# Prevention Program Regarding Falls among Older Adults at Geriatrics Homes

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## ABSTRACT

***Context*:** Older adults are vulnerable to falls that result in injury and disability, making fall prevention a national priority.
***Aim***: This study aimed to evaluate the effect of a fall prevention program on older adults' knowledge, practices, and elder wellbeing regarding falls.
***Methods***: A quasi-experimental (single group pre/post-test design) was utilized to achieve the aim of this study. Four geriatric homes at the North district, Cairo governorate were included in the study. The systematic random sample composed of 50 older adults were included in this study. The pre-designed interviewing questionnaire was utilized to collect data regarding socio-demographic characteristics to assess age, sex, marital status of the older adult, and to assess the presence of chronic illness, medication, frequency of falling, and hospitalization. This questionnaire also assesses the knowledge of older adults regarding meaning, causes, protective measures, complications, and a safe environment. Besides, it assesses the reported practices of older adults regarding their health maintenance measures, nutrition, physical activity, and safe home environment. Older adult wellbeing scales developed to assess older adult physical, social, and psychological wellbeing. An environmental safety checklist used to assess the safety of the geriatric home environment.
***Results***: Revealed that more than two-thirds of older adults aged ≥ 75 years more than half of them experienced falling two times during the past two years, there was a highly statistically significant difference in older adults' total knowledge pre and post prevention program implementation $P<0.001$. Moreover, there was a highly statistically significant difference between total older adult reported practices pre and post prevention program implementation $P<0.001$. There was statistically significant improvement related to the physical, social, and psychological wellbeing of older adult pre and post-program implementation. There was a statistically significant correlation between the older adult educational level and their knowledge and practices ($p<0.05$).
***Conclusion*** Application of the prevention program has a positive effect on the studied older adults' knowledge, reported practices, and their wellbeing regarding fall prevention at geriatric homes. The current study recommended that prevention programs should be applied in all geriatric homes to prevent and control falls among older adults.

***Keywords*:** Prevention program, falls, older adult, and geriatric homes.

## 1. Introduction

Older adults are described as people had 60 years and older, the aging of the world's population resulted from the gradual decrease in fertility rate and rising life expectancy, resulting in growing numbers and proportions of people over 60 years of age *(WHO, 2015).*

In 2050, the world's population aged 60 and over is predicted to reach 2 billion, up from 900 million in 2015, 125 million people aged 80 or over, in 2050, there will be almost as many (120 million) living in China alone, and 434 million people live in this age group worldwide. In 2050, 80% of all older people will live in low-and middle-income countries *(WHO, 2018).*

Older age is distinguished by the occurrence of many complex health disorders that appear to arise only later in life and may not fall into distinct groups of diseases, usually referred to as geriatric syndromes, frequently arising from several underlying causes like frailty, urinary incontinence, falling, delirium and ulcer pressure *(Stevens et al., 2012).*

For older people, falls are a symptom of frailty, immobility, acute, and chronic health disability. Falls, in turn, decrease function by causing injury, limitations of movement, fear of falling, and loss of mobility. Falls cause most elderly' injuries; knee, elbow, humerus, and pelvis fractures are typically caused by the combined impact of falls and osteoporosis *(Alexander et al., 1992).*

Globally, falls are the world's second accidental or unintentional injury that produces deaths. An estimated 424,000 people die from falls each year, of which more than 80 percent are in low-and middle-countries. The most significant number of fatal falls was suffered by adults over 65. Every year there are 37.3 million falls, which are severe enough to require medical attention *(WHO, 2016)*.

Falls result from a complex and interactive mix of factors such as biological or medical, behavioral, and environmental. There is an increasing array of international

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evidence of best practices to prevent falls. Interventions and preventive initiatives in developing countries are based mainly on evidence from developed countries. Preventive approaches should concentrate on awareness, training, and the development of a healthy environment, prioritizing fall-related research, and establishing effective policies to reduce risk *(Alexander et al., 1992)*.

The Guidelines of the American Geriatrics Society recommended modification of environmental hazards, training paths, hip protectors, and appropriate use of support tools (sticks, walkers), which can be effective elements of a multifactorial intervention program, balance exercises are also recommended. In conclusion, an initial assessment, supported by a comprehensive cardiovascular and neuro autonomic evaluation, allows for reaching a final diagnosis in most cases, demonstrating a vital role in the real identification of the etiology of the fall and implementing the treatment measures *(Ungar et al., 2013).*

Community health nurses play an integral role in keeping older adults safe. This role includes the assessment of them for fall risk factors, providing information about proper care for the older adult who takes medications, and an adequate diet. Additionally, modifying environmental risk factors, promoting exercise to strengthen their bodies, and considering physical and occupational therapy sessions to assist with gait techniques. It also includes the provision of older adults with assistive devices for transfer and ambulation and initiates geriatric home safety evaluation as needed *(Ackley et al., 2017).*

