Physical Activities and its Effect on memory of The Elderly

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Abstract

Background: Physical activity generally refers to movement that enhances health. Any body movement that works muscles and requires more energy than resting. **Aim**: the study aimed to assess physical activity and its effect on memory of the elderly **Research design**: Descriptive analytic design was utilized in this study. **Settings**: The study was conducted in Geriatric home at Suez Canal University. **Subjects**: A convenient sample of 60 older adults, from the previous setting at age 60 or higher, without cognitive impairments. **Tools** of data collection: **First tool:** Interviewing questionnaire, it was composed of 4 parts, **part one**: socio-demographic data, **part two**: Medical history, and nutritional style. **Part three**: Assess elderly's knowledge regarding to physiological changes, physical activity, and exercise. **Part four:** Assess elderly's practice regarding to physical activities, and exercise. **Second tool**: Observational checklist, it was composed of 4 parts, **Part one:** Assess elderly's general health. **Part two:** Assess elderly's activities of daily living. **Part three:** Assess elderly's mini mental state. **Results**: Regarding to elderly' knowledge, the current study shows that, all 100.0% of the elderly had unsatisfactory knowledge regarding physiological changes, importance of physical activity, exercise, and memory. The present study also shows that, all 100.0% of the elderly had poor practice of physical activity. The current study represents that, few 2.9% of the elderly had poor practice, around one fifth 15.7% had average practice, majority 81.4% had good practice of activity of daily living, and no one of the elderly had stupor, one third 34.3% had drowsy, and two thirds 65.7% had alert of mini mental state. **Conclusion:** Elderly in the current study lacked appropriate knowledge, practices, activity of daily living, and mini mental state were mostly unsatisfactory. **Recommendations**: Health team member should be planning and implemented several health educational programs regarding physical activities, which types of eating and drinks that enhancing memory and brain function for elderly people in geriatric home, Conducting physical activity programs for older persons that can be safe, effective in community settings, and low cost therapeutic approach, and members of health team should be planning and implemented several health educational programs regarding physical activities, which types of eating and drinks that enhancing memory and brain function for elderly people in geriatric home.

Key words: Elderly, Memory, Physical activity.

Introduction

Physical activity generally refers to movement that enhances health. And is any body movement that works muscles and requires more energy than resting. Walking, running, dancing, swimming, yoga The other types of physical activity muscle-strengthening, bone strengthening, and stretching benefit the body in other ways. Muscle-strengthening activities improve the strength, power, and endurance of the muscles. Doing pushups and sit ups, lifting weights, climbing stairs, and digging in the garden are examples of muscle-strengthening activities. **(Carroll, et al, 2015).**

Physical exercise has well-documented benefits for general health and well-being, and more recently has been showen to benefit cognition. Epidemiological evidence consistently links physical exercise with cognitive benefits. Lower risk for dementia, and reduced pathological changes. **(WHO, 2017).**

Egypt is the most populous country in the Middle East and the third-most populous on the African continent (after Nigeria and Ethiopia). One of the main features of the Egyptian population over the last few decades is the gradual increase in the absolute and relative numbers of older people. This trend is expected to continue over the next decades. **(WHO, 2017).**

The community health nurse plays a key role in all aspects of prevention through good care planning and collaboration with secondary care colleagues, or by advising and supporting family careers in community settings, Physical and emotional wellbeing are closely linked and any intervention to support one will also affect the other. **(Jenkins& Bernie, 2016).**

Nurses take many roles in promoting physical activity for older adults. Because many older adults do not perceive the benefits of physical activity and in fact may falsely believe that physical activity should be avoided. Nurses need to assess the person's beliefs about and understanding of both the beneficial and detrimental effects of physical activity. Nurses also assess for and address other factors that positively or negatively influence an older adult to participate in regular physical activity. Nurse researcher found an association between self-efficacy and motivation to participate in exercise and physical activity. **(Carol, 2013).**

Significant of the study:

Today, over 46 million people live with dementia worldwide. This number is estimated to increase to 131.5 million by 2050**.** The prevalence rate of dementia in Egypt (4.5%) is within the mean age-adjusted prevalence estimate in developing countries (5.3%). **(Alzheimer Disease International, 2016)**.

