Effect of Educational Health Program on Prevention of Falling among Older Adults at Geriatric Homes

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ABSTRACT

- **Back ground:** Falls are a major public health problem among older adults and the leading cause of fatal and nonfatal injuries among them. **The aim of this study** was to evaluate the effect of educational health program on prevention of falling among older adults. **Research design:** A quasi-experimental design was used in this study. **Setting:** The study was conducted at Geriatric Homes, Benha Geriatic Home in Benha City and Abo Negada Geriatic Home in Ismalia City.**The sample**:A purposive sample was used in this study, the total number of older adults in the above mentioned setting were 40 older adults; 24 from Benha City and 16 from Ismalia City. **Tools:** Three tools were utilized in this study comprised 1- A structured interviewing questionnaire for; the socio-demographic characteristics, the past medical history, falls risk factors assessment of older adults, and for the assessment of knowledge of the older adults, 2- The Falls Efficacy Scale International (FESI) to assess older adults fear of falling 3- An observation checklist was used to A) assess practices of the older adults physical activities B) Assess geriatric safety homes environments. **Results** of this study showed; 32.5% of the older adults aged from 65 to less than 70 years old. 55 % of them were female, 45% had secondary education, and 82.5% of them were widow. As regard total knowledge of older adults regarding falls; before the program; 40 % of them had good total knowledge scores, while after the program increased to 70 % of them. Concerning to total falls efficacy scale-international; 55% of older adults were very concerned. **This study concluded that**: Educational health program has showed a highly statistically significant effect on knowledge and practices of the older adults post program and improving their knowledge and practices regarding falling prevention. **The study recommended that:** Well-designed educational health program are needed in Geriatric Homes to prevent falling include intrinsic & extrinsic risk factors and further research is needed for the prevention of falls in older adults.

Key words: Older adults*,* falls prevention, and health education program.

Introduction

Older adults are among the fastest increasing age groups; older adults are defined as any age after 60 or 65 years and constitute a vulnerable group that needs special care. Globally, the number of older adults (aged 60 years or over) is expected to more than double, from 841 million people in 2013 to more than 2 billion in 2050*(World Population Ageing, 2013)*.

A fall can be defined as a sudden, unintentional change in position causing older adults to land at a lower level, on object, the floor, or the ground, other than as a consequence of sudden onset of paralysis, epileptic seizure, or overwhelming external force. Falls are a serious threat to the lives, health, and independence of older adults. Falls are caused by complex interactions among multiple risk factors, which are characterized as intrinsic (patient related) or extrinsic (external to the patient).Between 30% and 40% of older adults fall at least once / year. Falls were leading cause of fatal and nonfatal injuries among older adults, death rate due to falls is 10 / 100 000 persons for those aged 65 to 74 years and 147 / 100 000 persons for those aged 85 years or older *(Al-Faisal, 2006; Michael, 2010)*.

Falls are the public health epidemic of this decade; falls are the leading cause of traumatic brain injury and fractures in older adults. For individuals aged 65 and older, falls outpace motor vehicle accidents as the leading cause of unintentional death by several thousands. Falls are the leading cause of emergency department visits by older adults, and hospital admissions due to trauma. Falls also threaten the independence of older adults as institutionalization rates increase among those who have had multiple falls, also lead to psychological disturbances such as social withdrawal, increased anxiety, and fear of falling *(Tiffany & Shubert, 2011; Jennifer et al., 2012)*.

Older adults have the highest risk of death or serious injury arising from a fall and the risk increases with age. In the United States of America, 20–30% of older adults who fall suffer moderate to severe injuries such as bruises, hip fractures, or head traumas. This risk level may be in part due to physical, sensory, and cognitive changes associated with ageing, in combination with environments that are not adapted for an aging population *(World Health Organization (WHO), 2012).*

The term falls prevention refers to the optimal management of falling risk to prevent the falls. It is estimated that the maximum reduction in fall rates due to an intervention is between 30% and 40%.Health education about risk factor of falling, exercise and physical activity, medical assessment and management, medication adjustment, environmental modification and education about vitamin D supplementary have the strongest benefit for preventing falls among older adults. A certain number of older adults will still fall, regardless of interventions, but every effort must be taken to minimize risk *(Campbell & Robertson, 2007; Tinetti& Kumar, 2010).*

Significant of the study

According to Centers for Disease Control and Prevention *(CDC, 2015):* each year, millions of older people—those 65 Over 700,000 patients a year are hospitalized because of a fall injury, most often because of a head injury or hip fracture and older—fall. In fact, one out of three older people falls each year, also 2.5 million older people are treated in emergency departments for fall injuries, and Over 700,000 patients a year are hospitalized because of a fall injury, most often because of a head injury or hip fracture, each year at least 250,000 older people are hospitalized for hip fractures.

Globally, falls are a major public health problem. An estimated 424 000 fatal falls occur each year, making it the second leading cause of unintentional injury

death, after road traffic injuries. Over 80% of fall-related fatalities occur in low- and middle-income countries, death rates are highest among adults over the age of 60 years. Though not fatal, approximately 37.3 million falls are severe enough to require medical attention occur each year, such falls are responsible for over 17 million DALYs (disability-adjusted life years) lost. The largest morbidity occurs in older adults 65 years or older. Age is one of the key risk factors for falls. In Egypt, there is gradual increase in the absolute and relative numbers of older people over the last few decades. The last country profile of Egypt shows that the percentage of older adults (more than 65 years) is 3.7 % of the total population in 2009*(Kamel et al., 2013)*.

Community Health Nurses play an important role regarding reducing of falls among older adults through identifying the hazards of falls at geriatric home, and the way to minimize, also guiding older adults about factors that contribute to falls, consequence of falls, and the way to prevent falls so this program is very important .

