate protein intake.

Low Physical Activity and Energy Expenditure. The participants lived a rural lifestyle based on agriculture, which meant waking up early, cooking food to eat at home, doing household chores or going out to the farm, and then coming home in the evening to eat dinner and go to bed. However, older adults having limited health and mobility, the majority of their activities were limited to inside the house.

Ability to Performed Activity of Daily Living. All participants were able to do activities of daily living regarding eating, personal hygiene, bathroom visits, and putting on clothes by themselves and they were still able to walk. Some could walk on their own without assistive devices. Some could walk with walking aids, such as canes and wheelchairs, for support. However, most were able to walk short distances only due to knee pain, or muscle weakness, or fatigue while walking long distances. They were careful and carry out their activities by preventing falls.

Inadequate Physical Activity. Most of the older adults could still do household chores, such as cooking, laundry, wiping, sweeping or growing vegetables in the kitchen garden, there may be changes to their methods of performing such tasks due to the inability to stand or walk for long periods, such as using

a low stove to sit and cook food, moving in or around the house by scooting or crawling. Most of participants were unable to work outside the home. Each day they would spend a little time doing household chores in the morning and evening. Most of them had little physical activity and spent a lot of time sitting or lying down, according to the participants' statements as follows:

> "I usually stay in the house. I would use scoot on my buttocks or crawl. I rarely walk. I'm afraid of falling. But if there was anything to support me, I would walk around the house often by using a cane. Look at my knees. I've been crawling until my knees are all calloused." (P02)

> "It's so hard to do anything. When I stand, my legs shake. I have to keep holding on to closets and tables to walk. But I cook and pound chili on my own. I don't walk often. I can't do it, I'll fall. I walk around the house once in a long while." (P03)

All participants recognized the beneficial effects of regular exercise in maintaining health and managing or preventing complications associated with chronic diseases. The majority engaged in daily exercise sessions, typically once or twice per day, consisting of common routines such as walking, arm swings, and seated foot swings, performed in sets of 10-20 repetitions. Most exercises were independently conducted at home without the assistance of devices.

> "In the morning, I sit at the chair watching television, stretch my legs, lift my legs, clench my hands, do breathing exercises, move my head up and down. I do it every morning in the house. Not for a long time. If it's too long. I lift my legs up and down twenty or thirty times and keep going. I try to manage myself." (P12)

> "I exercise regularly. I sit and raise my arms and swing them. I lift my legs up and down like this. When I come out to sit here, I try to move my legs." (P25)

Family Encouraging Unhealthy Behavior

The majority of individuals believed that performing good deeds and expressing gratitude to ancestors was a moral obligation. Therefore, most of the young relatives of the participants expressed their gratitude by taking care of their parents, grandparents and relatives to make them happy by preparing or buying food and care giving during illness, taking them to the hospital and assisting in their work or activities. Such beliefs impacted the health conditions of older adults, such as buying food, snacks or drinks without considering health conditions. The young relatives limiting activities that require movement, making free time useful, and feeling self-value of older adults. The aforementioned factors contributing to SO in older adults, as in the following statements:

> "My sons never forbid me to eat anything. They only remind me to eat. They buy me delicious things. They know I have diabetes, but they say just to eat. They don't forbid me, they're afraid I'd starve. If I'm sick, they take me to the doctor and say to eat because you can't eat when you're dead." (P16)

> "My children never warned me, never forbade me to eat. They say if there's something I can eat, then eat it. They prefer that I eat. They say that they'd buy me anything I want to eat." (P17)

Occasionally, younger family members limited the activities of elderly relatives, expressing concerns about excessive walking and the risk of falls. They discouraged physical exertion and promoted rest, as reported by the older adults:

> "I wake up at eight in the morning. And if I wake up early, my daughter complains about what I'm doing up so early, telling me to go back to sleep. I wake up and sweep the house. I only clean the kitchen, wiping things. Doing a little here and a little there. If I don't have anything to do, I sleep. Sometimes, I come to sit here. Just sitting, often all day, without doing anything. I just sit

and sleep without doing much. I don't walk to a lot of places. I just walk around here, to hang clothes behind the house sometimes. That's it." (P15)

"I don't do anything all day. I sweep the house and wash the dishes, but I can't let my grandchildren see it. He'll scold me. He'd come back and do it themselves. I don't even walk on the road in front of the house." (P25)

Achieving Goals in Health

Regarding health expectations, all participants expressed a desire to independently perform daily activities without relying on assistance from others. Some of participants noted stress due to the inability to perform activities.