Worldwide federation of Alzheimer associations and global voice on dementia, a purpose-driven global health and care company that is the leading international provider of specialist dementia care, caring for around 60,000 people living with dementia each year. Together, we are committed to ensuring that dementia becomes an international health priority. We believe national dementia plans are the first step towards ensuring all countries are equipped to enable people to live well with dementia, and help to reduce the risk of dementia for future generations. There is now a growing list

of countries which have such provision in place or which are developing national dementia plans, but it's not enough. **(Alzheimer's Disease International, 2016).**

Aim of the study

This study aimed to assess assesse physical activity and memory in the elderly through:

1- Assessing elderly' knowledge toward physiological changes, physical activity, exercise, and memory.

2- Assesse elderly's practice regarding physical activity and its effect on memory, exercise, activity of daily living.

3- Assessing elderly's mini mental state.

Research Questions:

- What's the level of elderly' knowledge toward physiological changes, physical activity, exercise, and memory?
- What are the elderly' practices regarding physical activity, exercise, activity of daily living?
- what are the elderly' mini mental state?

Subjects and Methods

Research design:

Descriptive research design was utilized to meet the aim of the study.

Technical design:

Research Setting:

The present study was conducted at Ismailia geriatric home.

Subjects:

A Convenient sample was used in the current study. The sample size was calculated using the following equation:

$$Sample\ Size = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1+(\frac{z^2 \times p(1-p)}{e^2 N})}$$

The sample size was 60 older adults representing 100% of the total number 60 of older adults, who attended the previous mentioned setting in the latest year 2017, with criteria of older adults, age 60 or higher, without cognitive impairments and agreed to participate in the study. 10% (6) of the subjects were excluded in a pilot study.

C-Tools for data collection:

Tool (1): An interviewing questionnaire: it was an Arabic interviewing questionnaire developed by the researcher, it included the following parts:

Part I: It was concerned with elderly socio- demographic data included: (age, gender, educational level, marital status, job, residence, and income). **(American Academy of Family Physicians, 2011).**

Part II: A. elderly health history: It was composed of 3 items which included: medical history included (previous chronic disease- previous surgery – current medication- and are you taken anti-depression medication), and elderly nutritional style. **(WHO, 2010).**

Part III: Elderly knowledge about: 1) physiological changes of elderly: It was composed of 7 items included (skin changes- hearing changes,

vision changes, hair changes, urinary system changes, sleep changes, and memory changes), 2) elderly knowledge regarding to importance of physical activity and exercise: It was composed of 7 items which included (definition physical activity- types of physical activity- importance of physical activity- meaning of exercise- meaning of memory- type of memory- and does physical activity affect on the memory). **(Ministry of Health, 2013).**

❖ **Scoring System for knowledge:**

It was included 14 items a correct answer scored one and each incorrect answer scored zero, a total of 60% and above were considered satisfactory and less than 60% were considered unsatisfactory.

Part IV: elderly practice regarding to their physical activities, and exercise: It was composed of 37 items which included: elderly practice of physical activities: It was composed of 31 items included (practice any physical activity- types of physical activity are practice- practice any recreational activities- watch video Sport, etc), and elderly practice of exercise: It was composed of 6 items which included (practice any sport activity- type of sports activity do you practice- times have you practiced sports- duration of exercise- feel when you exercise- and personal benefit to you from your practice of sport). **(Center for Physical Activity, 2002, WHO, 2010).**

❖ **Scoring system for practices:**

It was composed of 37 items and answers were coded according to the following: always= 1scores, and rarely =0, and the total optimal score = 74.