Aim of the Study:

This study aimed to evaluate the effect of educational health program on prevention of falling among older adults through:-1-Assessing the older adults' knowledge, fear of falling and practices physical activities needs towards prevention of falling, 2- Assessing risk factor of falling among older adults, 3-Assessing safety environment at Geriatric homes,4-Developing and implementing an educational health program based on the previously detected needs of older adults, and 5-Evaluating the degree of improvement as an impact of the exposure to the educational health program.

Research hypothesis

To fulfill the aim of this study the following research hypothesis formulated:

Older adults who received the educational health program would have improved knowledge and practices related to risk factors to prevent them from falling.

Subjects and Methods

Study design and setting

A quasi experimental design was utilized to carry out this study, with pre-post assessment to evaluate the effect of the educational health program. This study was conducted at Geriatric Homes, Benha Geriatic Home in Benha City and Abo Negada Geriatic Home in Ismalia City.

Sampling

A purposive sample used in this study, the total number of older adults in the above mentioned setting were 44 older adults; 26 from Benha Geriatic Home in Benha City and 18from Abo Negada Geriatic Home in Ismalia City.4 older adults were excluded for pilot study. All older adults were taken according to certain criteria their age above 60 years and independents.

Tools of data collection:

1) A structured interviewing questionnaire: It consisted of the following four parts: **Part one:** Socio-demographic characteristics of the older adults included five items as age, gender, residence, education, and marital status. **Part two:** Concerned with the past medical history of older adults. **Part three** included the falls risk factors of older adults as history of falling, medication, vision, and nutrition. **Part four:** Assessed the knowledge of older adults about falling, which included 28 items about meaning of falling, causes of falls, and preventive measures of falling. **Scoring system;** for each question was given as follows: 3 if good knowledge, 2 if average knowledge, and 1if poor knowledge.The total knowledge scores were considered good if the score of the

total knowledge ≥ 75 % (≥ 21), considered average if it is equals 50- < 75% (14- < 21), and considered poor if it is less than 50% (< 14).

 2)The Falls Efficacy Scale International (FESI) adopted from **(Yardley et al., 2005)**,through asking questions; it included fifteen items used to assess older adults' fear of falling e.g. cleaning the room, getting dressed or undressed, preparing simple meals, taking a bath or shower, going to the shop, getting in or out a chair, going up or down stairs, etc. Scoring system for each item was given as follows: 4 if very concerned, 3 if fairly concerned, 2 if somewhat concerned, and 1 if not at all concerned. The total scores of scale were considered very concerned if equal 60, considered fairly concerned if equal 45, considered somewhat concerned if equal 30, and considered not at all concerned if equal 15.

3) An Observation Checklist: It was concerned with **two parts. Part one** designed to assess practices of the older adults' physical exercises; it included nine physical exercises, which included 49 items about modified mountain pose, heel raise, stand on one foot, side leg raise, back leg raise ,sit to stand, heel-toe pose, backwards steps, and shift forward and back. **Scoring system**; the total practices were considered satisfactory if the score of the total practices equals ≥ 65 % (≥ 23), and considered unsatisfactory if it is < 65% (< 32).**Part two** to assess Geriatric safety homes environments. **Scoring system;** each item was assigned a score of 1 if present and 2 if absent.

Validity test

The tools were revised for content validity by 3 juries who were experts in the Community Health Nursing Specialties, for clarity, relevance, comprehensiveness, and applicability. According to their suggestions, the modifications were applied.

Reliability test

Reliability of the tools was applied by the researcher for testing the internal consistency of the tool, by administration of the same tools to the same subjects under similar condition on one or more occasion. Answers from repeated testing were compared (test- re –test reliability).

Operational Design:

Preparatory phase

Preparation of study design and data collection tools based on reviewing current, past, local, and international related literature about various aspects of falling among older adults by using journals, periodicals books and internet search to construct the tools and prepare the health educational program.

Ethical considerations

Personal communication was done with older adults to explain the purpose of the study, assure their best possible cooperation and ensuring confidentiality of the data. The researchers emphasized to older adults that the study was voluntary and anonymous. Older adults had the full right to refuse to participate in the study or to withdraw at any time without giving any reason.

Administrative design

Official permission was obtained by submission of an official letter from the Faculties of Nursing to the responsible authorities of the study settings to obtain the permission for data collection.

Pilot study

After the development of the tools, a pilot study was carried out on 10% of the sample (4 older adults) to ascertain the clarity, applicability, feasibility of the tool, to estimate the exact time needed to fill in the questionnaire, and to

detect any problems that might face the researcher and interfere with data collection. After conducting the pilot study, minor necessary changes were done, the tool was then finalized. The pilot sample was not included in the main study sample.

Field work

• Preparation of data collection tools was carried out over a period of six months from the beginning of May 2015 to end of October 2015, including experts' opinions, validity, and reliability test.

• Official permissions were obtained from the deans of the faculties (Benha and El -Isamailia Faculties of Nursing), also from administrators of the Geriatric home.

• A pilot study was carried out to test clarity and simplicity of questions.

Program construction:

The current study was carried out on four phases, preparatory phase, development phase, implementation phase and evaluation phase.

1. Program assessment phase: The program was designed after extensive review of related literature, by the researchers. Based on results obtained from pre-assessment tools, it was revised and modified.

2. Program development phase: The program was developed based on the actual results that were obtained from pre-program assessment using the interviewing questionnaire, practices and observation checklist as well as, literature review which aimed to enhance the older adults' knowledge, and practices regarding prevention of falling.

An objective of the program was to improve knowledge and practices related to risk factors of older adults' to prevent them from falling.