## 2. Significance of the study

Falls are one of the most common geriatric syndromes that threaten the independence of older adult people. Millions of adults aged 65 and older fall every year. Falls can be devastating due to approximately 95 percent of hip fractures and head injuries resulting in hospitalization that may be at least one year after recovery. In Egypt, there is a gradual increase in the absolute and relative numbers of older people over the last few decades. Older adults constituted 8.9% in 2016 and exceed to constitute 10.9% in 2026. In Egypt, the number of elderly persons reached 5.8 million in 2011 and was estimated at representing 7.3% of the total population. This percentage is expected to increase to 11.6% in 2030 *(Central Agency for Public Mobilization and Statistics (CAPMAS), 2015).*

The estimated prevalence of falls during the past 12 months among elderly in Suez City in Egypt was 60.3% from total number 340 participants *(Kamel et al., 2013)* while the prevalence of falls is high among the elderly 62% from total number 408 elderly persons aged 60 years and older in Sharkia Governorate, Egypt *(Mohammed et al., 2018).* Fall-related injuries are the sixth leading cause of death in older adults. So, the current study provides knowledge regarding fall risk factors, practical skills to fall prevention strategies, and increase older adults' wellbeing thorough evaluation of the effect of a fall prevention program on older adults' knowledge, reported practices, and elder wellbeing regarding falls.

## 3. Aim of the study

This study aimed to evaluate the effect of a fall prevention program on older adults' knowledge, reported practices, and elder wellbeing regarding falls.

### 3.1. Research Hypotheses

- Elderly who exposed to the fall prevention program will exhibit improved knowledge compared to their pre-intervention level.
- Elderly who exposed to the fall prevention program will exhibit improved reported practice compared to their pre-intervention level.
- The elderly who exposed to the fall prevention program will exhibit physical, social, and psychological wellbeing compared to their pre-intervention level.

## 4. Subjects & Methods

### *4.1. Research design*

A quasi-experimental (single group pre/post-test) design will be used to explore the effect of a prevention program on knowledge and reported practices of older adults regarding fall at geriatrics homes. Quasi-experimental research is research that resembles experimental research but is not true experimental research. Although the independent variable is manipulated, participants are not randomly assigned to conditions or orders of conditions *(Cook & Campbell, 1979).*

### *4.2. Research Setting*

The study was conducted in geriatric homes at the North district, Cairo governorate. This district includes seven areas. The district has chosen randomly (Elsahel district). It included four geriatric homes (Elnasr Eleslamia 36 older adults, Saint Helena 28 older adults male and female, Pastor Wahba 18 female older adults and Elnour Elmohamady 15 female older adults) all were chosen. The total number of an older adult was 97 in four previous settings.

### *4.3. Subjects*

A convenient sample included 50 older adults from the previous setting based on the following inclusion criteria: both genders, aged from 60 and above, exposed to falling during the previous six months.

### *4.4. Tools of the study*

Three tools will be used for data collection.

#### 4.4.1. Pre-designed Interviewing Questionnaire

It developed by the researchers based on the recent related literature review, experts' opinion and researcher experience, which includes four parts:

Part I*:* Socio-Demographic characteristics of the older adult client to assess their age, gender, marital status, educational level, and monthly income. It included five closed-end questions.

Part II: Medical history of the elderly client include five closed-ended questions as associated chronic diseases, the medication used, frequency of falling in the past two years, falling place, and previous hospitalization.
Part III: Older adult knowledge questionnaire to assess participant level of knowledge. It adopted from *(Lord et al., 2001; Hammarlund et al., 2016).* It includes five open-ended questions related to meaning of fall, causes, complications, protective measures of falling and safe environment. it was used pre/post program implementation
*Scoring system*

According to the answers obtained from the participant, each correct and complete answer was giving 2 scores, one score was giving for wrong or incomplete answer. The total score for the questionnaire was ten grades (5 questions) (equal 100%). Their knowledge was categorized into; correct knowledge (scored 75% and more), and incorrect knowledge (scored less than75%).
*Part IV*: Older adults reported practices questionnaire to assess fall prevention reported practices. It includes 24 MCQs, distributed as follows: Health maintenance measures (5 MCQs), nutrition (7 MCQs), safe home environment (8 MCQs), and physical activities (4 MCQs). It adopted from *(World Health Organization, 2016).* It was used pre/post-program implementation.
*Scoring system*

Practices scored against three points Likert scale for each response as follows: 2 grades to the practices usually done, 1 grade to practice sometimes done, and 0 grade for practices never done. Total practice score was considered as satisfactory practices if the total scores ≥60% and considered unsatisfactory if the score <60%.

