

Effect of Nursing Intervention Program on Knowledge and Practices of Elderly Regarding Sarcopenia

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Abstract

Background

Sarcopenia is one of prevalent conditions affecting the elderly, which raises the risk of functional disability, falls, loss of independence, a decline in quality of life, higher medical expenses, and increased risk of death. **Aim of the study** to evaluate the effect of nursing intervention program on knowledge and practices of elderly regarding sarcopenia. **Subjects and method:** - **Study design:** A quasi-experimental study design was conducted carry out this study. **Subjects:** A purposive sample of 60 elderly was used in this study. **Tools of data collection:** - Two tools were used in the study. **Tool I: Structured interview Schedule:** - **composed of 4 parts:** Part (1): - Socio-demographic data of studied elderly Part (2): - Medical history of the elderly. Part (3): -The SARC-F questionnaire for screening of sarcopenia and part (4): - The Physical Self-Maintenance Scale (PSMS). **Tool II: - Knowledge and reported practice of the studied elderly related to sarcopenia:** - Part 1: - Knowledge of elderly related to sarcopenia. Part (2): - Self-reported practices related to sarcopenia. **Results:** - It was evident that, most (98.3%) of the studied elderly had a low level of knowledge about sarcopenia pre intervention program implementation compared to only two fifths (40.0%) after implementation of nursing intervention program. All (100%) of the studied elderly practicing low level of physical activity pre nursing intervention program compared to more than three quarters (78.3%) of them three months' post intervention program. On the other hand, no one of the studied elderly practicing moderate and high level of physical activity pre nursing intervention program compared to (11.7% and 10.0% respectively) three months post program intervention. **Conclusion and recommendations:** - It was concluded that the nursing intervention program significantly increase the knowledge and preventive practices of the studied elderly regarding sarcopenia including physical activity, daily living activity and nutritional practices. So, ongoing education, routine screening and additional research related to sarcopenia are recommended in this study.

Keywords: Muscular system, Sarcopenia, Nutritional requirements, physical activity and elderly population

Introduction

Loss in muscular mass, strength, and function is usually associated with aging. Nowadays, it is acknowledged that sarcopenia plays a crucial role in the pathogenesis of geriatric frailty.

Bilodeau et al., (2018).

According to the European Working Group on Sarcopenia in Older People (EWGSOP) 2010, sarcopenia is a syndrome characterized by a widespread and progressive loss of strength and skeletal muscle mass, which increases the chance of negative consequences like physical disability, a lower quality of life, and even death.

Morley & Malmstrom (2020).

Recently, sarcopenia is a serious issue for public health because of its huge economic burden as it is a completely degenerative condition with the slow dementing of skeletal muscle mass with age, accompanied by muscle weakness and dysfunction. **Batsis et al.,(2020)**

The conceptual staging of sarcopenia as proposed by the European Working Group on Sarcopenia in Older People (EWGSOP) include: pre-sarcopenia, sarcopenia and severe sarcopenia **Morley & Malmstrom (2020).**The pre-sarcopenia stage is characterized by modest muscle mass with little effect on muscle strength or athletic performance. The sarcopenia stage is distinguished by reduced muscular mass, low muscle strength, or low physical performance, while severe sarcopenia is identified if all the three requirements of the description are met. **Oliveira et al., (2020).**

The diagnoses of sarcopenia based on muscle mass, that can be measured by

computed tomography (CT scan), magnetic resonance imaging (MRI), DXA, or bio impedance analysis (BIA), muscle strength, which can be determined using isometric handgrip strength, knee flexion, or peak expiratory flow. Finally, sarcopenia can be diagnosed through physical function, which can be measured using the Short Physical Performance Battery (SPPB), to evaluate the balance, gait, strength, and endurance. **Oakland (2016).**

Worldwide, sarcopenia affects around 600 million people over the age of 60. This figure is anticipated to increase to 1.2 billion by 2025 and 2 billion by 2050. According to Papadopoulou (2020), sarcopenia is ranged between 5% and 13% in elderly adults aged 60-70 years old, this prevalence is higher in those of 80 years and older, ranging from 11 to 50% among Greeks.

In Egypt the exact magnitude of sarcopenia is not yet reported. However, a study conducted in Cairo by **Abdel Rahman et al. (2014)**, the prevalence of sarcopenia among nursing home senior residents in Cairo was 17.7% among elderly males and 14.4% among elderly women. Another study conducted in Cairo by **Sanad et al., (2019)**, revealed that, the prevalence of sarcopenia among hospitalized elderly patients is 31% of total study participants, with 47% among men and 53% among women (**Meier & Lee, (2020).**

Sarcopenia is widespread as its prevalence increases with population aging. It varies greatly depending on the population examined (for example, differences in gender, age, ethnicity,

and body composition among ethnic groups), living settings (hospitalized, community dwelling, or nursing homes), and assessment instruments and methods.

Many risk factors can have contributed to the high prevalence of sarcopenia which consist of sedentary lifestyle, limited physical activity, bed rest, chronic disease, specific drugs, malnourishment, anabolic resistance, infiltration of intermuscular adipose tissue, and a decrease in neuromuscular activation. **Lee, et al., (2019).**

As regard to types of sarcopenia, it may be primary if ageing is the only clear cause. Whereas, secondary sarcopenia would be brought on by other conditions either connected to inactivity, certain diseases or nutritional deficiencies. **Marulanda et al.,(2019).**

Management of sarcopenia is currently supported by limited evidence, resistance training is optionally complemented with a high diet of necessary amino acids and vitamin D. Testosterone has been proposed as a therapy option, and other medications, such as myostatin inhibitors, are being developed.

So, Exercise programs (particularly strength, endurance, and power training) and nutritional therapies (adequate protein consumption is thought to be extremely important) are well-established approaches to sarcopenia prevention; ideally, a mix of the two **Nakahara (2021).** Community health nurses (CHNs) have an important role in identifying the risk factors and causes of sarcopenia to develop its prevention and treatment

strategies. They should contribute in assessment of the disease and its subsequent complications **Shaw et al., (2020).** The nurses have crucial role in eliminating the risk of developing sarcopenia through improving and promoting the elderly nutritional status by having adequate intake of protein with high amino acids and maintaining an exercise program by educating the elderly about importance of performing exercise both resistance and aerobic exercises which were important to promote the physical function in older people. Additionally community health nurse should encourage the elderly to stop smoking and drinking alcohol. **Cruz-Jentoft et al., (2019).**

Significance of the study

According to the International Classification of Diseases (ICD), Sarcopenia is now classified as a separate condition. Sarcopenia is a disorder characterized by a loss of skeletal muscle mass and function that is strongly associated with physical impairment, quality of life, and death. Unfortunately, most elderly don't consider it as a disease. Improving knowledge and awareness regarding sarcopenia and its preventive practices among elderly adults is of great importance to increase adherence and motivation to change their lifestyle. So, the aim of this study was to evaluate the effect of nursing intervention program regarding prevention of sarcopenia among elderly people in Tanta city.

The aim of this study was to:

Evaluate the effect of nursing intervention on knowledge and

practices of elderly regarding sarcopenia.

Research Hypotheses: -

- 1- Elderly level of knowledge is expected to be improved after nursing intervention program.
- 2- Elderly preventive practices are expected to be improved after nursing intervention program.

Subjects and method:

Study design:

A quasi - experimental research design was used in this study.