Contents of program: The content of the program was designed to meet older adults' needs and to fit into their interest and level of understanding. Its contents were:

- Meaning of falling.
- Causes of falling included intrinsic and extrinsic risk factors:

a- Intrinsic risk factors as medical history of some diseases e.g., urinary incontinence, osteoporosis, fracture, arthritis, anemia, vitamin D deficiency diabetes mellitus, hypertension, stroke, cataract, cardiovascular diseases, gastrointestinal tract diseases, and chest diseases. Taking some medications as; antihypertensive drugs, sedatives, cardiovascular medications …etc.

b- Extrinsic risk factors as poor lighting, stairs with inadequate handrails, rugs/floor surfaces with low friction, lack of equipment/aids such as walking sticks or walking frames ….etc.

- Preventive measures of falling.

3. Program implementation phase: The program was implemented in a period of six months, from the beginning of May 2015 to the end of October 2015.Implementation of the program was carried out at the Geriatric Homes of Benha City and Ismaalia City. The subject material used has been sequenced through the 5 sessions (2 sessions for theory and 3 sessions for practices). The duration of each session ranged from 30 to 45 minutes including times for discussion according to older adults' achievement, progress and feedback. The sessions contained knowledge about falling as meaning, causes, intrinsic and extrinsic risk factors preventive measures, and three practical sessions for physical activities to prevent risk of falling.

Older adults were divided into small groups; each group included about 6 or 5older adults. The five sessions were implemented for each group separately for 2 weeks (2 days/week), in addition to one week for pre and posttest. Sometimes the researcher worked with two groups in the same day. At the beginning of the first session, an orientation to the program and its purpose took place. After each session, a feedback about the previous session was done as well as the objectives of the new topics were mentioned. Methods of teaching included lectures, group discussions, demonstrations, re-demonstration and role play. An instructional media was used including an illustrated booklet and brochure.

4. Program evaluation phase: After the implementation of the program, the post-test was done to the older adults to assess knowledge, and practice physical exercises by the same format of the pre-test to evaluate the effectiveness of the implemented program. This was done immediately after the intervention of program implementation.

Statistical Design

The collected data were verified prior to computerized entry; statistical analysis was done by using the Statistical Package for Social Science (SPSS) version 20. Data were presented in tables by using mean, standard deviation, number, percentage distribution, and Chi- Square. Statistical significance was considered at:

P- Value > 0.05 insignificant

P- Value < 0.05 significant

P- Value < 0.001 highly significant.

Results

Table (1) Shows that, 32.5% of the older adults aged from 65 to < 70 years old. Regarding to gender 55 % of them was female, 60% live in separate room, 45% had secondary education, and 82.5% of them were widow.

Table (2) Elaborated that all older adults had past medical history, 70 % of them had arthritis, and osteoporosis, 80% of them had hypertension, while 47.5% of them had diabetes mellitus.

Table (3) Shows that the risk factor of falls among the older adults, around 45% of them had risk factor due to previous falling at last 12 month, and 80% of them due to taking medication as antihypertensive drugs, 50% taking diuretic medication, 25% of older adult liable to falling due to difficulty seeing across the room with or without glasses. 30.0% liable to falling due to vitamin D deficiency while 75% of them due to calcium deficiency.

Table (4) Explains that; the older adults' knowledge about falling (meaning, causes, and preventive measures of falling) improved significantly after the implementation of the program (P < 0.001).

Figure (1) Illustrates that, before the program implementation; 40 % of the older adults had good total knowledge scores regarding falling, while after the program implementation; total knowledge scores increased to70 %.

Table (5) Explains that; total practices of the older adults' physical exercises (modified mountain pose ,heel raise, stand on one foot, side leg raise ,back leg raise ,sit to stand, heel-toe pose, backwards steps, and shift forward and back)improved significantly after the implementation of the program (P < 0.001).

Figure (2) Illustrates that, the total scores of older adults' practices was satisfactory for30%of them before the program implementation and increased to 80%after the program implementation

Table (6) Shows that; the highly percentage of older adults was 55% related to total falls efficacy scale-international. As regards taking a bath or shower and walking up or down a slope, very concerned was 55%. Also, 45% of older adults were cleaning the room fairly concerned. As regards going up or down stairs 42% of older adults were somewhat concerned. Meanwhile 37% of subjects were not at all concerned related to going to the shop and walking on an uneven surface.

Table (7) Shows that; 100% of geriatric safety homes environment had lamp, extension & telephone cords are located outside of walking path, flooring is free from rips &holes, older adults uses furniture for support while ambulating, lighting is adequate, older adults easily opens/closes at least one window & all blinds or shades, floors & tabletops are free of clutter.

Table (8) Shows that; there were high statistically significant differences between the older adults' total knowledge scores and their gender, residence, and educational levels (P < 0.001).

Table (9) Shows that; there were high statistically significant differences between the older adults' total practices scores and their age, gender, residence, educational levels, and their marital status (P < 0.001).

Table (1): Distribution of older adults according to their socio-demographic characteristics (n= 40).

Socio-demographic characteristics	No.	%
Age / years		
< 65	9	22.5
65-	13	32.5
70-	10	25.0
≥ 75	8	20.0
X±SD = 66.80 ± 5.09 **Range =**22.00		
Gender		
Male	18	45.0
Female	22	55.0
Residence		
Separate	24	60.0
Conjoint	10	25.0
Triple	6	15.0
Education		
Illiterate	11	27.5
Basic education	14	10.0
Secondary education	18	45.0
High education	7	17.0
Marital status		
Single	2	5.0
Married	3	7.5
Divorced	2	5.0
Widow	33	82.5

Table (2): Distribution of older adults according to their past medical history (n= 40).

Past history	No.	%

Urinary incontinence	10	25.0
Osteoporosis	28	70.0
Fracture	2	5.0
Arthritis	28	70.0
Anemia	7	17.0
Diabetes mellitus	19	47.5
Hypertension	32	80.0
Stroke	1	2.5
Cataract	10	25.0
Cardiovascular diseases	19	47.5
Gastrointestinal tract diseases	22	55.0
Chest diseases	13	32.0

N.B.: Answers were not mutually exclusive.