#### 4.4.2. Older Adult Wellbeing Scale

It was adopted from *(Muki et al., 2016)* to assess the physical, social, and psychological wellbeing. it was used pre/post-program implementation.

#### 4.4.2.1. Physical Wellbeing Scale

This part included eight activities such as wearing clothes, going to the bathroom, taking a shower, ability to clean room, ability to handle meals, clean dishes, the ability to go to the market, and the ability to carry heavy things.

Scoring ranged from one to three, entirely dependent scored 1, partially dependent scored 2, and ultimately independent scored 3. The total score for all items related to physical wellbeing scale was 24 and categorized as the followings:
- Dependent for scores ranged from 1 to 8.
- Partially dependent scores ranged from 9 to 16.
- Independent for score ranged from 17 to 24.

#### 4.4.2.2 Social Wellbeing Scale

This part included four activities as social activities, doing hobbies, visiting friends, and participating in community events.

Scoring ranged from one to three, never scored 1, sometimes scored 2, and always scored 3. The total score for all items was 12 and categorized as the followings:
- High social wellbeing scores ranged from 9 to 12.
- Average social wellbeing scores ranged from 5 to 8.
- Low social wellbeing for scores ranged from 1 to 4.

#### 4.4.2.3. Psychological Wellbeing Scale

This part included eight statements, such as feeling worried about falls, feeling scared, loneliness, communication with others, economic status, anxiety, safety, and security.

Scoring ranged from one to three, never scored 1, sometimes scored 2, and always scored 3. The total score for all items related to psychological wellbeing scale was 24 items and categorized as the followings:
- High psychological wellbeing for score ranged from 17 to 24
- The average psychological wellbeing for scores ranged from 9 to 16.
- Low psychological wellbeing for scores ranged from 1 to 8.

#### 4.4.3. Geriatric Home Environmental Assessment Checklist

It adapted from *(Gill et al., 2011).* It included nine parts as lamps and light, electrical cords, outlets, pieces of furniture, appliances, doors, floor surfaces, stairways, bathrooms, and kitchen. It filled by the researchers through observation of geriatric homes during visits. It was used once.

Each item had scored 1 if it is safe, and zero if unsafe. The total score level of all parts nine grades and categorized into two levels as follows:
- The safe environment for scores ranged from 5 to 9.
- Unsafe environment for score ranged from 1 to 4.

### *4.5. Procedures*

Preparation of data collection tools was carried out over one month began from the end of March 2019 to the end of April 2019, after being revised from experts to test their validity.

Content and face validity were performed by three professors of the Community Health Nursing Department of Faculty of Nursing, Ain Shams University, Egypt. They reviewed the tools for content accuracy.

After official permissions to carry out the study, the aim of the study was explained to the directors of geriatric homes, then to elderly clients.

A pilot study was conducted on 10% of the study subjects, (5) older adults to test the feasibility of the research process, and evaluate the clarity and applicability of the study tools and time required for completion of each study tool. Also, the pilot study sample was excluded from the primary study sample.

Fieldwork: The Dean of Faculty of Nursing, Ain Shams University, issued a formal letter directed to the geriatrics home directors in order to obtain the agreement

and cooperation for conduct this study. Official permission was obtained.

Ethical consideration: A clear and straightforward clarification about the aims and nature of the study was explained to all elderly participant clients. Consent was obtained from the chosen patients to ensure the willingness to engage in the study. Patient's participation was voluntary; they can withdraw from the study at any time. The researchers ensured the confidentiality of the participant's data, and the study has not any harmful effect on them.

The application of the prevention program, done by the researchers, lasted for three months from the beginning of August 2019 to the end of October 2019. The average time consumed to fill the interviewing questionnaires was 30 minutes. Then it took 20 minutes to fill the geriatric home environment assessment checklist. The previously mentioned setting was visited by the researchers two days/week (Monday and Tuesday) from 10.00 a.m. to 12.00 moon.

Prevention Program Development Phases:

Phase I: Based on the results obtained from the pilot study, the researchers also designed the program, revised and modified it according to the related recent, national and international literature, and consideration was given to the various aspects of the research problem *(World Health Organization, 2007).*

Phase II included the pre-program assessment that uses the previous interviewing questionnaires for collecting the data from the clients.

Phase III: The prevention program was reviewed by the researchers based on results obtained from the pilot study. It was modified based on related literature and experts' comments to cover elderly client's knowledge and practices toward fall prevention.

The general objectives of the program:

At the end of the health educations program, the elderly at risk for falls become able to have improved knowledge, reported practices, and better wellbeing. The program contents included the following:

*Theoretical part*

- Meaning of fall among older adults.
- The risk factor of fall
- The complication of fall.
- The protective measure of falling.
- Safety environmental issues.

*Practical part*

- Prevention of fall measures
- Safety environment.
- Healthy nutrition.
- Physical exercise.
- Health maintenance measures.
- Physical, social, psychological wellbeing issues.