Independent of Activity Daily Living. All participants had concerns about being independent and being able to perform daily activity and that was associated with happiness in life. All participants did not want an imposition or burden on caretakers, as articulated in their statements:

"I still want to be able to walk. Everything in the body is intact, allowing me to help myself. Don't want to be a burden to my children/grandchildren. I'm afraid of one thing: being bedridden. My sons have to work and my grandchildren have to study. Everyone's got a burden. They can't be taking care of me all the time. I have to help myself. I never thought to have my young relatives help me. If I can do it, I have to help myself first. The young relatives have the duty to work to earn their living." (P12)

"If I lose a little weight, I think I'd be able to walk easily. I've dreamed in my sleep before that I could walk and didn't need a wheelchair. It was so nice in my dream. I was happy. I want it to be real." (P13)

"I want to be able to walk and do normal activities. I want my body to be strong. I don't want to be a burden to my daughter and sons." (P20)

Stress due to Activity Limitations. The participants were accustomed to living on their own, and some participants experienced stress due to health conditions that hindered their ability to engage in activities or work as they did during adulthood. One participant became emotional during an interview with the researcher, expressing the following statement:

"I feel like my body has gotten a lot worse this year. Sometimes I look around the house and tear up. I think to myself, "Why has it gotten to this? How come other people can walk and I can't? Why can the others still work in the fields and do this and that and I'm always in the house? If I walk out of the house, my sons are afraid that I'd fall without anyone to see or help me." (P03)

Discussion and Conclusion

Discussion of Main Results

This research aimed to explore the perceptions and other contributing factors influencing SO among older adults in a rural community in Thailand. Based on the research findings, participants demonstrated a good understanding of obesity and methods for addressing it. However, they were previously unfamiliar with SO, resulting in a lack of information regarding this medical condition. Consequently, the participants lacked perception of their health conditions and were unaware of SO. Therefore, the participants never knew that symptoms such as fatigue when walking long distances, lack of energy in legs, and inability to lift legs, or aches were effects of SO. All elderly individuals suffered from chronic diseases, possessed a good understanding of disease management, yet were unable to fully adhere to it. The risk factors of SO among older adults in this community were excessive energy intake, low protein intake, low physical

activity, and inadequate exercise. The family members of the SO older adults contribute to the occurrence of this disease by encouraging the consumption of high-energy diet and limiting physical activity. All participants expressed a desire to autonomously engage in their daily activities.

Health perception is an important predictor of health outcomes, which individual perceptions affect health behaviors (Souto et al., 2018). The findings from this study demonstrate that all participants lack information about SO, which resulted in misunderstanding the disease. Sarcopenic obesity remains relatively unfamiliar within Thailand, both among healthcare professionals and the general public. Initiating perception and awareness efforts for this health condition should commence with disseminating information regarding risk factors, health impacts and complications of the disease. When an individual possesses an accurate and realistic perception of their own health status, an increased awareness of existing health issues develops. This heightened awareness consequently prompts behavioral modifications, contributing to the pursuit of an improved state of health.

The participants suffered from non-communicable diseases either associated or resulting from SO. However, they lacked awareness of the correlations between these conditions. Excessive adiposity coupled with diminished muscle mass exacerbates the onset and management of chronic non-communicable diseases. For instance, skeletal muscle is the primary organ responsible for glucose uptake, plays a crucial role in maintaining glucose metabolism. Increased skeletal muscle mass can additionally improve glucose control (Chen et al., 2023). Effectively managing SO consequently results in improve management of non-communicable diseases.