Study settings:

Tanta University Hospital, which is connected to the Ministry of Higher Education and Scientific Research, and Health Insurance Hospital, which is connected to the Ministry of Health and Population, both had medical, rheumatoid, and orthopedic outpatient clinics where this study was conducted.

Subjects:

The study included a purposive sample of 60 senior citizens who visited the previously described settings and satisfied the inclusion requirements. The Epi-Info Software Statistical Package, version 2002, developed by the World Health Organization in partnership with the Centers for Disease Control and Prevention in Atlanta, Georgia, USA, was used to determine the sample size and power analysis. After determining that the sample size was $N > 44$, it was raised to 60 senior citizens in order to improve the accuracy of the data gathered. The total number of people who attended the settings that were previously chosen during the three months prior to data

collection was used to calculate the sample size.

Inclusion criteria for the elderly: -

- Both sexes
- Age: 60 years old or older.
- Willing to participate in the study
- Have no cognitive impairment.
- Ability to communicate effectively.
- Have no contraindications for any exercises

Tools for data collection: -

After examining recent literature, the researcher created two tools to collect the required data.

Tool I: A structured interview schedule: -

A structured interview schedule was developed and used by the researcher after examining the recent and related literatures to collect the required data **Ha & Park, (2022)**. It contained 24 questions and divided into the following parts: -

Part (1): - Socio-demographic data of studied elderly (eight questions): It included data regarding age, sex, marital status, previous occupation, level of education, income, place of residence and height and weight to calculate BMI.

Part (2): - Medical history of the elderly (five questions):

This part was developed to assess the previous and current health status of the elderly as regard to history of chronic diseases as heart diseases, diabetes, hypertension, osteoarthritis, joint stiffness and history of smoking as duration, number and type of smoking.

Part (3): The SARC-F questionnaire for screening of sarcopenia. (Five questions)

The SARC-F questionnaire was developed by The European Working Group on Sarcopenia in Older People (EWGSOP) in 2013 **Malmstrom& Morley,(2013)**. This questionnaire was adopted by the researcher to the researcher to assess patients for self-reported indicators suggestive of sarcopenia, such as impairments in strength, walking, rising from a chair, ascending stairs, and experiencing falls.

Scoring system related to SARC-F questionnaire:

-The respondents were asked how much difficulties they have when carrying ten pounds (4.5 kg), moving from a chair or bed, climbing stairs, and crossing the room.

These signs were scored as:

-zero for no difficulty

-One for some difficulties

-Two for a lot of difficulties or unable to do.

Additionally, the respondents were assessed for falling during the past year and scored as 0 = no fall, one = 1-3 times and 2 = 4 times or more. Scores on the SARC-F scale vary from 0 to 10, with each component worth 0–2 points.

A score equal to or greater than 4 is predictive of sarcopenia and bad outcome.

Part (4): - The Physical Self-Maintenance Scale (PSMS): - (six items)

The Physical Self-Maintenance Scale (PSMS) which was developed by **Lawton and Brody., (1969)**. The researcher modified it and used it to evaluate the Activities of Elderly Daily Living (ADL). The scale consists of six-items to assess the independence

and dependence level, the elderly's activities of eating, clothing, grooming, walking, bathing, and toileting. ADL difficulties were characterized as impairments in any of the six items.

Scoring system related to the Physical Self-Maintenance Scale (PSMS)

The elderly responses ranged between (0-4) as the activity that can be done independently without help from others take (four) points while, done with minimal help of others (three) points, need great help in doing activities (two) points, depend on others with minimum help from them (one) point and completely dependent on others to the activities took (zero). The total PSMS score ranged between 0-24. Result of the scale was scored as follow: - Impairment was described as being unable to do anything on one's own or requiring assistance from others.

The total level of ADL impairment was categorized as follow: -

-Impaired = 0 - <18 points

-Not impaired = 18 – 24 points

Tool II: - Knowledge and reported practice of the studied elderly related to sarcopenia: - it consisted of the following parts: -

Part 1: - Knowledge of elderly related to sarcopenia.

This part was developed by (**Ancum J M et al., 2020**) and adopted by the researcher to assess the subjects' knowledge related to sarcopenia. It included 6 questions six questions about the definition, etiology, risk factors, consequences, therapy, and prevention of sarcopenia.

Scoring system related to elderly knowledge: -

Each question in the knowledge section was scored. Each accurate item of question received one mark, with a zero for erroneous answers or don't know. The overall knowledge score was (19). The scores of the elderly responses was added up, the total score was converted into percentage.

The elderly level of knowledge was classified as follows: -

-Low level of knowledge < 50% of the total knowledge score. (≤ 9 points)

-Moderate level of knowledge 50%-70% of the total knowledge score. (9-13 points)

-High level of knowledge > 70% of the total knowledge score. (>13 points)

Part (2): - Self-reported practices related to sarcopenia: -

This part was created by the researcher based on recent and related literatures **Galvin JE et al., 2020**. It contained the following components:

Assessment of the elderly intake of required nutrients related to sarcopenia:-

The elderly was asked about the frequency of intake of the following nutrients per week: protein consumption as (meat, poultry, fish, eggs, and dairy foods), omega 3 consumption as fatty fish like salmon, mackerel, and tuna, orange juice, milk, cereal, beef liver, and egg yolk, as well as vitamin D and calcium from dairy products like milk, cheese, and yogurt, as well as omega 3 foods like mackerel, salmon, sardines, tuna, and vegetables, particularly green leafy ones.

Scoring system

According to the elderly responses related to the frequency of the required

nutritional elements, it was scored as follows: -

-Seldom eaten (0-1 days/week) = one point

-Often eaten (2–3 days/week) = two point

-Always eaten (4–7 days/week) = three points

The total nutritional score ranged between 3-9.

B. Assessment of the elderly level of physical activity: -

The level of the elderly physical activity was assessed using the Quick Physical Activity Rating (QPAR) scale which includes a brief assessment of physical activity in older adults that was developed by **Galvin JE et al., 2020**. It was adapted by the researcher to suit the Egyptian participant's culture.

It consisted of ten items that covered exercise, chores, hobbies and leisure activities, walking, passive activities, and each with an example. Housework and hobbies were further divided into three categories: light, moderate, and strenuous activities were further separated into two categories: flexibility exercises and muscle strength exercises. During the previous four weeks, respondents were asked to think about these physical activities.

Scoring system of The Quick Physical Activity Rating (QPAR) scale was as follows: -

Each exercise was weighted based on intensity, frequency, and duration, with intensity ranging from one mild intensity to three heavy intensity. The frequency of activity each week was measured using a four-point likert scale ranging from zero (never) to three

(often), with categories of never (0 days), seldom (1-2 days), occasionally (3-4 days), and often (5-7 days). While the duration of exercise was evaluated as one less than one hour per day, two for one to two hours per day, and three for more than two hours per day. Multiplication of the intensity (1-3), frequency (0-3) and duration (1-3) scores allowed for the computation of a dose of physical activity by adding the total score of total activity, which ranged from 0 to 153.

The level of physical activity was classified according to the total level of physical activity as follow: -

- **Low level of physical activity** < 50% of the total dose of physical activity. (76 points)
- **Moderate level of physical activity** 50% -75% of the total dose of physical activity. (76-115 points)
- **High level of physical activity** > 75% of the total dose of physical activity. (116-153 points).
- **The total practice score** (nutritional and physical activity) ranged between 3- 162. This total score is summed up and converted into percentage then, it was characterized as:
- Satisfactory practices: $\geq 60\%$ of the total score.
- Unsatisfactory practices :< 60% of the total score.