Program Implementation:

The program was implemented for over six months. The time allowed was 6 hours distributed on six sessions, 2 hours for theory, and 4 hours for practices. The time of every session was ranged from 35 minutes to 45 minutes.

The actual work started by meeting the client in the previously mentioned settings. First, the researcher introduced herself to the participant and gave them a brief idea of the study and its purpose.

At the beginning of the first session, an orientation was done about the program, its purposes. The participant was informed about the time of the program sessions.

Each session began with a summary of what was given through the new one's previous sessions and goals, considering the use of simple and clear language at all levels of the sample being studied.

Teaching methods included discussion, demonstration, re-demonstration, and group discussion. Suitable teaching aids prepared especially for the program were used, such as printed materials, posters, the guiding Arabic booklet, and PowerPoint presentations and videos using a laptop. A booklet was constructed for patients according to their educational level and needs assessment of the patient. It was prepared in simple Arabic language.

Program evaluation:

It was applied for pre/post program through pre and post-test using the same study questionnaires in order to appraise differences, similarities, and areas of improvement, as well as defects. It also estimated the effect of a health education program on clients at risk for falling.

### *4.6. Data analysis*

Data entry was done using Epi -info, version 6.04 laptop software program package, while statistical analysis was done using the statistical package for social sciences (SPSS), version 21.0. Quality control was done at the stages of coding and data entry. Data were presented using descriptive statistics for qualitative factors in the form of frequencies and percentages. Qualitative variables were compared using the Paired t-test, Spearman correlation, and Chi-square test ($x^2$). The significance of the results was considered as not significant, if $P>0.05$; significant, if $P<0.05$; and highly significant, if $P<0.001$.

## 5. Results

Table 1 shows that 62.1 % of older adults aged ≥75years, the mean age of them was 67.23±11.58 years, and 67.2% of them were males, while 93.1% of them were married and 54% of them had basic education, with 74 % of them had not enough monthly income.

Table 2 shows that 30% of the older adults suffered from heart diseases; 30 % of them take analgesics or cardiac medication. 54% of them experienced falling two times during the past two years; out of them, 62% experienced falling at geriatric homes, with 100% of them were hospitalized.

Table 3 shows a significant improvement related to the mean and median of all knowledge elements post-program compared to their pre-intervention level.

Figure 1 shows the total satisfactory mean knowledge between pre and post-program implementation. The mean difference is 41.250, with a highly statistically significant

difference between pre and post prevention program implementation at P <0.001.

Table 4 shows a statistically significant difference in older adults' reported practice regarding the safe home environment and physical activities. There is an improvement if the health maintenance measures and nutrition but did not reach a significant level.

Figure 2 reveals that the total reported practices mean difference between pre and post prevention program implementation is 4.667. With a highly statistically significant difference between pre and post prevention program implementation P <0.001.

Table 5 shows that there was statistically significant improvement related to the physical, social, and psychological wellbeing of older adult pre and post prevention program implementation. At the same time, independence improved from 42% to 52% significantly, and the percent of high social wellbeing also improved significantly from 20% to 44%. Additionally, high psychological well-being from 24% to 40% with P-value < 0.001.

Table 6 shows that 75% of geriatric homes had no safety measures for electrical cords, outlets, and surfaces. All 100% of stairways of geriatric homes were unsafe, 75% of bathrooms were unsafe (wet and slippery). 75 % of geriatric homes' exteriors were unsafe.

Table 7 reveals that there was a statistically significant correlation between the older adult educational level and knowledge. Table 8 reveals that there was a statistically significant correlation between older adults' educational level and their practices.

**Table (1): Frequency and percentage distribution of socio-demographic characteristics of the studied older adults (N=50).**

| Socio-Demographic Characteristics | N | % |
|---|---|---|
| **Age in years** | | |
| 60< 65 | 3 | 5.6 |
| 65< 70 | 7 | 13.7 |
| 70< 75 | 9 | 18.7 |
| ≥ 75 | 31 | 62.1 |
| Mean ±SD | 67.23±11.58 | |
| **Gender** | | |
| Male | 35 | 67.2 |
| Female | 15 | 32.8 |
| **Marital status** | | |
| Married | 46 | 93.1 |
| Not married | 4 | 6.9 |
| **Educational level** | | |
| Cannot read and write | 17 | 34 |
| Basic education | 27 | 54 |
| High education | 6 | 12 |
| **Monthly income** | | |
| Enough | 13 | 26 |
| Not enough | 37 | 74 |