Factors influencing SO in elderly individuals comprise overconsumption of energy, inadequate protein intake, sedentary lifestyle, and lack of resistance exercise. Inappropriate dietary habits and repetitive consumption of preferred foods contribute to nutritional issues among older adults, representing a prevalent dietary pattern in this community (Maiteeb, 2021). The data were consistent with a meta-analysis that studied prevalence of insufficient protein intake among older adults in European countries, the United States, and Canada, which was found to be at 65–76% (Hengeveld et al., 2020). According to a study in Thailand on factors correlated with sarcopenia among older adults, older adults with low muscle mass were found to have lower protein consumption than the body’s needs at 84.20% (Chaithongkrua et al., 2021). A lack of awareness regarding the significance of protein-rich foods in maintaining health status is evident among the elderly population. Additionally, some individuals experience discomfort, such as bloating, when consuming protein-rich foods. Consequently, mere protein consumption may not be sufficient to fulfill the body's nutritional requirements. Insufficient physical activity and increased sedentary behaviors were factors of non-communicable diseases and SO. In accordance with a survey assessing the physical activity levels among individuals aged 65 years and older, it was found that merely 12.70% adhere to the recommended exercise guidelines (Ward et al., 2016). Providing sufficient and relevant information regarding the risk factors associated with diseases, along with information for modifying behaviors aimed at mitigating and preventing complications resulting from SO in the older adults.

The families in this community expressed their gratitude by taking care of their parents, grandparents and relatives. Family support is a key factor in the health care of older adults that involves material, instrumental, physical, and emotional support (Bull et al., 2020). The study report of Shahriari et al. (2013) indicated that the effects of behavioral change led to success and stability in self-care programs with family support. Developing strategies for modifying health behaviors to address the issue of SO needs consideration of familial factors. Providing opportunities for family members to engage in the adjustment of health behaviors among the elderly is crucial.

All participants wanted to maintain the ability to perform activities in daily living without being dependent on other people. Reducing the amount of body fat and increasing muscle strength enabled older adults to perform activities in daily living independently as well as enabled them to participate in social

activities. The capacity to make health-related decisions, engage in ADLs, and perform healthy behaviors can profoundly impact the perception of health and well-being among older adults (Tkatch et al., 2017). A direct relationship exists between active lifestyle and the mitigation of preventable chronic diseases, as well as an enhanced self-perceived health status and quality of life in older individuals. Moreover, involvement in physical activity is associated with a reduced occurrence of diseases, decreased dependency on medications, and an increased perception of both physical and mental well-being (Svantesson et al., 2015).

Limitations

While this study provided valuable insights, it was constrained by some limitations, specifically in terms of extrapolating the findings to different populations or community contexts. One major constraint was that the data collected pertained specifically to older adults with SO in rural community of Thailand. The study results should be appropriately validated before being applied to other populations, diseases, or contexts.

Implications for Behavioral Science

Developing strategies to modify health behaviors requires utilizing empirical evidence applied to the specific characteristics of the target population. Insights information from this study can serve as foundational data for behavioral modification strategies planning among older adults with SO. Appropriate strategies should improving efficiency, effectiveness, and long-term sustainability in behavior modification.

Conclusion

The main finding of this study is that, SO is largely unfamiliar to the elderly population, leading to a low perception and awareness regarding this health issue. Consequently, affected individuals often resort to symptom management rather than addressing the root cause of the condition. Furthermore, a majority of the participants had chronic diseases. If SO can be controlled, it could lead to better management of these chronic health conditions, SO being the leading cause of those chronic disease. There were several contributing factors to the development of SO, including excessive energy intake, inadequate protein consumption, low levels of physical activity, and a lack of resistance exercise. Additionally, family influences contributed to the perpetuation of these factors. Participants expressed a desire to maintain independence in daily activities, highlighting the importance of addressing sarcopenic obesity to enhance muscular strength and functional capacity among the elderly. Moreover, guidance or strategies on dietary and exercise regimens, as well as familial care, which are influential factors in disease progression, influence distinct impact among elderly individuals residing in rural locales. The findings in this study provided valuable information for generating a strategy of care for SO in older adults in future studies.

Declarations

Conflicts of Interest: *The authors declare no conflicts of interest.*

Ethical Approval Statement*:* The study was conducted in accordance with the Declaration of Helsinki, and approved by the Human Research Ethics Committee at Thammasat University (Science) under the certificate No. COA 015/2566 on March 2, 2023. Before signing the consent form, participants were provided with information about their research rights, the study's objectives, data collection procedures, the timeframe for data collection, and potential benefits. Additionally, participants were duly informed of their rights, which encompassed the right to decline to respond to inquiries or to withdraw from any activity at their discretion, particularly feeling discomfort or unwillingness to continue in the study.

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