Method

The operation of this study was carried out as follows: -

Obtaining approvals:

- The Dean of the Faculty of Nursing granted permission to conduct the study, which was then communicated to the responsible authorities (managers of

Health Insurance Hospital and Tanta University Hospital) for their approval and cooperation. The study's aim and objectives were explained.

Ethical and legal considerations: -

- The study proposal was approved by the Scientific Research Ethical Committee of Tanta University's Faculty of Nursing (code: 50/4/2022).
- All study subjects provided informed consent after being explained the purpose of the study.
- Participants were informed they could withdraw from the study at any time.
- The complete sample is not harmed or in pain as a result of the study's design.
- Assured the participants that the information they provided would be kept private and confidential and that it would only be utilized for research.
- Anonymity was ensured by using coding instead of names.

Developing of the tools: -

- Based on current and relevant literature, the study tools I and II were created, modified, or adopted.
- Supervisors assessed the developed tools and translated them into Arabic to align with Egyptian culture. The document was then submitted to seven community health nursing specialists to undergo content and face validity testing. Based on expert opinions, the questionnaire's validity was computed and determined to be (96%).

The pilot study: -

- In order to verify the tools' clarity, applicability, and comprehension, identify potential roadblocks during data collection, and ascertain the amount of time required to gather the data; the researcher conducted a pilot

study on six elderly participants, or 10% of the total study participants.

-The elderly was included in the full study population because the pilot study revealed no changes after it was completed.

Cronbach's Alpha test was used to apply the reliability test to the earlier tools. It was **0.893** for SARC-F scale for screening and prediction of sarcopenia, **0.953** for the knowledge, **0.889** for nutritional practices and **0.914** for physical activity practices and for total questionnaire was 0.814.

Developing the intervention program:

The program was developed using the following stages.

I-Assessment phase:

Prior to the program's implementation, each old person was questioned separately to build rapport. The data was gathered using the aforementioned instruments by conducting individual interviews with each elderly person to get baseline information regarding sarcopenia as a pre-intervention assessment.

II-Planning phase:

The geriatric needs identified during the assessment phase and through a review of the literature were taken into consideration when planning the intervention program. The actions listed below were taken:

A-Formulating program goal and objectives

-The main goal of the program:

The intervention plan's major purpose was to improve elderly people's understanding and habits for preventing sarcopenia.

-Specific objectives of the program:

At the conclusion of the intervention program, the older patients were capable to:

- Recognize the muscular system and its types and functions.
 - Define sarcopenia.
 - Recall causes of sarcopenia.
 - Differentiate between types of sarcopenia.
 - Identify risk factors of sarcopenia.
 - List signs and symptoms of sarcopenia.
 - Explain the detrimental effects of sarcopenia.
 - Discuss the management of sarcopenia
 - Practice the recommended exercises for preventing sarcopenia such as Walking, leisure and recreational pursuits, exercise, and housework are examples of passive activities.
 - Recognize the types of nutrients prevent sarcopenia
 - Appreciate the high protein, omega 3, calcium and vitamin D in diet and increase their intake in the diet.
- #### **B-Preparing and organizing the program content: -**
- The program's contents were designed to meet the needs, learning objectives, and readiness of the senior participants.
 - A literature review was undertaken utilizing textbooks, journals, periodicals, and related sources and web searches to explore various elements of the topic. It was critical for the researcher to become acquainted with and oriented to aspects of the research problem, such as the creation of the intervention program.
 - The researcher designed a nursing intervention program based on the

results of an interview questionnaire and literature study.

- The contents of the intervention program were organized in six consecutive sessions as follow: -

Session (1): Program orientation and expectation: (45 minutes).

Session (2): An overview about muscular system, its functions and types of muscles: - (45 minutes).

Session (3): - An overview about sarcopenia and its categories: (45 minutes).

Session (4): Stages, diagnosis and complications of sarcopenia: (45 minutes).

Session (5): Nutritional requirements for prevention of sarcopenia: - (45 minutes).

Session (6): physical activity and its role in prevention of sarcopenia: (45 minutes).

C-Selecting the teaching strategies:

Teaching methods: -

-The procedures employed were as follows:

Group discussion, demonstration and redemonstrations and Roleplaying` were used as a teaching method to conduct the intervention program

-Instructional materials were used as follow: -

An audiovisual material included booklet for elderly and power point slides were used in this study. The study participants were given booklets at the end of each session to refresh their knowledge, and a power point presentation was provided as needed.

III- Implementation phase:

- The researcher carried out the program to provide comprehensive and reliable

information on sarcopenia therapy and prevention.

- This study's field work began on November 1st and will last until the end of June 2023, which is approximately 8 months.

- The program was implemented in a conference room with approval from the competent authority to ensure correct awareness of sarcopenia among study participants,

- To ensure correct understanding of sarcopenia among study participants, the elderly was divided into 10 groups, with no more than 6 in each educational session.

- All elderly attended the 6 sessions of the program (315 minutes) 45 minutes for each session. After ending the program sessions, the researcher follows the subjects through telephone calls until the time of posttest to encourage them ensure this to be commitment with recommended diet & exercises.

IV. Evaluation phase:

- The objective of this phase was to assess the impact of a nursing intervention program on the practices and knowledge of elderly individuals on sarcopenia.

This evaluation was conducted two times:

1)Before implementing the health education program, use study tools I&II (pretest).

2) Three months after implementing the nursing intervention program, utilizing tools I (part 4) and II (posttest).

Statistical analysis of the data

The acquired data was coded, entered, tabulated, and analyzed with SPSS

(Statistical Package for Social Science) version 25 (IBM Corporation, Armonk, NY, USA). For quantitative data, the range, mean, and standard deviation were determined. The Chi-square test (χ^2) was used to compare two or more groups of qualitative data categorized by frequency, percentage, or proportion. The Mann-Whitney test's Z value was used to compare the means of two groups of nonparametric data from independent samples. The Z value of the Wilcoxon Signed Ranks Test was used to compare the means of two non-parametric data groups (before and after the intervention program). Kruskal-Wallis (2) was used to compare multiple non-parametric data means. Pearson's correlation coefficient (r) was used to examine the relationship between variables.

Results

Figure (1): shows distribution of the studied elderly according to their body mass index (BMI). This figure shows that, it ranged between 20.40-44.80 kg/m² with a mean of 28.92±5.14 kg/m². Less than half (43.3%) of them were overweight, nearly about one third (31.7%) are obese and one quarter (25.0%) of them were of normal weight.

Figure (2): represents distribution of the studied elderly according to the result of total SARC-F score. It was clear that, the result of SARC-F questionnaire was predictive of sarcopenia for more than two thirds (68.3%) of the studied elderly while, it was not predictive of the rest of the studied elderly (31.7%). The mean

score of the elderly SARC-F result was 4.40±2.89.

Table (1): illustrates distribution of the studied elderly regarding impairment level in daily activities based on PSMS before and after implementation of nursing intervention program. Prior to the nursing intervention program's implementation, less than one quarter (23.3%) of the older individuals under study had difficulties with their feeding activities; three months following the program's start, this percentage dropped to 18.3%.

