The Effects of Health Promotion Program on Healthy Aging, Wellbeing and Health Promoting Behaviour among Community Dwelling Older Adults

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Abstract

Background: One of the most essential needs of all people is providing, enhancing the health level, and adopting a lifestyle that promotes health. It is the most significant and practical way to keep older persons' wellbeing and promote healthy aging. **Aim:** To investigate the effects of health promotion program on healthy aging, wellbeing and health promoting behaviour among community dwelling older adults. **Methods:** Four randomly selected health centers out of a total of 38 were used for the study, which was carried out in the Mansoura District within the Dakahlia governorate. Based on inclusion and exclusion criteria, a purposive sample of 94 older adults from 110 older persons enrolled in the above-mentioned setting was selected, 75 older adults were included in the final analysis. **Tools:** Four tools were used; Structured Interview Questionnaire, Healthy Aging Instrument (HAI), Modified Wellbeing Assessment Tool, and Health Promoting Lifestyle Profile-II Questionnaire (HPLP-II). **Results:** All healthy aging factors, wellbeing domains, and health promoting behaviour dimensions of the study group showed significant improvement after the program implementation (p <0.0001). This improvement appears in young old married female, with university education, who still working, had enough income, living with family, and with good health status. Also, highly statistically significant positive correlations (p<0.001) were found between wellbeing, healthy aging, and health promoting behaviour in the study group. **Conclusion:** Health promotion program has a positive effect on older adults' healthy aging, wellbeing, and health promoting behaviour. **Recommendations:** To promote older adults' health and decrease the prevalence of chronic illnesses and multiple complications due to lack of healthy lifestyle, it is recommended to implement health promotion lifestyle programs.

Key words: Health Promotion Program, Healthy Aging, Wellbeing, Health Promoting Behaviour, and Community Dwelling Older Adults

1. Introduction

The development of medical technology has extended human life expectancy and it has also increased the proportion of the old age life cycle. Older adults are expected to increase from 15.7% in 2020 to 32.3% in 2040 [1]. Egypt has the highest percentage of older adults among Arab worlds. Egyptian older adults are representing 6.7% of total population and expected to reach 17.9% by 2052 [2]. As a result of the changes in aging, the older adults are becoming an increasingly important segment of

the health care system. Ageing of the population is a threat for the emergence of a serious challenge related to the rise in non-contagious diseases and a huge increase in care and treatment expenses because of these changes, which are thought to be driving factors for the development of age-related diseases as well as an increasing ratio of limitations and disabilities associated with these problems [3,4]. Encouraging older persons to lead a healthy lifestyle is crucial since there are several elements that can delay old age or lessen the severity of physical changes. As a result, improving the health of older adults should be a top priority [5].

Encouraging a healthy lifestyle is crucial from both an individual and a public health perspective. In addition to being a recognized method for improving quality of life, health promotion of older adults enables a healthier and more productive life at later years. Health promotion behaviours refer to the health management activities for a healthier life that inspires people's potentiality of health and advances their physical and mental health [6]. Research carried out by the World Health Organization (WHO) revealed that lifestyle and health-related behaviours account for nearly 60% of poor life quality and 53% of death causes [7, 8]. A Healthy lifestyle in older adults is defined as the ability to recognize and manage all behaviours that could compromise their health, choose healthy behaviours, and organize their daily activities. It comprises six dimensions of stress management, interpersonal relationships, physical activity, nutrition, spiritual growth, and health responsibility [9, 5]. Numerous studies have reported that public health applications and life style modifications can help in preventing chronic diseases and reducing older adults' medical and social service needs. Moreover, it greatly contributes in increasing older adults' independence and promotes wellbeing and achieves healthy aging [10, 11].

Health promotion has an important role in ensuring healthy ageing. Healthy aging is as a lifelong process that enhancing chances to improve and preserve health, independence, quality of life as well as facilitate successful life-course transitions. Healthy ageing has defined by WHO as a process of maintaining functional ability to enable wellbeing in older age [12]. Healthy lifestyle is a crucial element for healthy ageing. Healthy individuals who not only live longer, but also so do in better health, delaying the onset of age related diseases and disabilities to last years of life [13]. Several studies indicate that bad eating habits, obesity, physical inactivity, smoking, and sedentary lifestyle all leading factors that increased mortality as well as the morbidity onset, and poor quality of life [14,13]. However, healthy aging and wellbeing are mostly dependent on factors as proper diet, quitting smoking, exercising, and

having social support. These are the cornerstones of interventions to avoid psychological and non-communicable diseases [14].