The total points of practice represent the optimal score and accordingly the points obtained will be classified into always => 50% and rarely =< 50%.

Tool (2): The Observational Checklist (Appendix 11) contain four variables were measured by the investigator in this study which included:

Part I: Assessing elderly general health: It composed of 16 items which included (vital Signs- body shape- head- eyes- ears- mouth, throat- neck- cardiac- pulmonary- breasts- abdomen- gastrointestinal, genital, rectal- extremities- muscular/ skeletal- skin- and neurologic). **(American Academy of Family Physicians, 2011).**

❖ **Scoring system for practices:**

It was composed of 16 items and answers were coded according to the following: normal= 3scores, moderate= 2 scores, and abnormal =1, and the total optimal score = 48.

Part II: Assessing elderly activities of daily living: It composed of 10 items which included (eating- showering- personal care- wearing- using toilet- mobility- movement- stairs- defecation- and urination). **(Katz, et al, 1970).**

❖ **Scoring system for practices:**

It was composed of 10 items and answers were coded according to the following: non-dependent= 2scores, semi-dependent= 1 scores, and dependent =0, and the total optimal score = 20.

Part III: Assessing elderly performance regarding exercise**:** It composed of 6 items which included (physical activity (Warm up)- walking-

muscle strength- stretching- flexibility- and balance) and each item contain 4 parts which included: (duration- frequency- intensity- and volume). **(Center for Physical Activity, 2002).**

❖ **Scoring system for practices:**

It was composed of 6 items and each item contain 4 parts and answers were coded according to the following: always= 2scores, sometimes= 1 scores, and rarely =0, and the total optimal score = 48.

Part IV: Assessing elderly mini mental state: It composed of 4 items which included (orientation1- orientation2- registration- attention and calculation- recall- and language). **(Katz, et al, 1970).**

❖ **Scoring system for practices:**

It was composed of 4 items and answers were coded according to the following: alert= 5scores, drowsy= 3 scores, stupor= 2 and coma =1, and the total optimal score = 30.

Content validity and reliability:

To achieve the criteria of trustworthiness of the data collection tools in this study, tools were tested and evaluated for content validity. Content validity was tested by five experts in community health nursing and medicine specialties. They were from different academic categories, i.e., professor and assistant professor from faculty of nursing and Suez Canal university. To ascertain relevance, clarity, applicability and completeness of the tools. Based on experts comments and recommendations, minor modifications had been made such as rephrasing and rearrangements of some sentences. And Chronbach Alpha test was used to measure the reliability of the 2 tools used in the current study.

Pilot study:

A pilot study was carried out on 10% (6) of elderly to test the study tools for clarity, feasibility, applicability and time required to fill out the questionnaires. The necessary modifications were done through omission of unneeded or repeated questions and improvements were made prior to data collection according to the pilot study results. The sample of the elderly who participated in the pilot study was excluded from the main study sample.

Field work:

Approval was obtained from the authorities of the faculty of nursing, Ain Shams University, then written official letters sent to the director of Isamilia geriatric home, include the aim of the study and steps of the program obtained to elderly in geriatric home.

Data collection procedure:

The researcher attended the geriatric home three days per week, from 11.00 AM. to 1.00 PM. The data collection lasted over six months starting from the beginning of December 2017 up to May 2018.

The researcher interviewed each elderly individually and briefly explained the nature and the purposes of the study, and asked for participation. All elderly were informed that participation is voluntary.

After obtaining the acceptance of elderly to participate in the present study. The elderly was interviewed to assess their socio-demographic data, and their knowledge, practice, activities of daily

living, health status, mini mental state. The average time needed to fill out the questionnaires was 1-2 hours. A number of interviewed elderly per week ranged from 10- 12.