**Table (2): Frequency and percentage distribution of the older adults' health history (N=50).**

| Health history | N | % |
|---|---|---|
| **Associated chronic diseases** | | |
| Hypertension | 7 | 14 |
| D.M | 12 | 24 |
| Renal diseases | 2 | 4 |
| Osteoarthritis | 10 | 20 |
| Heart diseases | 15 | 30 |
| Eye diseases | 4 | 8 |
| **Medication** | | |
| Hypertension Medication | 7 | 14 |
| Antidiabetic Medication | 12 | 24 |
| Cardiac medication | 15 | 30 |
| Analgesics | 16 | 30 |
| **Frequency of falling during the past two years** | | |
| Once | 27 | 34 |
| Two times | 15 | 54 |
| Three times | 8 | 16 |
| **Falling place:** | | |
| Geriatric home | 31 | 62 |
| Street | 19 | 38 |
| **Hospitalization** | 50 | 100 |

**Table (3): Comparison of satisfactory knowledge mean scores of older adults' between pre and post prevention program implementation (N=50).**

| Knowledge related to fall | Knowledge score (max=100) | | | | Mean Difference | Paired t-test | p-value |
|---|---|---|---|---|---|---|---|
| | Pre (n=50) | | Post (n=50) | | | | |
| | Mean ±SD | Median | Mean±SD | Median | | | |
| Meaning of falling | 45.9±15.0 | 40.00 | 79.0±17.5 | 80.00 | 41.500 | 12.248 | <0.001 |
| Causes of falling | 63.1±25.9 | 28.60 | 67.8±16.1 | 71.40 | 42.85 | 15.834 | <0.001 |
| Complication of falling | 37.5±17.1 | 45.50 | 76.8±12.7 | 81.80 | 30.90 | 11.532 | <0.001 |
| The protective measure of falling | 25.0±17.3 | 75.00 | 91.9±13.1 | 100.00 | 28.750 | 7.667 | <0.001 |
| Safety environmental issues | 42.5±30.2 | 33.30 | 76.7±25.3 | 66.70 | 34.167 | 7.050 | <0.001 |

*(*) Statistically significant at p<0.05*

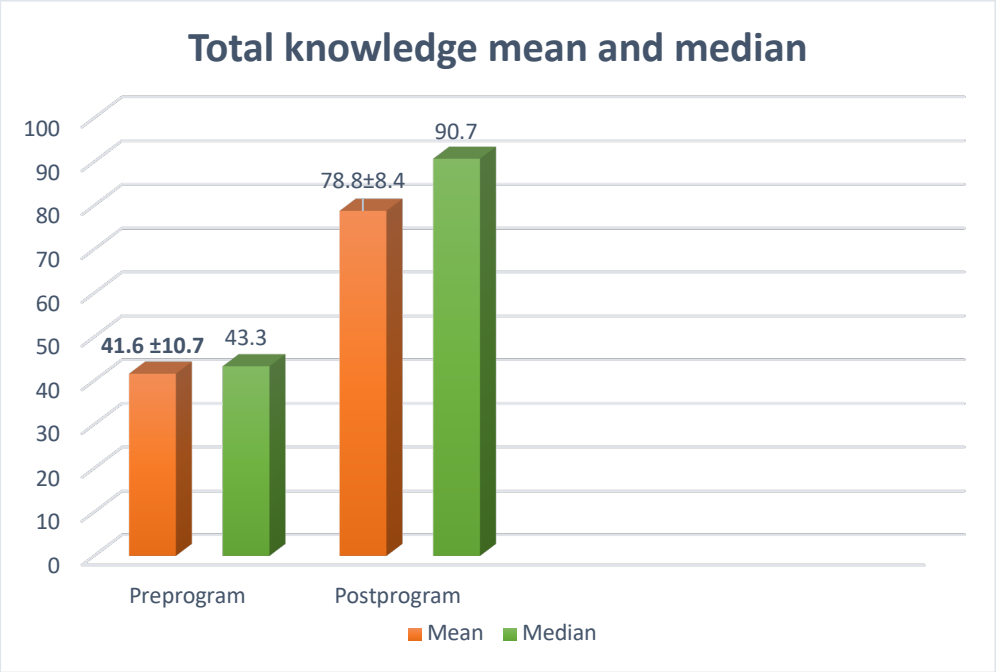


**Figure (1): Total satisfactory older adults' mean and median knowledge pre and post prevention program implementation (Mean difference 41.250, *P*<0.001).**

**Table (4): Comparison of reported practices mean scores of older adults' between pre-post prevention program implementation (N=50).**

| Reported practice related to falling prevention | Practice score (max=100) | | | | Mean Difference | Paired t-test | p-value |
|---|---|---|---|---|---|---|---|
| | Pre (n=50) | | Post (n=50) | | | | |
| | Mean±SD | Median | Mean±SD | Median | | | |
| Health maintenance measures | 78.3±13.8 | 46.00 | 80.1±14.1 | 75.00 | 1.875 | 4.7671 | 0.083 |
| Nutrition | 75.1±14.8 | 66.70 | 79.4±16.4 | 66.70 | 3.333 | 1.778 | 0.073 |
| Safety home environment | 54.4±21.5 | 75.00 | 62.5±17.2 | 66.70 | 7.083 | 3.076 | 0.004 |
| Physical activities | 65.1±8.9 | 62.63 | 69.6±22.4 | 62.50 | 11.250 | 1.778 | <0.001 |