Table (3): Distribution of older adults according to their falls risk factors (n= 40).

Falls Risk Factors	No.	%

| 1-Falls history:		
- Fear of falling due to previous falling the last 12 months	18	45.0
- Loss confidence and balanced since have fallen	16	40.0
2- Medication:		
- **Taken 4 or more medications**	22	55.0
- **Taken any of the following medication:**		
• Sleeping pills	3	32.3
• Antihypertensive drugs	32	80.0
• Diuretics	20	50.0
• Anesthetics	1	2.5
• Antihistamine	16	40.0
• Cathartics	18	45.0
• Anti-seizure	1	2.5
• Hypoglycemic	13	32.5
• Psychotropic	3	7.5
• Sedative/ hypnotics	10	25.0
3- Vision:		
- Difficulty seeing across the room without glasses	10	25.0
- Recently started wearing bifocals (last three months)	7	17.5
4- Nutrition:		
- Vitamin D deficiency	22	55.0
- Calcium deficiency	23	57.5

N.B.: Answers were not mutually exclusive.

Table (4): Percentage distribution of the older adults' knowledge about falling before& after the program implementation (n=40).

Knowledge	Before- program (%)			After- program (%)			X^2	P-value
	Good	Average	Poor	Good	Average	Poor		
Meaning of falling	25.0	0.0	75.0	80.0	0.0	20.0	24.2	< 0.001
Causes of falling	12.5	25.0	52.5	50.0	32.5	17.5	19.5	< 0.001
Preventive measures of falling	27.5	17.5	55.0	55.0	20.0	25.0	20.7	<0.001

** Highly statistically significant difference (P <0.001).

Figure (1): Percentage distribution for total knowledge scores regarding falling among the older adults before& after the program implementation (n=40).
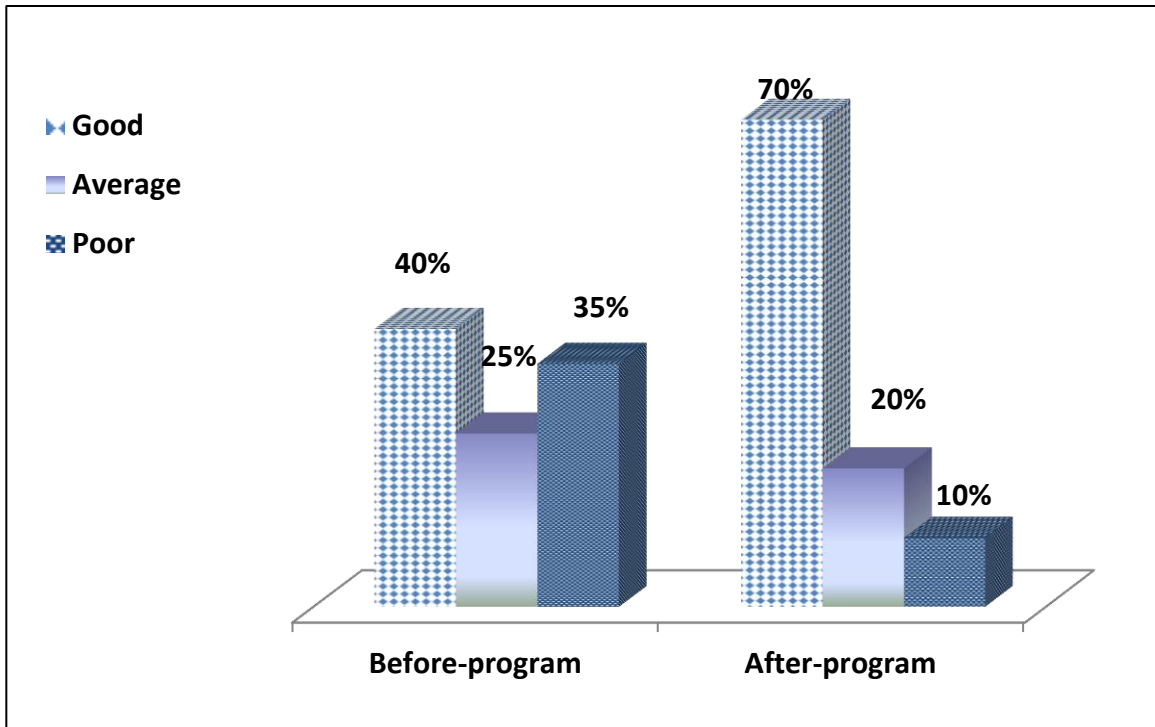
Table (5): Percentage distribution of older adults' physical exercises before& after the program implementation (n=40).

Physical exercises	Before- program (%)	After- program (%)	X^2	P-value

	Done completely (%)	Done incompletely (%)	Done completely (%)	Done incompletely (%)		
Modified mountain pose	55.0	45.0	87.5	12.5	10.9	<0.001**
Heel raise	42.5	57.5	60.0	40.0	10.2	<0.001**
Stand on one foot	37.5	62.5	72.5	27.5	15.0	<0.001**
Side leg raise	62.5	37.5	85.0	15.0	14.4	<0.001**
Back leg raise	55.0	45.0	82.5	17.5	16.8	<0.001**
Sit to stand	25.0	75.0	70.0	30.0	16.2	<0.001**
Heel-toe pose	30.0	70.0	57.5	42.5	14.5	<0.001**
Backwards steps	72.5	27.5	67.5	32.5	12.8	<0.001**
Shift forward and back	25.0	75.0	55.0	45.0	14.3	<0.001**