Statistical Design

The collected data were organized, analyzed using appropriate statistical significant tests. The data were collected and coded using the Computer Statistical Package for Social Science (SPSS), version 20, and was also used to do the statistical analysis of data to evaluate the studied subject's changes throughout the study. Data were presented using descriptive statistics in the form of frequencies and percentages. Chi-square tests were used to compare frequencies and correlation between study variables. Degrees of significance of results were considered as follow: p-value > 0.05 not significant, p-value ≤ 0.05 Significant, p-value ≤ 0.01 highly Significant.

Results

Table (1): Shows that 46.7% of elderly age ranging from 65 to < 70 years, 70.0% were female, 37.7% were had secondary school, 56.7% were widow, also, 43.3% were housewife, 90.0% were lived in urban, and 90% of elderly were had enough income.

Table (2): illustrates distribution of the elderly according to their medical history; showed that 35% elderly had diabetes mellitus, 35% elderly were taken diabetes mellitus medication, and 95% of elderly hadn't taken anti-depression medication.

Table (3): illustrated distribution of the elderly nutritional style; showed that 85.1% of elderly hadn't taken nutrition from outside geriatric home , 91.7% had varity meals 93.3% had suitable meal for health person, moreover, 100.0% had enough meal quentity, also, 91.7% had taken three meals per/day, and 90.0% of elderly had prefered fruits and vegetables meals.

Figure (1): This figure shows that, all 100.0% of the elderly had unsatisfactory knowledge regarding physiological changes, physical activity, exercise, and memory.

Figure (2): This figure denotes that, that, all 100.0% of the elderly had poor practice of physical activity.

Figure (3): This figure denotes that, few 2.9% of the elderly had poor practice, around one fifth 15.7% had average practice, majority 81.4% had good practice of activity of daily living.

Figure (4): This figure denotes that, no 0.0% of the elderly had stupor, one third 34.3% had drowsy, and two thirds 65.7% had alert of mini mental state.

Table (4): represents that, all correlations are weak the only statistically significant correlation is between total activity of daily level and total practices but still weak positive $r = 0.3$.

Table (1): Distribution of the elderly according to their socio- demographic characteristics (n=60).

Item	No	%
Age:		
60 years < 65	21	35
65 years < 70	28	46.7
70 years and above	11	18.3
Mean±SD	66.35±5.97	
Gender:		
Male	18	30.0
Female	42	70.0
Educational level:		
Illitrate	13	21.6
Read &write	19	31.7
Secondary	22	37.7
University	6	10.0
Marital status:		
Married	9	15
Single	9	15
Divorced	8	13.3
Widowed.	34	56.7
Job:		
Does not work	11	18.3
House wife	26	43.3
Retired	22	36.7
free work	1	1.7
Residence:		
Urban	54	90.0
Rural	6	10.0
Income:		
Enough	54	90
Not enough	3	5
Enough and save	3	5

Table (2): Distribution of elderly according to their medical history (n=60).

Item	No	%
*** Previous chronic diseases:**		
Diabetes mellitus.	21	35
High blood pressure.	15	25
Heart disease.	15	25
Kidney diseases.	6	10
Liver diseases.	5	8.3
Respiratory system diseases.	3	5
*** Previous surgery:**		
Yes.	41	68.3
No.	19	31.7
*** Current medications:**		
Diabetes mellitus mediaction.	21	35
Hypertension mediaction.	15	25
Heart disease mediaction.	15	25
Others medication.	6	10
*** Are you taken anti-depression medication:**		
Yes.	3	5
No.	57	95

Table (3): Distribution of elderly regarding to their nutritional style (n=60).