Furthermore, less than half (41.7% and 41.7%) of the studied elderly were impaired concerning dressing and bathing activities respectively before implementation of nursing intervention program, while three months post intervention program, this percentages were decreased to 16.7% and 23.3% respectively. Following the implementation of the nursing intervention program, there were statistically significant reductions in the impairment levels related to dressing and bathing activities ($p=0.003$ and 0.032 , respectively).

Also, this table reveals, that prior to the nursing intervention program, approximately one-third (33.3%) and 31.7%, respectively, of the elderly individuals under study had difficulties with their physical ambulation and grooming; three months after the program began, these percentages dropped to less than one-fourth (23.3%) and 23.3%, respectively. Nevertheless, following the execution of the nursing intervention program, there was no

statistically significant improvement in the elderly's capacity for physical ambulation and grooming ($p=0.224$ and 0.307).

furthermore, this table shows that prior to the nursing intervention program, 25% of the older individuals under study experienced difficulty with toileting, however three months after the program began, this percentage dropped to just 20%. However, this table demonstrates that, in terms of overall physical impairment, it was evident that only one-third (33.3%) of the elderly individuals under study were physically impaired prior to the implementation of the program, and that, three months after the intervention, less than one-quarter (21.7%) of them were still physically impaired. After three months of the program, there was a significant improvement in the elderly participants' level of physical self-maintenance ($p=0.0001$).

Table (2): illustrates distribution of the studied elderly according to their knowledge regarding sarcopenia before and after implementation of nursing intervention program. This table reveals that in contrast to about one-quarter of the senior participants (25.0%, 25.0%, and 26.7%) three months after the intervention program, the majority of the participants (91.7%, 91.7%, and 86.7%) in the study were unaware of or provided inaccurate responses regarding the definition, causes, and risk factors of sarcopenia prior to the program.

Indeed, only (6.7%, 6.7%) of the studied elderly knew that malnutrition and getting old are the causes of

sarcopenia before the program implementation compared to less than two thirds of them (58.3% and 65%) respectively three months post intervention program. While, less than 10% of them know that adopting improper diet, excessive alcohol consumption and excessive smoking are among the risk factors of sarcopenia (6.7%, 8.3% and 0.5) respectively compared to (61.7%, 61.7% and 51.7%) respectively three months post program intervention. However, all the study subjects couldn't identify diabetes mellitus as a risk factor for sarcopenia preprogram compared to more than two fifth (41.7%) of them 3 months after program

Concerning the symptoms and complications of sarcopenia, this table reveals that the majority of the studied elderly (88.3%, 86.7%) didn't know or gave incorrect answers related to the symptoms and complications of sarcopenia preprogram intervention. While three months post program intervention, more than 40% of them knew that small muscle size, low weight and fatigue (43.3%, 61.7% & 43.3%) respectively are among the symptoms of sarcopenia and that fractures, disabilities and death are among the complication of sarcopenia (45.0%, 63.3% & 50.0%) respectively.

As for the knowledge related to ways to prevent sarcopenia, more than two fifths (43.3%) of the studied elderly didn't know the ways to prevent sarcopenia preprogram intervention while three months post intervention, more than two thirds of them (86.7%, 73.3% & 68.3%) mentioned proper,

varied nutrition doing light exercise and quiet smoking as ways for prevention of sarcopenia. All of the studied elderly's sarcopenia-related knowledge items showed very statistically significant gains after the intervention compared to before ($P < 0.001$).

Table (3): represents the distribution of the studied elderly according to their total level of knowledge regarding sarcopenia before and after implementation of nursing intervention program. It was clear that, most (98.3%) of the studied elderly had a low level of knowledge about sarcopenia pre intervention program implementation compared to only two fifths (40.0%) after implementation of nursing intervention program. On the other hand, the percentage of those having high level of knowledge increased from 1.7% preprogram intervention to 28.3% after implementation of nursing intervention program. There was a statistically significant improvement in total knowledge score related to sarcopenia among the studied elderly after program implementation of the intervention program ($P = 0.0001$), where the mean score of their knowledge increased from (1.62 ± 0.87) preprogram intervention to (10.40 ± 4.36) three months post intervention program.

Table (4): represents distribution of the studied elderly regarding the reported nutritional practices related to sarcopenia before and after implementation of nursing intervention program. This table shows that more than one quarter (26.7%) of the studied elderly seldom

eat a protein rich diet for 0-1 days/week preprogram intervention compared to less than three quarters (3.3%) of them three months post program intervention. Regarding to foods containing omega 3, nearly about one third (31.7 %) of the studied elderly always eat an omega 3 rich diet for 4-7 days/week preprogram intervention and this improved among more than two thirds of them (70.0%) after three months of intervention program.

Concerning to a diet rich in vitamin D and calcium, slightly more than one tenth (6.7%) of the studied elderly always eat vitamin D and calcium rich diet for 4-7 days/week preprogram intervention while three months post intervention program, this percentage increased to about two thirds (61.7%) of them. Indeed, there were a statistically significant improvement in all mentioned items of the reported nutritional practices related to sarcopenia among three months post program than preprogram ($P < 0.05$). Where the mean score of their total nutritional practices increased from (5.77 ± 5.03) preprogram intervention to (21.95 ± 2.36) three months post intervention program.

Table (5): represents mean & standard deviation of different aspects of physical activities related to sarcopenia before and after implementation of nursing intervention program. This table reveals that There was a substantial improvement in overall mean scores of physical activities of the investigated seniors during post-program implementation than before the

intervention ($P=0.0001$), where the mean score of their reported frequency of physical activities increased from (2.43 ± 2.17) preprogram intervention to (12.73 ± 5.98) three months post intervention program.

Also, there was a statistically significant enhancement in the duration of physical activities among the studied elderly 3 months after program implementation than preprogram ($P=0.0001$), where the mean score of their reported duration of physical activities increased from (4.25 ± 3.12) preprogram intervention to (14.52 ± 5.47) three months post intervention program

Moreover, there was a statistically significant advancement in the intensity of physical activities among the studied elderly post program of the study than preprogram ($P= 0.0001$). The mean score of the intensity of their physical activities increased from (1.57 ± 0.62) pre intervention program to (2.30 ± 0.59) three months post intervention program.

Table (6): represents distribution of the studied elderly regarding total level of physical activity of the studied elderly related to sarcopenia before and after implementation of nursing intervention program. This table reveals that all (100%) of the studied elderly practicing low level of physical activity pre nursing intervention program compared to more than three quarters (78.3%) of them Three months after completion of the intervention program. In contrast, no one of the studied elderly practicing moderate and high level of physical activity pre nursing intervention

program compared to (11.7% and 10.0% respectively) three months post program intervention

There was a statistically significant improvement in levels of physical activities among the studied elderly three months post intervention ($P=0.0001$) than pre intervention where the mean score of their reported level of physical activities increased from (2.62 ± 4.50) preprogram intervention to (52.63 ± 38.13) three months post intervention program.

Table (7) :represents distribution of the studied elderly regarding total score of practice among the studied elderly related to sarcopenia before and after implementation of nursing intervention program. This table reveals that the study found a significant improvement in the total practice score of the elderly with sarcopenia before and after the intervention program ($P= 0.0001$). The mean score increased from (8.83 ± 5.26) pre-intervention to (59.97 ± 38.57) three months later.