**Statistically significant at p<0.05, Statistically highly significant at p<0.001*

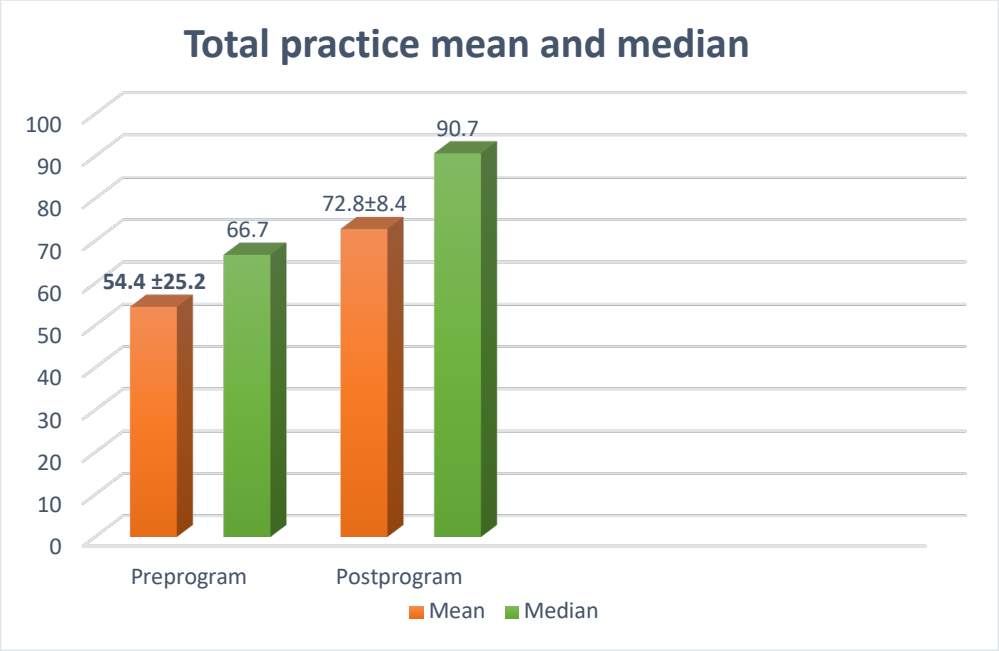


**Figure (2): Total reported practices mean and median score between pre and post prevention program implementation (Mean difference 4.667, *P* <0.001).**

**Table (5): Comparison of total physical, social, and social wellbeing of the older adults between pre and post prevention program implementation (N=50).**

| Wellbeing subscale | Preprogram | | Post-program | | Chi | P-value |
|---|---|---|---|---|---|---|
| | No | % | No | % | | |
| **Physical wellbeing** | | | | | | |
| Independent | 21 | 42 | 26 | 52 | 51.44 | 0.001 |
| Partially dependent | 25 | 50 | 21 | 42 | | |
| Dependent | 4 | 8 | 3 | 6 | | |
| **Social wellbeing** | | | | | | |
| High | 10 | 20 | 22 | 44 | 38.33 | 0.001 |
| Average | 25 | 50 | 18 | 36 | | |
| Low | 15 | 30 | 10 | 20 | | |
| **Psychological wellbeing** | | | | | | |
| High | 12 | 24 | 20 | 40 | 5.783 | 0.05 |
| Average | 17 | 34 | 12 | 24 | | |
| Low | 21 | 42 | 18 | 36 | | |

**Statistically significant at p<0.05, Statistically highly significant at p<0.001*

**Table (6): Distribution of environmental safety at geriatric homes (N=4).**

| variables | Safe | | Un-safe | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Lamps and light | 3 | 75 | 1 | 25 |
| Electrical cords and outlets | 1 | 25 | 3 | 75 |
| Pieces of furniture | 2 | 50 | 2 | 50 |
| Appliances | 2 | 50 | 2 | 50 |
| Door(s) | 2 | 50 | 2 | 50 |
| Floor surfaces | 1 | 25 | 3 | 75 |
| Stairways | 0 | 0 | 4 | 100 |
| Bathroom(s) (wet and slippery) | 1 | 25 | 3 | 75 |
| Kitchen | 2 | 50 | 2 | 50 |
| Geriatric home's exterior | 1 | 25 | 3 | 75 |