Item	No	%
*** Nutrition from outside of geriatric home:**		
Yes.	9	15
No.	51	85.1
*** Nutrition Variety:**		
Yes.	55	91.7
No.	5	8.3
*** Suitable for person health:**		
Yes.	56	93.3
No.	4	6.7
*** Quantity:**		
Enough.	60	100.0
*** Frequency:**		
Less than three meals.	4	6.6
More than three meals.	1	1.7
Three meals.	55	91.7
*** Which foods do prefer:**		
Meat.	35	58.3
Legume.	17	28.3
Starche.	23	38.3
Friuts Vegetables.	54	90.0
Milk.	35	58.3

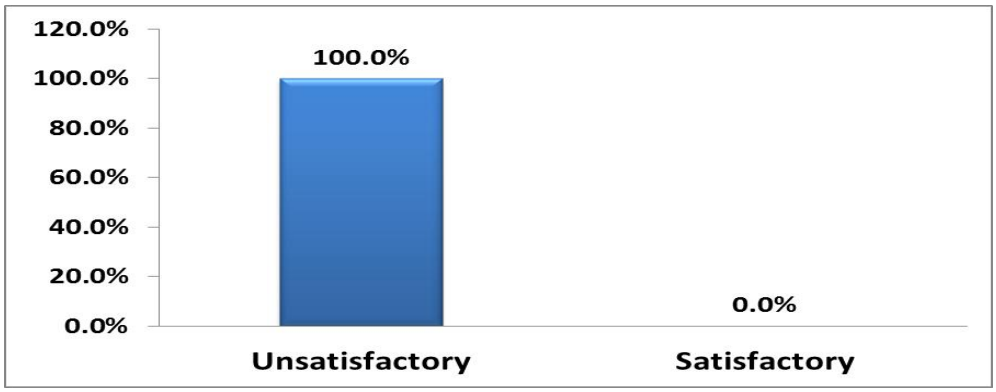

Figure (1): Percentage distribution of the elderly according to their total knowledge (n=60).

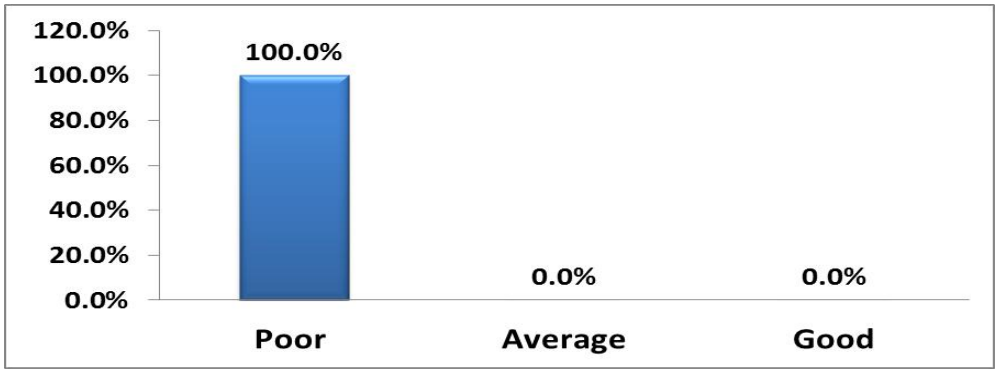

Figure (2): Percentage distribution of the elderly according to their total practice (n=60).

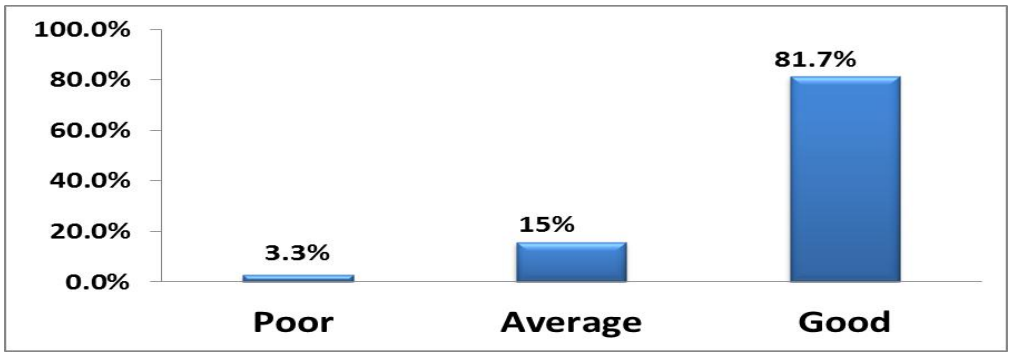

Figure (3): Percentage distribution of the elderly according to their total activity of daily living (n=60).