** Highly statistically significant difference (P <0.001).

Figure (2): Percentage distribution for total scores of older adults' practices before& after the program implementation (n=40).
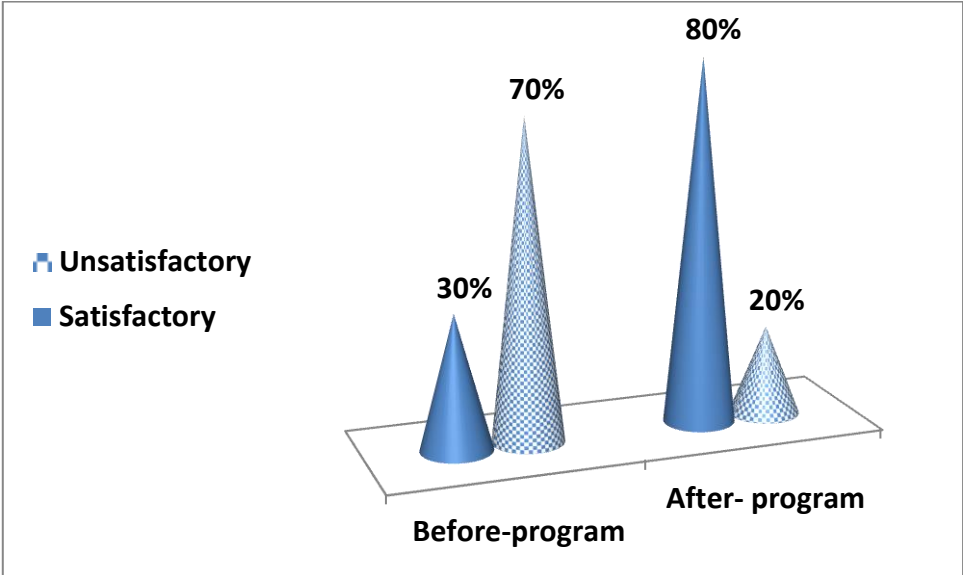
Table (6): Percentage distribution of the older adults' according to falls efficacy scale-international. (n=40).

Falls Efficacy Scale	Not at all concerned (%)	Somewhat concerned (%)	Fairly concerned (%)	Very concerned (%)
Cleaning the room (e.g. sweep, vacuum, dust)	22.5	17.5	45.0	15.0
Getting dressed or undressed	5.0	20.0	25.0	50.0
Preparing simple meals	30.0	20.5	32.5	17.0
Taking a bath or shower	7.5	17.5	20.0	55.0
Going to the shop	37.5	25.0	20.0	17.0
Getting in or out of a chair	10.0	22.5	27.5	40.0
Going up or down stairs	7.5	42.5	25.0	25.0
Walking around in the neighborhood	17.5	30.0	30.0	22.5
Reaching for something above your head or on the ground	12.5	17.5	25.0	45.0
Going to answer the telephone before it stops ringing	17.5	22.5	25.5	22.5
Walking on a slippery surface (e.g. wet or icy)	30.0	32.5	17.0	20.0
Visiting a friend or relative	10.0	27.5	22.5	40.0
Walking in a place with crowds	27.5	22.5	17.0	32.5
Walking on an uneven surface (e.g. rocky ground, poorly maintained pavement)	37.5	25.0	20.5	17.0
Walking up or down a slope	7.5	17.0	20.5	55.0
Total	12.5	17.5	25.0	55.0

Table (7): Percentage distribution of the geriatrics safety homes environmental conditions (n=2).

Geriatric safety homes environment	Present	
	No.	%
Easily moves in/out & through room without bumping/tripping into anything.	1	50.0
Lamp, extension & telephone cords are located outside of walking path.	2	100.0
Flooring is free from rips & holes.	2	100.0
Older adults use furniture for support while ambulating.	2	100.0
Table tops & floor are free of excessive clutter.	1	50.0
Lighting is adequate.	2	100.0
The older adult easily opens/closes at least one window & all blinds or shades.	2	100.0
Mattress is supportive & does not sag when sat on.	1	50.0
Bedside commode available if nighttime trips to bathroom are difficult.	1	50.0
Floors & tabletops are free of clutter.	2	100.0
Closet clothing is accessible without client standing on tiptoes or chair.	2	100.0
Pathway to bathroom is lit at night (by nightlights, flashlight or light left on).	2	100.0
Older adults can easily get on & off the toilet.	2	100.0
Faucets are easy-to-use.	1	50.0

Non-skid safety treads or mats on bottom of bathtub.	1	50.0

Table (8): Relations between the older adults' total knowledge scores& their socio-demographic characteristics (n=40).

Socio-demographic Characteristics	Total knowledge						Chi –Square	
	Before- program (%)			After- program (%)			X^2	P-value
	Good	Average	Poor	Good	Average	Poor		
Age / years								
< 65	22.2	44.4	33.4	55.5	33.4	11.1		
65-	30.8	38.4	30.8	38.5	46.	15.4	34.57	> 0.05
70-	30.0	20.0	50.0	40.0	40.0	20.0		
≥ 75	12.5	12.5	75.0	37.5	50.0	12.5		
Gender								
Male	27.8	11.1	61.1	55.6	22.2	22.2	18.55	< 0.001**
Female	18.2	27.3	54.5	50.0	40.9	9.1		
Residence								
Separate	45.8	29.2	25.0	66.7	33.3	0.0		
Conjoint	40.0	30.0	30.0	60.0	40.0	0.0	44.57	< 0.001**
Triple	33.3	16.7	50.0	66.6	16.7	16.7		
Educational levels								
Illiterate	18.2	18.2	63.6	36.4	45.4	18.2		
Basic Education	25.0	25.0	50.0	50.0	50.0	0.0	31.07	< 0.001**
Secondary Education	33.3	27.0	38.9	50.0	33.3	11.7		
High Education	42.9	42.8	14.2	71.4	28.6	0.0		
Marital status								
Single	50.0	50.0	0.0	100.0	0.0	0.0		
Married	66.6	33.4	0.0	100.0	0.0	0.0	3.63	> 0.05
Divorced	50.0	50.0	0.0	100.0	0.0	0.0		
Widower	30.3	33.3	36.4	48.5	39.4	12.1		

Table (9): Relations between the older adults' total practices scores & their socio-demographic characteristics (n=40).