One significant objective that health promotion can support is the promotion of older adults' well-being and healthy aging in the community [15]. Wellbeing is a multifaceted concept involving person's quality of life global assessment, based on the values and expectations of everyone. Subjective perceptions of health, independence, and self-efficacy are all part of physical well-being dimensions. While overall life satisfaction and the dominance of positive emotional experiences over negative experiences are the two indicators of psychological wellbeing. An important step toward improving physical and psychological well-being in older adults is to investigate modifiable life style behaviours that may support and promote physical and psychological wellbeing, while also preventing or delaying disease and disability [16]. Engaging in regular physical activity promotes an increase in current physical and psychological well-being, whereas adherence to dietary recommendations is related to future physical and psychological well-being according to finding of longitudinal study about the advantages of a health-promoting lifestyle [17].

Gerontological nurses play an important role in prevention at all levels, especially in health promotion, so safe and efficient ways to promote healthy lifestyle behaviours as people age are required. Thus, they ought to stress the importance of carrying out further research into each complex relationship between healthy aging, behaviours that promote health and both physical and psychological wellbeing. Additionally, in order to achieve the program's impact widely, the nurses ought to help older adults to get information about available local community health services reduce environmental barriers. Adopting behaviours that promote health is also the most essential and efficient way to preserve and enhance older adults' health [18].

Significance of the study

While there is no way to stop aging, it can be delayed or its negative effects reduced by concentrating on effective aging programs that turn the aging process into an enjoyable stage. According to the World Health Organization, health promotion enables people to take more control over their health. It encompasses a broad spectrum of social and environmental interventions intended to improve and safeguard the health and well-being of all people by addressing and preventing the causes of illness. It also raises the average healthy life expectancy, which improves the health outcomes of older adults' remaining years and their overall wellbeing as they age healthily [5, 6]. Therefore, healthcare providers, especially gerontological nurses, must make

significant efforts to ensure the health of the older adults' promoting behaviours to improve their wellbeing, and promote healthy aging and quality of life.

2. Study Aim

This study aimed to investigate the effects of health promotion program on healthy aging, wellbeing and health promoting behaviour among community dwelling older adults.

3. Research hypothesis

Older adults in the study group who was involved in health promotion program develop a significant improvement on healthy aging, wellbeing, and health promoting behaviours than those in control group.

4. Methods

4.1. Study design
Randomized controlled trail was adopted.

4.2. Setting
The study was conducted in Mansoura District affiliated to the Dakahlia governorate. It made up of 38 villages and one city. The local health directors provided a list of health centers/units located in rural Mansoura District. Simple random sampling methods were applied to the selection of rural health centers and units. Out of 38 health centers 4 were chosen

4.3. Subjects
The sample size for studying health promoting behaviour, active aging and wellbeing for older adults was calculated using research software (https://clincalc.com/). A previous study [19] found the mean of health promoting behaviour was 2.52 ± 0.59 pre-test and it raised to 3.40 ± 0.28 post-test, with an alpha error of 5%, study power of 80%. Then the calculated sample size was 60 older adults. Initially, a total of 110 older adults visiting the health centers/units were interviewed and assessed for the study eligibility. 79 of eligible participants agreed to enrol in the study. Additionally, to prevent potential participants drop-out at follow-up, the recruitment of an extra 15 participants was done, resulting in a total of 94 participants. They were randomly allocated into two equal groups, study group (n = 47) and control group (n =47) using day randomization technique. Homogeneity of

both groups was established (Figure 1). 75 older adults were included in the final analysis.