Table (8): represents correlation between total sarcopenia (SARC-F) score and total scores of knowledge, nutritional practice, physical activity and total daily activities score of the studied elderly. This table reveals that there were significant negative correlations between total sarcopenia scores and the total knowledge score, total physical activities score and total daily life activities score among the studied elderly ($p= 0.033, 0.015, \text{ and } 0.0001$) respectively.

Table (9): represents correlations between age and body mass index of

the studied elderly and their total scores of knowledge, daily life activities, nutritional practice, total Physical activity, total practice score and total sarcopenia score. This table reveals that There were significant negative relationships between the investigated elderly's age and their total daily activities score and total nutritional practice score ($p= 0001^*$, 0.043^*), respectively. While there was a substantial positive link between the investigated elderly's age and overall sarcopenia score ($p= 0001^*$). On the other hand, a strong positive association was found between the investigated elderly's BMI and their total knowledge score ($p = 0.009$).

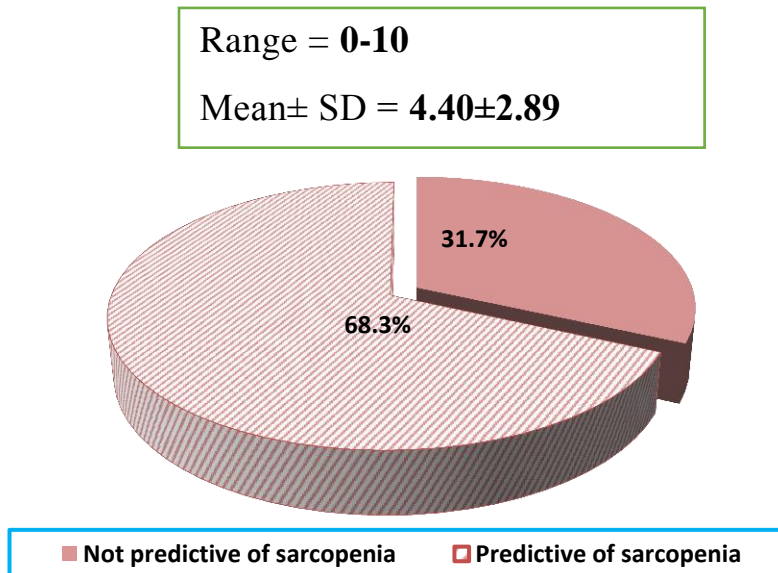


Figure (1): Distribution of the studied elderly according to their total SARC-F score.

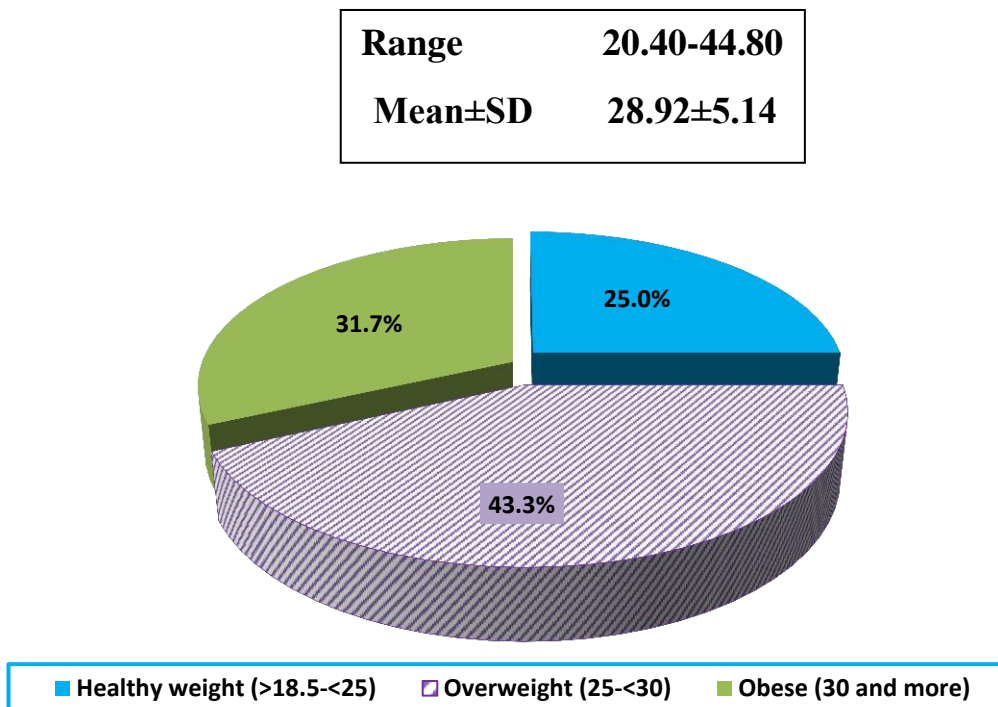


Figure (2): - Distribution of the studied elderly according to their body mass index (BMI).

Table (I): Distribution of the studied elderly regarding to the level of impairment in daily activities based on PSMS before and after implementation of nursing intervention program.

Impairment of daily activities items (PSMS scale)	The studied elderly (n=60)				χ^2 test	P value
	Before		3 months after			
	N	%	N	%		
-Feeding						
Impaired	14	23.3	11	18.3	0.455	0.500
Not Impaired	46	76.7	49	81.7		
-Dressing						
Impaired	25	41.7	10	16.7	9.076	0.003*
Not Impaired	35	58.3	50	83.3		
-Grooming						
Impaired	20	33.3	14	23.3	1.477	0.224
Not Impaired	40	66.7	46	76.7		
-Physical Ambulation						
Impaired	19	31.7	14	23.3	1.045	0.307
Not Impaired	41	68.3	46	76.7		
-Bathing						
Impaired	25	41.7	14	23.3	4.596	0.032*
Not Impaired	35	58.3	46	76.7		
-Toilet						
Impaired	15	25.0	12	20.0	0.430	0.512
Not Impaired	45	75.0	48	80.0		
Total daily activities score (6 -24)	6-24	16-24				
	13.65±5.30	21.95±2.36				
Z value	4.912					
P value	0.0001*					

*Statistically significant (P<0.05)

Table (2): Distribution of the studied elderly according to their knowledge regarding sarcopenia before and after implementation of nursing intervention program.