Socio-Demographic characteristics	Total practices				Chi –Square	
	Before- program (%)		After- program (%)		X^2	P-value
	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory		
Age / years						
< 65	55.5	44.5	77.8	22.8		
65-	46.2	53.8	69.2	30.8	22.85	< 0.001**
70-	30.0	70.0	50.0	50.0		
≥ 75	37.5	62.5	50.0	50.0		
Gender						
Male	33.4	66.7	55.5	44.5	24.73	< 0.001**
Female	36.7	63.3	45.5	54.5		
Residence						
Separate	54.2	45.8	75.0	25.0	32.38	< 0.001**
Conjoint	30.0	70.0	80.0	20.0		
Triple	33.4	66.6	66.6	33.4		
Educational levels						
Illiterate	36.4	63.6	81.8	18.2		
Basic Education	50.0	50.0	75.0	25.0	26.93	< 0.001**
Secondary Education	61.1	38.9	83.3	16.7		
High Education	71.4	28.6	100.0	0.0		
Marital status						
Single	50.0	50.0	100.0	0.0		
Married	66.7	33.3	100.0	0.0	10.56	< 0.001**
Divorced	50.0	50.0	100.0	0.0		
Widower	45.5	54.5	60.6	39.4		

Discussion

Falls are a serious threat to the lives, health, and older adults, falls are a threat to the health of older adults and can reduce ability to remain independent. Falls are caused by complex interactions among multiple risk factors, which are characterized as intrinsic (older adults related) or extrinsic (external to the older adults). Understanding the risk factors is the first step to reducing older adult falls and effective interventions can prevent older adult falling*(CDC,2008;Michael, 2010).*

Concerning the socio-demographic characteristics of older adults, the study finding in *Table (1)* revealed that about more than half of them were females, this finding is congruent *Masbah (2007),* who found that more than two thirds of the studied subjects were females. This could be attributed to the females have more live than men. Regarding the studied subjects' educational level less than half of the older adults had secondary education ,this finding is disagree with *Ebrahem (2013),*who found that more than half of older adults were illiterate. These differences may be due to the difference of the setting of the study, where the study was conducted in Out Patient Clinic. Regarding the marital status, it was found that the majority of the studied subjects were widowed. This finding goes with the same line with *Ahmed (2009)*, who found that more than three quarters of study subjects were widowed. While this result is in contrast with *Taha and Ali (2011)*, who clarified in the study the majority of the study subjects were married.

As regards to past medical history of older adults, finding in **Table (2)** showed that about the majority of the study subjects had hypertension, less than three quarters had arthritis, and osteoporosis. These findings are in agreement with **Eliopoulos (2010)**, who mentioned that more than one third of the older adults have hypertension, arthritis, and osteoporosis. This finding also supported by **Nies& McEwen (2011),** who stated that many of the physiological changes that occur with aging as well as a variety of chronic diseases can affect balanced and make falls. This is could be attributed to the multi disease associated with aging process.

Regarding risk factors of falls, findings in **Table, (3)** showed that about less than half of the studied subjects had fear from previous falling, these findings was supported by **WHO (2007)**, who stated that fear of falling is frequently reported by older adults, fear can lead to a decline in overall quality of life and increase the risk of falls through a reduction in the activities needed to maintain self-esteem, confidence, strength and balance. In addition, fear can lead to maladaptive changes in balance control that may increase the risk of falling. Older adults who are fearful of falling also tend to lack confidence in their ability to prevent or manage falls, which increases the risk of falling again.

Also, the findings in **Table, (3)** elaborated that the majority of the older adults had risk factors of falls due to take medication, this finding agree with **Nies& McEwen (2011),** who stated that medication such as anti-hypertensive drugs, diuretics and tranquilizers may increase risk of falling among older adults. The finding of the current study also revealed that more than half of study sample had risk factors of falls due to vitamin D and calcium deficiency, this finding is in agreement with **WHO (2007),** who stated that older adults with low dietary intake of calcium and vitamin D may be at risk for falls and therefore fractures resulting from them, dietary calcium and vitamin D intake improves bone mass among persons with low bone density and that it reduces the risk of osteoporosis and falling.

Concerning research hypothesis; the educational health program will improve knowledge and practices related to intrinsic and extrinsic risk factors of older adults to prevent them from falling(tables 4-7, Fig., 1&2). Concerning the older adults' knowledge about falling, findings in *Table, (4*) and **figure (1)** showed that knowledge about falling was improved significantly after implementation of the program (P < 0.001). *Jennifer (2012)* stated that education program for older adults can minimize the risk for falls by using specific assessment and prevention strategies, and *WHO, (2012)* recommended that effective fall prevention programmes aim to reduce the number of people who fall, the rate of falls and the severity of injury should a fall occur. For older adults, fall prevention programmes can include a number of components to identify and modify risk factors.

The current study findings in *Table, (5)* and *Figure,(2)* indicated that; total practices of the older adults' physical exercises (modified mountain pose ,heel raise, stand on one foot ,side leg raise ,back leg raise ,sit to stand, heel-toe pose, backwards steps, and shift forward and back)improved significantly after the implementation of the program (P < 0.001).