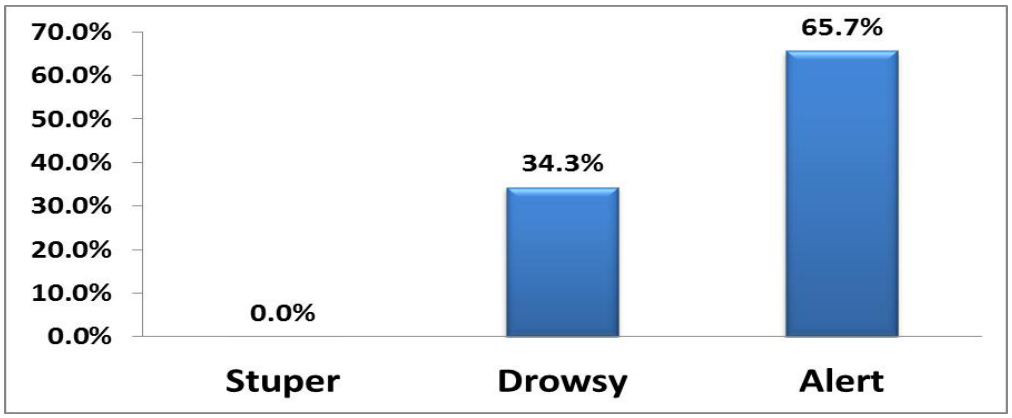

Figure (4): Percentage distribution of the elderly according to their mini mental state (n=60).

Table (4): Correlation between total practice, activity of daily living, mini mental state and total knowledge, practice, activity of daily living (n=60).

Items:		Total Practice Scale	Total activity of daily living Scale	Elderly mini mental state scale
Total Knowledge Scale	**R**	**-0.10**	**-0.13**	**0.02**
	P Value	0.3972	0.2742	0.8813
Total Practice Scale	**R**		**0.30**	**0.07**
	P Value		0.0105	0.5904
Total activity of daily living Scale	**R**			**0.20**
	P Value			0.1009

Discussion

Physical activities such as shopping, laundry, managing finance, leisure activities, learning new technologies, communicating with family and friends and monitoring health related activities. elderly also carry out enhanced activity of daily living to adapt changing environment that requires to be willing to accept challenges and engage in learning experiences. These are primarily cognitive oriented, and they contribute to quality of life. **(Izekenova, et al, 2015).**

According to socio-demographic characteristics of elderly, the present study revealed that less than half of elderly age were ranged from 65 to <70 years old, *Mean±SD* 66.35 ± 5.97, more than two third were female, more than one third were had secondary school, more than half were widow, more than two forth were housewife, the majority were lived in urban areas, and the majority had enough income **(Table 1)**. This finding in the same line with the study about physical activity pattern in elderly Kashan population in Iranian by **Ali et al., (2016)** who study reported that the average of age of the study population was 67.6 ± 6.8 years.

Concerning medical history of elderly, the current study revealed that more than one third were had diabetes mellitus, and taken diabetes medication, more than two thirds had previous surgery, and the majority of them were hadn't taken anti-depression medication **(Table 2)**. This finding agrees with **Irving, (2014)** who mentioned that a study about antidepressant and the placebo effect in USA study reported that popular antidepressants may induce a biological vulnerability in the future.

Regarding nutritional style of elderly the current results revealed that the majority were hadn't taken food from outside geriatric home, most of them were had variety meals, most of them had suitable meal for health person, also the majority of them taken three meals per/ day, most of them preferred fruits and vegetables, and all of them were had enough meal quantity **(Table 3).**This result disagrees with **Shigeki et al., (2015)** who study nutritional status of an elderly population in south west China, a cross-sectional study based on comprehensive geriatric assessment study reported that 3.2% were had malnutrition, and 19.3% were at risk for malnutrition, and the majority of them had normal nutritional status.