Knowledge items with correct answers about sarcopenia (score)	The studied elderly (n=60)				χ^2 test	P value
	Before		3 months after			
	No	%	No	%		
Definition of sarcopenia						
Incorrect or don't know	55	91.7	15	25.0	54.857	0.0001*
A disease that refers to the loss or weakness of muscles as a result of advancing age	5	8.7	45	75.0		
The causes of sarcopenia						
Incorrect or don't know	55	91.7	15	25.0	54.857	0.0001*
Malnutrition	4	6.7	35	58.3	36.505	0.0001*
Getting old	4	6.7	39	65.0	44.397	0.0001*
The risk factors for sarcopenia						
Incorrect or don't know	52	86.7	16	26.7	43.982	0.0001*
Old age	2	3.3	10	16.7	5.926	0.015*
Adopting an improper diet	4	6.7	37	61.7	40.346	0.0001*
Excessive alcohol consumption	5	8.3	37	61.7	37.509	0.0001*
Too much smoking	3	5.0	31	51.7	32.175	0.0001*
Diabetes mellitus	0	0	25	41.7	31.579	0.0001*
The symptoms of sarcopenia						
Incorrect or don't know	53	88.3	10	16.7	61.788	0.0001*
Small muscle size	5	8.3	26	43.3	19.181	0.0001*
Low weight	6	10.0	37	61.7	34.829	0.0001*
Fatigue and severe fatigue	3	5.0	26	43.3	24.055	0.0001*
The complications of sarcopenia						
Incorrect or don't know	52	86.7	12	20.0	53.571	0.0001*
Fractures	4	6.7	27	45.0	23.008	0.0001*
Disability	6	10.2	38	63.3	36.080	0.0001*
Death	3	5.0	30	50.0	30.470	0.0001*
The ways to prevent sarcopenia						
Incorrect or don't know	26	43.3	2	3.3	26.832	0.0001*
Take vitamins and nutritional supplements	4	6.7	20	33.3	13.323	0.0001*
Doing light exercise	13	21.7	44	73.3	32.114	0.0001*
Proper, varied nutrition	17	28.3	52	86.7	41.773	0.0001*
Quit smoking	4	6.7	41	68.3	48.676	0.0001*
Exposure to the sun	5	8.3	24	40.0	16.415	0.0001*

*Statistically significant (P<0.05)

*More than one answer allowed

Table (3): Distribution of the studied elderly according to their total level of knowledge regarding sarcopenia before and after implementation of nursing intervention program.

Total knowledge about sarcopenia (score)	The studied elderly before and after implementation of nursing intervention program (n=60)				χ^2 test	P value
	Before		3 months after			
	N	%	N	%		
Total knowledge level						
Low level	59	98.3	24	40.0	47.981	0.0001*
Moderate level	0	0	19	31.7		
High level	1	1.7	17	28.3		
Total knowledge score						
Range	0-17		0-18			
Mean±SD	1.62±0.87		10.40±4.36			
Z value	8.487					
P value	0.0001*					

*Statistically significant (P<0.05)

Table (4): Distribution of the studied elderly regarding the reported nutritional practices related to sarcopenia before and after implementation of nursing intervention program.

Reported nutritional practices related to sarcopenia	The studied elderly (n=60)				χ^2 test P value
	Before		3 months after		
	N	%	N	%	
-Nutritional practices					
-Eat a diet rich in protein					
Seldom (0-1) day/week	16	26.7	2	3.3	19.145 0.0001*
Often (2-3 days/week)	23	38.3	16	26.7	
Always (4-7 days/week)	21	35.0	42	70.0	
-Eat foods containing omega 3					
Seldom (0-1) day/week	13	21.7	1	1.7	21.647 0.0001*
Often (2-3 days/week)	28	46.7	17	28.3	
Always (4-7 days/week)	19	31.6	42	70.0	
Eat a diet rich in vitamin D and calcium					
Seldom (0-1) day/week	29	48.3	4	6.7	46.892 0.0001*
Often (2-3 days/week)	27	45.0	19	31.7	
Always (4-7 days/week)	4	6.7	37	61.6	
Total Nutritional Practice Score					
Range	6-16		16-24		
Mean±SD	5.77±5.03		21.95±2.36		
Z value	7.894				
P value	0.0001*				

Table (5): Mean & standard deviation of different aspects of physical activities related to sarcopenia before and after implementation of nursing intervention program.

Different aspects of physical activities	Mean±SD	Mean±SD	Z value P value
	Before	After	
Frequency	2.43±2.17	12.73±5.98	7.869 (0.0001*)
Duration	4.25±3.12	14.52±5.47	7.850 (0.0001*)
Intensity	1.57±0.62	2.30±0.59	7.708(0.0001*)

Table (6): Distribution of the studied elderly regarding level of physical activity of the studied elderly related to sarcopenia before and after implementation of nursing intervention program.

Level of physical activity	The studied elderly (n=60)				χ^2 test	P value
	Before		3 months after			
	N	%	N	%		
-Level of physical activity						
Low level	60	100	47	78.3	14.579	0.001*
Moderate level	0	0	7	11.7		
High level	0	0	6	10.0		
Range	0-22		0-139			
Mean±SD	2.62±4.50		52.63±38.13			
Z value	8.368					
P value	0.0001*					

***Statistically significant (P<0.05)**

Table (7): Distribution of the studied elderly regarding total practice of the studied elderly related to sarcopenia before and after implementation of nursing intervention program.

Total practice	The studied elderly before and after nursing intervention program (n=60)			
	Before		3 months after	
	N	%	N	%
-Total practice level				
Unsatisfactory (<60%) (3-97)	60	100	51	85.0
Satisfactory (\geq 60%) (98-162)	0	0	9	15.0
-Total practice score (3-162)				
Range	3-28		4-148	
Mean \pm SD	8.83 \pm 5.26		59.97 \pm 38.57	
χ^2 test	9.730			
P value	0.002*			

*Statistically significant (P<0.05)

Table (8): Correlation between total sarcopenia (SARC-F) score and total scores of knowledge, nutritional practice physical activity, total practice and DLA score of the studied elderly.

Variables total scores	Total sarcopenia scores of the studied elderly (n=60)	
	R	P
Total knowledge score	-0.276	0.033*
Total Nutritional Practice Score	-0.213	0.102
Total physical activity score	-0.313	0.015*
Total life daily activities score	-0.782	0.0001*
Total practice score	*0.516	0.0001*

*Statistically significant (P<0.05)

Table (9): correlations between age and body mass index of the studied elderly and their total scores of knowledge, daily life activities, nutritional practice, total physical activity, total practice score and total sarcopenia score.

Variables total score	Age		BMI	
	r	P	r	P
Total daily activities score	-0.541	0001*	-0.039	0.765
Total knowledge score	-0.226	0.082	0.336	0.009*
Total Nutritional Practice score	-0.262	0.043*	-0.153	0.243
Total physical activity score	-0.197	0.132	0.140	0.285
Total practice score	-0.246	0.059	0.077	0.556
Total sarcopenia score	0.442	0.0001*	0.077	0.558

Discussion

Sarcopenia is a disorder that primarily affects the elderly and has a catastrophic effect on their physical health and quality of life. It is defined by a progressive loss of skeletal muscle mass and function, including problems in daily tasks, a higher risk of fractures due to falling, and even a shorter life expectancy in the elderly. Sarcopenia can be caused by aging, an imbalanced diet, and physical inactivity. In addition to inflammation and chronic disorders, which can hasten its progression. As the world's population ages, sarcopenia has arisen as a major health concern. (Hou et al., 2024).

The results of this study indicated that, in terms of BMI, three-quarters of the older participants were either overweight or obese (figure 2). This result contradicts the study that was conducted by Abbasy et al., (2023), who studied "Prognostic and diagnostic

anthropometric biomarkers of sarcopenia in a cohort of Egyptian patients with hepatitis C-induced liver cirrhosis, in Egypt", and found that, sarcopenic patients had a BMI of 25 kg/m² or above, indicating overweight or obesity. Furthermore, this conclusion contradicted the findings of Abdalla et al., (2021), who investigated the "Effect of pulmonary rehabilitation on muscle quality index in the elderly with sarcopenia, in Egypt" and discovered that 85% of the elderly had severe obesity with a BMI of 39.04 kg/m².