**Table (7): Best fitting multiple linear regression model for predictors of older adults' socio-demographic characteristics on their knowledge.**

| Socio-demographic characteristics | Regression coefficient | Standard error | r | t-test | p-value |
|---|---|---|---|---|---|
| Age | -0.123 | 0.048 | | 0.061 | 0.951 |
| Gender | -0.053 | 0.077 | | 0.452 | 0.583 |
| Marital status | 0.045 | 0.069 | 0.038 | 0.550 | 0.643 |
| Educational level | -0.001 | 0.097 | | -0.467 | .004 |
| Monthly income | -0.088 | 0.046 | | -2.341 | 0.761 |

*(*) statistically significant at p<0.05*

**Table (8): Best fitting multiple linear regression model for predictors of older adults' socio-demographic characteristics on their reported practices.**

| Socio-demographic characteristics | Regression coefficient | Standard error | r | t-test | p-value |
|---|---|---|---|---|---|
| Age | -0.045 | .048 | | -0.161 | 0.953 |
| gender | -0.053 | .079 | | 0.462 | 0.983 |
| Marital status | 0.38 | .089 | 0.026 | 0.559 | 0.543 |
| Educational level | -0.001 | .095 | | -0.367 | 0.005 |
| Monthly income | 0.083 | .086 | | -2.041 | 0.761 |

*(*) statistically significant at p<0.05*

## 6. Discussion

Fall and fall-related injuries are major public health problems that call for global consideration, especially with the rapid increase in the number of elderly individuals. In 2010, falls were responsible for approximately 80% of disability stemming from unintentional injuries, excluding traffic accidents, in adults 50 years and over. The current study aimed to evaluate the effect of a fall prevention program on older adults' knowledge, practices, and elder wellbeing regarding fall *(Williams et al., 2015)*

Concerning the socio-demographic characteristics of older adults, the current study revealed that less than two-thirds of them aged ≥75 years, and more than two-thirds of them were males, while the majority of them were married and more than half of them had basic education with around three-fourths of them had not enough a monthly income.

The results of older adults' age agreed with *Li et al., (1993),* who investigated fear of falling and low self-efficacy in Italia and reported that the average age of elderly clients who predisposed to falls was between 60-99 years.

These results incongruent with *Sirohi et al., (2017),* who studied the falls among elderly persons in a rural area of Haryana, and found that more than half of the studied sample were women and half of them were in the age group of 60–69 years, more than third of them were illiterate and were married while more than half of them had no enough income.

Considering the health history of the older adult, the present study revealed that less than a third of older adults suffered from heart diseases while less than third take analgesics and cardiac medication. All the elderly clients experienced falling; out of them, more than half experienced falling two times during the past two years, with less than two-thirds experienced falling at a geriatric home, and all the study sample were hospitalized. From the perspective of researchers, the rationale for an older adult being subjected to falling is the use of different types of medications that affect their balance and unsafety environment, the majority of an older adult suffering from much chronic illnesses such decrease vision acuity and arthritis which mainly affect their physical movement.

The findings of the current study were following *Fathy et al., (2017),* who studied elderly falls prevalence and associated factors in Sohag Governorate, which presents medication use and their relationship with falls among the studied population. As regards medication use, 41.5% of respondents who reported medication use experienced falls in the last year, where 39.1% of them reported that they used sedative and hypnotic drugs, and 14% used antihypertensive drugs.

On the other hand, these results on the opposite of a study by *Hany et al., (2013),* who assessed the risk factors of falls among elderly living in Urban Suez, Egypt and reported that the estimated prevalence of falls during the past 12 months among the study population is 60.3%. One-third of falls (36%) occurred outdoors. As regards for the most common diseases among the elders who reported falls, about one-third of them (30%) have diabetes mellitus, another third (29.7%) have hypertension and (18.5%) have osteoarthritis.

The present study indicated a significant improvement related to the mean and median of all elements of the knowledge. The total knowledge mean difference between pre and post-program implementation shows a highly statistically significant difference between pre and post-program implementation at $P<0.001$.

The previous results came in the same line with *El-Gilany et al. (2019)*, who studied the prevention of recurrent falls in the elderly: A pre-post intervention study

in a rural community, Egypt. The results showed significant improvement in the scores of all elements of the knowledge after the intervention. The median knowledge score increased significantly after intervention. This finding contrasted with *Gamage et al. (2018)*, who studied knowledge and perception of falls among dwelling community elderly in Southern Sri Lanka and found that half of the study sample did not know about falls and related injuries. From the perspective of researchers, the rationale for an older adult lower level of knowledge pre-program implementation is the lack of health education programs subjected to such an age group. This finding is supporting the first research hypothesis.

The current findings revealed that there was statistically significant improvement related to reported practice regarding safe home environment, and physical activities. While the median total practice score increased significantly after intervention from 66.70 up to 90.7, and the total reported practices mean difference between pre and post-program implementation is 4.667 with a highly statistically significant difference between pre and post-program implementation at $P<0.001$.