Regarding elderly total knowledge, the current results revealed that the majority of the elderly had unsatisfactory knowledge **(Figure 1).** this result agrees with **Reijneveld et al., (2003)** who mentioned that a study of promotion of health and physical activity improves the mental health of immigrant: results of a group randomized controlled trial among Turkish immigrants in the Netherlands aged 45 and over study reported that unsatisfactory knowledge.

Regarding elderly total practice, the current results revealed that all of the elderly had poor practice, one third of them had average practice, and non of them had good practice **(Figure 2).** This finding disagree with the study about interventions to increase physical activity among older adults: a meta-analysis in Columbia by **Jo-Ana, (2015)** who study reported that physical activity interventions had a significant impact on physical activity behaviors among community dwelling older adults P< 0.001.

Concerning of elderly activity of daily living, **(Figure 3)**, the current study revealed that, few of elderly had poor practice, about one fifth had average practice, and majority had good practice of activity of daily living**,** This finding agrees with the study about the effects of movement stimulation on activities of daily living performance and quality of life in nursing home residents with Dementia: a randomized controlled trail in Amsterdam by **Henskens, et al, (2018)** who study reported that a 6 month of activity of daily living training positively affected overall quality of life P= 0.004, and multiple aspects of quality of life.

Regarding elderly mini mental state, the current results revealed that non of the elderly had stupor, one third had drowsy, and two third of them had alert of mini mental state **(Figure 4).** This finding agrees with the study about cognitive and language function in a phasic patients assessed with the Korean version of mini-mental status examination in Korea by **Eun & Kun, (2016)** who study reported that the scores of orientation, language function, and total score of mini-mental state examination showed significant improvement in all groups P< 0.01.

Regarding correlations of all scale , the present study revealed that there are weak correlation, the only statistically significant correlation is between total activity of daily level and total practices but still weak positive r = 0.3. **(Table 4).** This result agree with the results of the study about cognitive effects of a healthy aging intervention in Erickson's USA by **Karen et al., (2012)** study reported that 6-week healthy lifestyle program can improve both encoding and recalling of a new verbal information, as well as self-perception of memory ability in older adults residing care retirement communities. This result agrees with the results of a study about physical activity and cognitive function in individuals over 60 years of age: a systematic review in Washington by **Ashley et al., (2014)** who study reported that physical activity may help improve cognitive function and consequently, delay the progression of cognitive impairment in the elderly. Also, agree with **Hyun & Kyoung, (2018)** who mentioned that a study of the effect of physical activity on cognitive and daily living activities of the elderly with mild dementia in USA study reported that the physical activity program improves cognitive function and activity of daily living in patients with mild dementia.

Conclusion

Based on the findings of this study,

it can be concluded that,

- As regard elderly knowledge regarding physiological changes, the present study revealed that highly significant knowledge in skin, hearing, vision, hair, urinary system, sleep, and memory changes at $p<0.001$.
- As regard elderly practice of physical activity, the present study revealed that highly significant in practice any physical activity, do memory exercise, purchase your own needs, prepare food by yourself, good feeling when you practice physical activity, personal benefit to you from practice your physical activities, and do you walking.
- As regard correlation between all scales, the present study revealed that scales of elderly knowledge of physiological changes, elderly knowledge of physical activity and exercise, total knowledge scale, elderly practice of physical activities, elderly practice of exercise and sport, total practice scale, and elderly mini mental state scale were statistically highly significant $P < 0.001$.

Recommendations

The results of this study projected the following recommendations:

- Conducting physical activity programs for older persons that can be safe, effective in community settings, and low cost therapeutic approach.
- Clinically meaningful outcome measurements are needed to assess the effectiveness of physical activity interventions and outcomes should be broader and including mental health and wellbeing in the field.

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