According to the current study, over two-thirds of the older participants displayed sarcopenia-related prognostic signs. (Figure 1). This may be due to sedentary and inactivity life among the retired elderly and ignorance of the importance of exercises and proper nutrition that Lifestyle choices like inactivity and inadequate diet can exacerbate muscle loss over time.

Moreover, underlying health conditions and medications commonly associated with aging, such as chronic diseases and certain medications, may further predispose individuals to sarcopenia. Likewise, a study done by **Sánchez-Rodríguez et al., (2019)**, entitled "Translation and validation of the Spanish version of the SARC-F questionnaire to assess sarcopenia in older people", in Spain, reported that SARC-F detected 56.7% of patients with sarcopenia and 43.3% without the condition. A study was also undertaken in Turkey by Sacar et al., (2021) on the "ability of SARC-F to find probable sarcopenia cases in older adults" revealed that 73% of older adults had probable sarcopenia. A study done by **Williams et al., (2021)**, entitled "SARC-F for screening of sarcopenia among older adults with cancer", in USA found that 33% of participants screened positive. These results indicated that sarcopenia prevalence is increasing in different countries and this problem need to the attention toward early detection and prevention. Concerning the results of physical self-maintenance scale (PSMS) before and after implementation of nursing intervention program, the present study reveals that there was statistically significant advancement in daily living activities among the studied elderly with sarcopenia during phases of intervention, where the mean score of their whole daily activities raised from 13.65 ± 5.30 at pre-program intervention to 21.95 ± 2.36 after three months of intervention (**Table 1**). This could be

because of the tailored nature of the intervention, which likely addressed key deficits and challenges faced by elderly individuals with sarcopenia. By focusing on enhancing muscle strength, mobility, and functional capacity, the intervention could have effectively mitigated impairments in daily activities. Additionally, the duration of the intervention (three months) allowed for sustained progress and adaptation, leading to significant improvements in overall daily activity scores.

These results contradicted a study named "Effects of vitality acupunch exercise on functional fitness and activities of daily living among probable sarcopenic older adults in residential facilities" conducted in Taiwan by **Tung et al.,(2022)**. The study found that the intervention group's activities of daily living significantly improved at each time point (all $p < 0.001$) and it concluded that the older adults' ability to perform these activities was significantly improved following the intervention.

Additionally, a study on the "Effectiveness of a short-term mixed exercise program for treating sarcopenia in hospitalized patients aged 80 years and older" by **Wang et al., (2020)** in China reported that the study group's patients performed significantly better in everyday activities than their counterparts in the control group.

In terms of total knowledge score before and after implementation of nursing intervention program, this study demonstrated that the majority of the studied elderly had a low level of

knowledge about sarcopenia prior to program intervention, but this percentage decreased to two fifths after program implementation. The study identified an important improvement in the elderly's knowledge of sarcopenia across all phases. The mean score of total knowledge raised from 1.62 ± 0.87 during preprogram intervention to 10.40 ± 4.36 three months later.

These results were compatible with those of **Keng et al., (2023)**, who reported in "Knowledge of Sarcopenia and Associated Factors among the Malaysian General Public" that the general people in Malaysia had a low level of knowledge (93.1%) regarding sarcopenia. **Park and Lee's (2023)** study, about "Effectiveness of Combined Exercise and Nutrition Interventions in Preventing and Improving Sarcopenia in Frail or Healthy Older Adults," supported these findings by stating that the exercise and nutrition interventions together were effective in raising the degree of knowledge about sarcopenia among older adults.

Additionally, **Chang and Chiu (2020)** discussed the "impact of resistance training on quality of life in older people with sarcopenic obesity living in long-term care institutions" and noted that older people's knowledge scores significantly increased with sarcopenia in post training program in contrast preprogram. Concerning the knowledge of the studied elderly regarding items of sarcopenia before and after implementation of a nursing intervention program, the present study

indicated that the vast majority of them did not know the definition and causes, the risk factors, the symptoms, and complications of sarcopenia at the time of pre-program intervention, whereas three months later, three quarters of them and nearly two thirds of them gave correct answers about these items. According to a study by **Keng et al., (2023)**, only 6.9% of participants knew what sarcopenia was, what causes it, and what risk factors it carries. Additionally, this conclusion aligned with a study titled "Lack of knowledge contrasts the willingness to counteract sarcopenia among community-dwelling adults" by **Van Ancum et al., (2020)** revealed that just 9% of the participants in the study in the Netherlands claimed to be aware of the signs and consequences of sarcopenia.

Additionally, the current study revealed that, prior to the program intervention, over two-fifths of the elderly participants were unaware of strategies to prevent sarcopenia. Three months after the program ended, over two-thirds of them correctly answered that eating a healthy, varied diet and engaging in moderate exercise were the best ways to prevent sarcopenia. Additionally, throughout the course of the study, the senior participants' understanding of sarcopenia significantly improved in all of the previously indicated areas (**Table II**).

This could be because elderly people aren't aware of sarcopenia among the elderly population prior to the intervention program and also because those two thirds of the elderly people

under study were either illiterate or only able to read and write that may hinder them from gaining health information. The findings suggest that the intervention program was helpful in disseminating information and promoting understanding about sarcopenia and its prevention methods among the elderly participants. The significant improvement observed in the knowledge levels after three months of program implementation, there was a notable improvement in knowledge levels, which suggests that the intervention had a good effect on older adults' awareness and retention of information.

Nutrition and diet are important factors in controlling sarcopenia in older persons because healthy eating keeps muscle mass from being lost, increases muscle strength, and improves physical performance. The current investigation showed that almost one-third of them always ate protein rich diet for 2-3 days/week during preprogram intervention, while three months post intervention program, nearly three quarters of them always ate a protein rich diet for 4-7 days/week (table 9). This finding was in accordance with a study carried out by **Hsu et al., (2019)** entitled "Effects of exercise and nutritional intervention on body composition, metabolic health, and physical performance in adults with sarcopenic obesity" in Taiwan and reported that 85.6% of the studied participants increased proteins in their diet after the nutritional intervention

compared to 40.2% of them before intervention.

In addition, according to the current study, one-third of the elderly participants always ate an omega 3 rich diet for 2-3 days/week during pre-program intervention and this improved to more than two thirds three months after intervention program. In the exact same, **Yin et al., (2023)**, who executed a study entitled "Dietary behaviour change intervention for managing sarcopenic obesity among community-dwelling older people", in China reported that there was a significant increase in the intake of foods rich with omega 3 among most of the studied older people after dietary intervention. These results indicate the ignorance of the elderly related to nutritional practice.

Furthermore, the current study found that only one-tenth of the studied elderly always ate a vitamin D and calcium-rich diet for 0-1 days per week during the pre-program intervention, whereas three months later, slightly more than three-fifths of them always ate a protein-rich diet for 4-7 days per week. This finding was consistent with a study accomplished in Hong Kong by **Yin et al., (2020)** titled "Effectiveness of non-pharmacological interventions on the management of sarcopenic obesity," which found that Nutritional strategies had a substantial effect on enhancing vitamin D and calcium-rich diet consumption among research participants.

Furthermore, the current study proved that every item of the stated nutritional

practices had improved statistically significantly related to sarcopenia of the studied elderly during the all phases of the study, However, three months after the intervention program, the mean score of their reported nutritional practices rose from 5.77 ± 1.54 before the program to 21.95 ± 2.36 . This can be as a result of the organized intervention program successfully addressing important facets of the older participants' dietary habits linked to sarcopenia. This improvement may be due to a number of intervention-related factors, including personalized dietary plans, counseling sessions, and perhaps even social support networks established during the program.