These results were following *Phelan et al., (2016),* who studied the adoption of evidence-based fall prevention practices in primary care for older adults with a history of falls. As for the performance of fall prevention practices, assessment ranged from 24% (home safety) to 78% (vitamin D). In order of increasing frequency: vitamin D, postural hypotension, lower extremity strength, feet/footwear, and vision. Medications and home safety – were addressed less frequently. This finding is supporting the second research hypothesis.

The current study revealed that there was statistically significant improvement related to the physical, social, and psychological wellbeing of older adults pre and post-program implementation. The percent of independent elderly increased significantly from 42% to 52%, and the percent of high social wellbeing also increased significantly from 20% to 44% with $p<0.001$. Also, the high psychological wellbeing improved from 24% to 40% with *P*-value 0.05. From the perspective of researchers presenting physical exercises for improving the older adults, muscle tone and strength helped them to become more dependent.

The previous findings came in the same line with *El-Gilany et al., (2019),* who revealed that the percent of independent elderly as measured by the activity of daily living increased significantly at two months after intervention (3.2% vs. 14.3%; and 3.2% vs. 12.7%; respectively). However, this improvement did not persist for four months post-intervention. The score showed a significant increase at both 2- and 4-months post-intervention.

These findings are disagreed with *Mohamed (2014),* who carried out a study about activities of daily living in elderly in Egypt and found that about two-thirds of the studied group required assistance in completing their daily living activities. From the perspective of researchers presenting physical exercises for improving the older adults, muscle tone and strength helped them to become more dependent. This finding is supporting the third research hypothesis.

Regarding the safety of the geriatric home environment, the present study reported that three-quarters of geriatric homes had not safety measures for electrical cords and outlets. All of the stairways of geriatric homes were unsafe. Three-quarters of bathrooms were wet and slippery. Three-quarters of geriatric homes' exteriors were unsafe. These findings were on the same line with *Abd-Aziz (2014),* in a study about self-management educational program for improving quality of health for older adults. The study found that three-quarters of geriatric homes were unsafe in lamps and light inside the home in Egypt.

These results were not congruent with the results of *Gillespie et al., (2014),* who designed interventions for preventing falls in older people living in the community in U.S.A who reported that half of the selected geriatric homes had safe appliances and doors, and the other half of selected geriatric homes had no safe homes' exteriors.

The current study was on the same line as a study conducted by *Sherbrown et al. (1996),* who investigated the characteristics and balance in older women in Australia. The results asserted that three-quarters of geriatric homes had suitable kitchens; three-quarters of geriatric homes had clean and safe bathrooms. These differences may be related to the differences between infrastructures of geriatric homes in Australia and the current study setting, the economic status of the countries is a crucial issue to the design of safety and healthy geriatric homes. Also, the awareness level of communities regarding geriatric home health and safety rules is affecting on geriatric home design and infrastructure.

Related to the correlation between pre-posttest improvements of older adults' knowledge and practices, mean scores and their characteristics reveal that there was a statistically significant correlation between the educational level of them and their knowledge and practices ($p<0.05$). The current study findings in contrast with *Sirohi, (2017),* who studied the association of falls with socio-demographic variables and selected chronic conditions by univariate analysis, and found that higher age, female gender, being a widow/widower, illiteracy, and low socioeconomic status were associated with falls. Use of more than one medication and tobacco use were also found to be associated with falls ($P<0.001$, OR = 2.3 [1.6–3.5]) and ($P = 0.004$, OR = 1.8 [1.2–2.6]), respectively.

## 7. Conclusions

Based on the current study results, it was concluded that there was a highly statistically significant improvement between older adult knowledge pre and post-program implementation at $P<0.001$. There was a highly statistically significant difference between total older adult reported practices pre and post-program implementation at $P<0.001$. There was statistically significant improvement related to the physical, social, and psychological wellbeing of older adult pre and post-program implementation, so the research

hypotheses are supported. There was a statistically significant correlation between the older adult educational level and their knowledge and practices ($p<0.05$).

## 8. Recommendations

- Prevention programs for fall prevention should be applied in all geriatric homes.
- Guiding instructions through mass media should be directed to prevent, and control falls among older adults.
- Fall prevention strategies should be comprehensive and multifaceted-geriatric care services, including promotive, preventive, and curative care.
- Periodical checkup of older adult health status to ensure vision acuity, management of chronic illness, which increased risk of falls.
- Ensure of safety geriatric home environment by geriatric home administrations such as presence of adequate lightning, dry floor surfaces, presence of handrails in the bathroom through educated worker in all geriatric homes.
- Improve older adult independence through physical activity and daily exercise under the supervision of nurses and doctors.
- Ensure a healthy diet which included in diet schedule under the supervision of a nutritionist to improve their physical wellbeing

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