In accordance with these findings, there has been considerable research demonstrating a positive effect of exercise on reducing fall risk among community-residing older adults *(American Geriatrics Society et al., 2001).* However, as is the case with other intervention research, these studies have not been replicated in nursing-home residents, probably due to their higher incidence of physical frailty and cognitive impairment. Studies have shown; however, that exercise even in very frail nursing-home residents improves balance, mobility, and flexibility, though these studies did not note a reduction in falls *(Toulotte et al., 2003).*Similarly*, (Pai and Bhatt, 2007;Mansfield et al., 2010),*its results demonstrated that one-third of falls in this study were attributed to tripping or slipping. Promising falls interventions include techniques for teaching individuals in laboratory settings how to regain their balance. Although, these may not be practical on a population level.

Recent work with healthy older adults showed that under laboratory conditions, training that used surface perturbations to simulate slipping and induce backwards falls improved both proactive (pre-slip) and reactive (post-slip) balance strategies. The result was fewer backward falls *(Mansfield et al., 2010; Wang et al., 2011).*

Concerning to total falls efficacy scale-international *Table (6)*, more than half of older adults were very concerned. Slightly above half were very concerned as regards taking a bath or shower and walking up or down a slope. Also, less than half of older adults were cleaning the room fairly concerned. As regards going up or down stairs 42% of older adults were somewhat concerned. Meanwhile more than one third of subjects were not at all concerned related to going to the shop and Walking on an uneven surface.

A similar finding was reported by *(Fletcher &Hirdes, 2004; Camargos et al., 2010),* who clarified that There are a number of studies were reported that being a multiple faller significantly increases fear of falling that may cause activity restriction. On the other hand, *(Kato et al., 2008)* studied a study to investigate the relation of the Falls Efficacy Scale (FES) to quality of life (QOL) among nursing home residents. They found FES score as 45±22.3, while it was found as 36.7±11.9. This difference may be related with age difference of participants of their study (age, mean: 85.6±6.1).

Concerning study setting as geriatrics safety homes environment*(Table7)*, had lamp extension& telephone cords are located outside of walking path, flooring is free from rips & holes, older adults uses furniture for support while ambulating, lighting is adequate, older adults easily opens/closes at least one window & all blinds or shades, floors & tabletops are free of clutter. All this items is important to prevent extrinsic factors of falling.

On the same line, all studies conducted in nursing homes have included environmental modifications as part of a multi factorial prevention

intervention. Ambulatory residents may fall when attempting to transfer to and from the bed, chair, or toilet. The height of these devices (e.g. the distance between the floor and the top of the bed mattress) is crucial to safe standing. Research on chair height recommends a seat height that is approximately 100% to 120% of the lower leg length; this facilitates rising by requiring less knee extension, forward leaning, and strength of lower-extremity muscles. For shorter (less than 5 feet in height) residents, the standard nursing-home bed may be too high, and so low beds that can be manually, hydraulically, or electrically adjusted to promote transfer are suggested *(Weintraub and Rubenstein, 2004).*

The present study findings in *Table, (8)*revealed that; there were high statistically significant differences between the older adults' total knowledge scores and their gender, residence, and educational levels (P < 0.001).On the other hand there were no statistically significant differences between the older adults' total knowledge scores and their age and marital status (P > 0.05).In agreement with this, *(Lewis, 2001)* no significantly post intervention compared to pre-intervention related to age and marital status. This result stand on line with *(Gillespie et al., 2012)*trials testing interventions to increase knowledge/educate about fall prevention alone did not significantly reduce the rate of falls (RaR 0.33, 95% CI 0.09 to 1.20; one trial; 45 participants) or risk of falling (RR 0.88, 95% CI 0.75 to 1.03; four trials; 2555 participants).

The present study showed that in *Table, (9)*; there were high statistically significant differences between the older adults' total practices scores and their age, gender, residence, educational levels, and their marital status (P < 0.001).This finding was in the same line with a study done by *(Grabiner et al., 2012)* explored whether task-specific training could reduce trip-related falls among 52 healthy middle-aged and older women. Using a treadmill to simulate tripping, the 22 women who had received training had significantly fewer falls (4.5%) than the 30 control women (26.6%). However, it is not known if laboratory training would benefit less

healthy older adults or if it would translate into fewer falls from unexpected trips and slips in real life settings.

These findings are inconsistent with other studies which have found there were no significant differences between women's and men's physical functionality, men tended to have a greater overall strength and physical functioning, while women tended towards, having a greater upper body flexibility *(Smeeet al., 2012).*

Conclusions

According to results & research hypothesis concluded that: Educational health program has showed a highly statistically significant effect on knowledge and practices related to intrinsic and extrinsic risk factors of the older adults to prevent them from falling post program. Total practices of the older adults' physical exercises (modified mountain pose ,heel raise, stand on one foot ,side leg raise ,back leg raise ,sit to stand, heel-toe pose, backwards steps, and shift forward and back)improved significantly after the implementation of the program $(P < 0.001)$.

Recommendation:

- Well-designed educational health program are needed in Geriatric Homes to prevent falling include intrinsic & extrinsic risk factors.
- Further research is also needed on the interventions that may contribute to the prevention of falls in older adults.

Reference

Ahmed, E.(2009): Quality of Life among Arthritic Elderly in Geriatric Homes-Cairo Governorate, Unpublished Master Thesis in Community Health Nursing Dep., Faculty of Nursing, Cairo University, Egypt.

Al-Faisal, W. (2006): Falls Prevention for Older Persons, Eastern Mediterranean Regional Review, available at:http://www.who.int/ageing/ projects/EMRO.pdf.

American Geriatrics Society. (2001): "Guideline for the prevention of falls in older persons" Journal of American Geriatric Soc.; vol. 49, pp.664-672.

Camargos, F., Dias, R., Dias, J., and Freire, M. (2010): "Cross-cultural adaptation and evaluation of the psychometric properties of the falls efficacy scale-international among elderly brazilians (FES-I-BRAZIL)", Rev. Bras. Fisioter, Vol. 14, pp. 237–243.

Campbell, A., and Robertson, M. (2007): .Rethinking individual and community fall prevention strategies: a meta-regression comparing single and multifactorial interventions. Age Ageing; 36:656–662.