These findings were consistent with a study executed by **Eglseer et al., (2023)** on "Nutritional and exercise interventions in individuals with sarcopenic obesity around retirement age in the Netherlands," which reported a statistically significant improvement in dietary practices of the studied participants following the nutritional intervention. In the similar concern, a study performed by **Chen et al., (2023)** entitled "Community-based exercise and nutritional interventions to improve frailty syndrome among older adults" in Taiwan, revealed that, in comparison with the pre-intervention phase, the reported nutritional practices of the older persons under study showed a statistically significant improvement.

Physical exercises are advised as the primary treatment for sarcopenia. Resistance-based exercise for older persons has several health benefits,

including muscular growth, strength increase, and enhanced physical performance. The current study found significant gains in all elements of physical activity (frequency, duration, and intensity where the mean score improved from 2.43 ± 2.17 , 4.25 ± 3.12 , 1.57 ± 0.62 preprogram intervention to 12.73 ± 5.98 , 14.52 ± 5.47 , 2.68 ± 0.57 respectively three months following program intervention (**Table V**). This may be the result of the structured nature of the intervention program, which likely provided clear guidance and motivation for the elderly participants to engage in physical activities more frequently. As the researcher continuously encourage them to continue doing recommended instructions through telephone calls. The significant improvement in reported frequency of physical activities suggests that the intervention program effectively instilled behavioral changes conducive to a more active lifestyle among the elderly participants. Also, the statistically significant improvement can be attributed to that the program effectively motivated the elderly participants to enhance their physical activity.

These results were in compliance with **Bernabei et al., (2022)**, who carried out a study entitled "Multi component intervention to prevent mobility disability in frail older adults", in Europe where they found that a multi-component intervention was associated with improvement in The frequency of physical exercise and the prevalence of mobility disability in elderly people

with physical frailty and sarcopenia. Likewise, the home-based exercise group had considerably greater frequency of physical activity ratings than the control group after three months, according to **Sen et al., (2021)** study. This supports that the structured nature of the intervention program, provided the elderly individuals with sarcopenia the necessary guidance to engage in physical activities more regularly. Moreover, the gradual progression of the intervention phases might have allowed participants to gradually adapt to increased physical activity levels, leading to sustained improvements over time.

The frequency of physical activity increased significantly ($P=0.042$) from 11.46 ± 0.86 to 11.77 ± 0.53 at week 12 and 11.82 ± 0.40 at week 24, depending on a study written by **Kim et al. (2023)** about "Combined exercise and nutrition intervention for older women with spinal sarcopenia" in Korea. Similarly, a study by **Eglseeret al., (2023)** confirmed that, following an exercise intervention, the frequency of physical activity among the sarcopenia-afflicted patients was much higher than it was prior to the intervention.

The finding is aligned with a study conducted by **Kim et al., (2023)**, which found that resistance training interventions are more beneficial in raising physical activity levels among sarcopenia-afflicted study participants. Similarly, **Faria et al., (2023)** whose research revealed that the senior participants' increased level of physical

activity was statistically significant as a result of the intervention program.

Concerning level of physical activity of the senior participants, the current study found that all of the senior participants had low levels of physical activity prior to the nursing intervention program taking effect, comparing their levels before and after the program's implementation and this percentage decreased to 78.3% of them. As regard to moderate and high level, no one of the studied elderly had moderate and heavy level of physical activity during preprogram nursing intervention and this percentage increased to (11.7% and 10.0% respectively) three months following the program intervention (**Table VI**). This decrease in the percentage after program may be attributed to resistance to change among older population.

However, a statistically essential enhancement was observed in the overall score of physical activities during all phases of the study, where the mean score of their level of physical activities increased from (2.62 ± 4.50) preprogram to (52.63 ± 38.13) three months post program (**Table VI**). This might be the result from the nurse intervention program's efficacy implemented for the elderly with sarcopenia. The program effectively motivated and supported participants in adopting more active lifestyles.

Similarly, a study carried out by **Ha & Park, (2022)**, who carried out a study about "Effects of a person-centered nursing intervention for frailty among prefrail community-dwelling older

adults”, in Korea and reported that 96.8% of the studied older adults had low physical activity level pre-intervention, while improved significantly to 58% of them had high activity level post intervention. These differences may be attributed to the method used in intervention program through mobile.

Pertaining correlation between total sarcopenia score (SARC-F) and age, body mass index and total daily activities of the studied elderly before and after implementation of nursing intervention program, The current study demonstrated that, the total sarcopenia scores of elderly individuals were significantly positively correlated with their age, whereas the total sarcopenia scores and total daily activities were significantly negatively correlated. (**Table VIII**).

This could be explained by the fact of natural physiological processes associated with aging, where in as individuals grow older, they typically lose muscular mass and function, resulting in an increase in sarcopenia scores. Furthermore, decreased activity of everyday living may lead to the worsening of sarcopenia. These findings were in harmony with a study done by **Saadeddine et al., (2021)** reported that there was a vital negative correlation between the elderly total score of daily activity and their total score of sarcopenia. Also, **Sánchez-Rodríguez et al., (2019)**, who indicated that there was an important statistical relation between sarcopenia an overall score of elderly and their age.

According to the current study, there was a significant negative correlation between the total sarcopenia score (SARC-F) and the total knowledge score, nutritional practice, total physical activity score, and total practice score of the elderly individuals under study. Additionally, the overall sarcopenia scores and the total physical activity score showed a strong negative connection. (**Table VIII**). This can be interpreted as individuals with greater knowledge about sarcopenia and its prevention may be more likely to engage in behaviors that mitigate its effects. This could include adopting healthier lifestyles, such as regular exercise and balanced nutrition, which are known to combat sarcopenia. Additionally, because exercise has preventive effects on muscular health, people who are more physically active may have lower sarcopenia scores. In addition to the results of the current investigation, a study by **Keng et al., (2023)** found a strong correlation between the elderly's overall sarcopenia score and their level of education. These results were in aligned with those of **Bao et al., (2020)**, who discovered a substantial negative connection between the overall score of sarcopenia and the physical activity level of the senior population under study.

Finally, we can say that elderly persons had many factors that contribute to occurrence of sarcopenia and they need for continuous follow up, support, guidance and motivation to adhere to preventive and curative practices

through intervention educational programs.

Conclusion

Depending on the current study's findings, it was identified that the nursing intervention program vitally enhanced the elderly participants' knowledge and preventive practices linked to sarcopenia, including physical activity, daily living activities, and nutritional practices. Additionally, there were significant negative correlations between the participants' total sarcopenia scores and their total knowledge, physical activity, and daily life activities scores among the older participants, even though the majority had little expertise.

Recommendations

Based on the finding of the present study, the following recommendations are proposed: -

- Ongoing workshops for education are needed for elderly people in gathering places as health insurance and outpatient clinics and elderly clubs to help them to gain the needed information for modifying their life style to prevent sarcopenic changes and other ageing changes.
- Inclusion of sarcopenia screening test to the elderly screening program.
- Provision of low-cost sport clubs for elderly to enable them practicing physical exercise to regain muscle mass and muscle strength.
- Future researches are recommended to explore the obstacles that hinder the older adults from practicing healthy behaviors to prevent sarcopenia.

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