Centers for Disease Control and Prevention (CDC). (2015): Important facts about falls. Available at: http://www.cdc.gov/homeandrecreationalsafety/falls/adult falls.html.

Centers for Disease Control and Prevention (CDC).(2008): Preventing Falls: How to Develop Community-based Fall Prevention Programs for Older Adults, available at: www.cdc.gov/ncipc/pub-res/demonstr.htm.

Center for Healthy Aging. (2011): Model health programs for communities. http://www.healthyagingprograms.org/content.asp?sectionid=8. Accessed on June 6, 2015.

Ebrahem, K. (2013): Quality of Life among Older Adults with Arthritis attending the Out-Patient Clinics in Benha Hospitals, Unpublished Master Thesis in Community Health Nursing Dep., Faculty of Nursing, Benha University.Pp.93-99.

Eliopoulos, C. (2010): Gerontological Nursing, 7th ed., Wolters Kluwer/Lippincott Williams & Wilkins Comp., Philadelphia, Pp.61,72- 73.

Fletcher, P.,andHirdes, J. (2004): "Restriction in activity associated with fear of falling among community-based seniors using home care services". Age and Ageing, 33(3), pp. 273–279.

Gillespie, L., Robertson, M., Gillespie, W., Sherrington, C., Gates, S., Clemson, L., and Lamb, S. (2012): "Interventions for preventing falls in older people living in the community", US National Library of Medicine, National institutes of health, NCBI,PubMed.

Grabiner, M., Bareither, M., Gatts, S., Marone, J., and Troy, K. (2012): "Task-specific training reduces trip-related fall risk in women", Medical Society of Sports Exercise.44(12),Pp.2410–2414.

*Jennifer, R., Lourdes, C., and Cristina, C. (2012):*Fall Prevention through Patient Partnerships, the Nurse Practitioner: the American Journal of Primary Health Care, 37(7):14-19.

Kato, C., Ida, K., Kawamura, M., Nagaya, M., Tokuda, H., Tamakoshi, A., and Harada, A. (2008): "Relation of falls efficacy scale (FES) to quality of life among nursing home female residents with comparatively intact cognitive function in Japan", Nagoya Journal of medical science, 70 (1), pp.19-27.

Lewis, L. (2001): "Practical Approaches to Reducing Falls" Caring for the Ages, American Medical Directors Association, published by Elsevier, 2(11), p.11-12

Mansfield, A., Peters, L., Liu, B., and Maki, B. (2010):"Effect of a perturbation-based balance training program on compensatory stepping and grasping reactions in older adults: a randomized controlled trial", *Physio Therapy*, Vol. 90: pp.476–491.

Masbah, A. (2007): The Relationship between the Percieved Stressors and Coping Strategies among Arthritic Patients in Shebin El-Kom, Unpublished Doctorate Dissertation, Faculty of Nursing, Menofia University, pp. 107-112.

Michael, Y., Whitlock, E., Jennifer. S., Rongwei, F., O'Connor, E., and Gold, R.(2010): Primary Care–Relevant Interventions to Prevent Falling in Older Adults: Preventive Services Task Force, Annals of Internal Medicine, 153:815-8.

Nies, M., and McEwen, M. (2011): Community health nursing promoting the health of population, 5th ed., Elsevier Saunders comp., London, pp367-370.

Pai, Y., and Bhatt, T., (2007): *"*Repeated-slip training: an emerging paradigm for prevention of slip-related falls among older adults", *Physio Therapy*, Vol. **87,** pp.1478–1491.

Smee, D., Anson, J., Waddington, G., and Berry, H.(2012): "Association between Physical Functionality and Falls Risk in Community-Living Older Adults", Current Gerontology and Geriatrics Research, Volume 2012.

Taha, N., and Ali, Z. (2011): Effect of Reflexology on Pain and Quality of Life in a Patient with Rheumatoid Arthritis, Medical Surgical Nursing Dep., Faculty of Nursing, Zagazig University, Zagazig, Egypt, Published in Life Science Journal, 8(2): 357-365.

Tiffany, E., and Shubert, M. (2011): Evidence-Based Exercise Prescription for Balance and Falls Prevention: A Current Review of the Literature, Journal of Geriatric Physical Therapy, 34(3):100-108.

Tinetti, M., and Kumar, C.(2010): The Patient Who Falls "It's Always a Trade-off" ,JAMA, 303(3):258-266.

Toulotte, C., Fabre, C., and Dangremont, B. (2003): "Effects of physical training on the physical capacity of frail, demented patients with a history of falling: a randomized controlled trial", Age Ageing; Vol., 32, pp.67-73.

Yardley, L., Beyer, N., Hauer, K., Kempen, G., Piot-Ziegler, C., and Todd, C. (2005). Development and initial validation of the Falls Efficacy Scale-International (FES-I).Age and Ageing, 34(6), 614-619. doi:10.1093/ageing/afi196.

Wang, T., Bhatt, T., Yang, F., and Pai, Y. (2011): **"**Generalization of motor adaptation to repeated-slip perturbation across tasks", *Neuroscience,* Vol. 180, pp.85–95.

Weintraub, V., and Rubenstein, L. (2004): "Falls in the nursing home: are they preventable?", Journal of American Medicine Direct Association .Vol. 5, pp.401-406.

World Health Organization (WHO).(2012):Falls, available at: http://www.who.int/mediacentre/factsheets/fs344/en/.

World Population Ageing. (2013):Department of Economic and Social Affairs Population Division, United Nations, New York, pp. xii. Available at: http://www.un.org/en/development/desa/population/publications/pdf/ageing/Wo rldPopulation Ageing.pdf.

World Health Organization. (2007): WHO Global Report on Falls Prevention in Older Age available at: e-mail: permissions@ who.int.