Inclusion criteria involved the following: (1) Age 60 years or above; (2) Ability to communicate; (3) Willingness to participate in the research; (4) absence of disabling diseases, psychiatric or mental disorders; (5) Not concurrently enrolled in another health promotion programs.
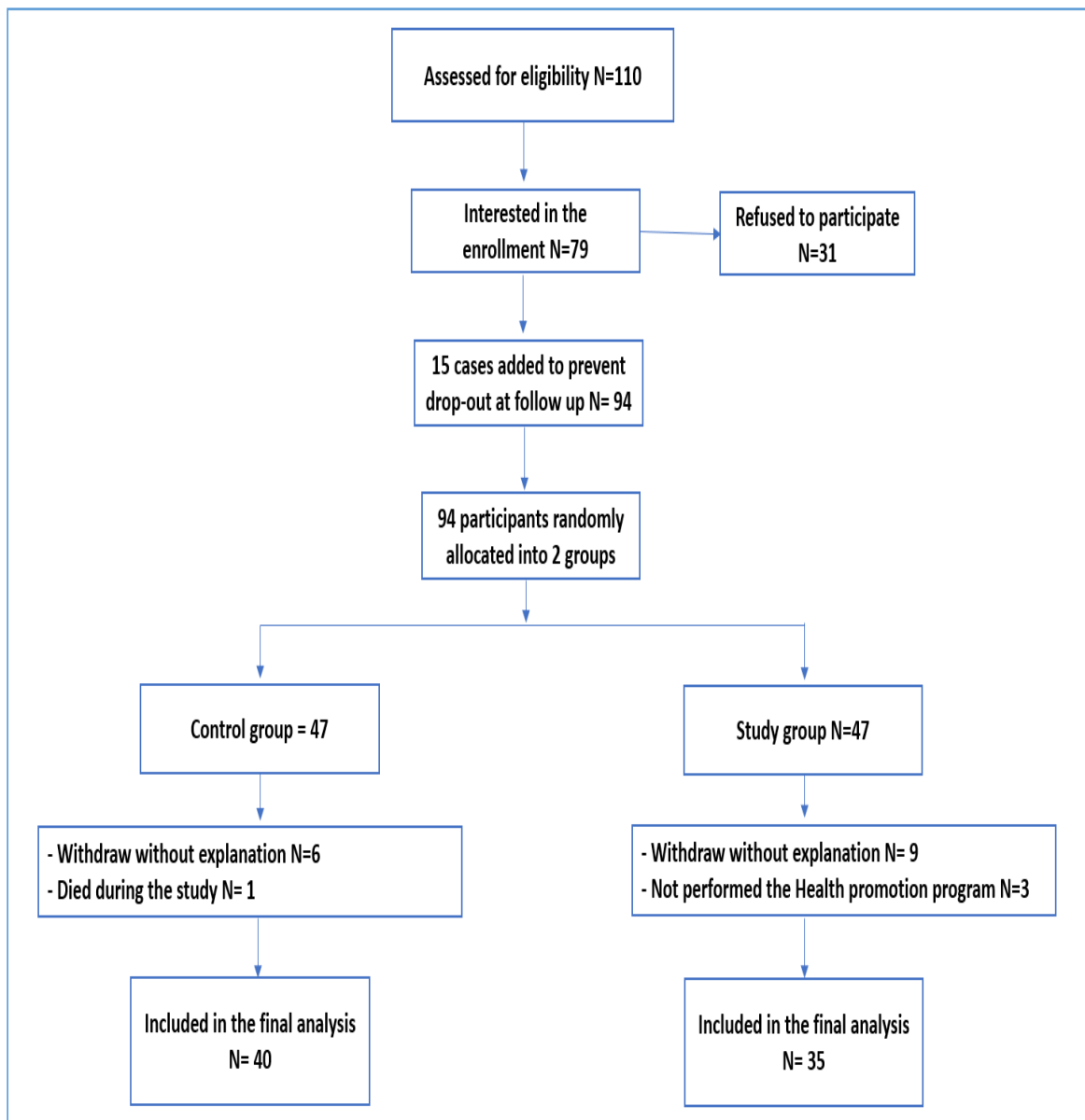

Figure 1. Participants' selection, enrolment, and completion chart.

4.4. Tools

To collect the necessary data four tools were used.

Tool I: Structured Interview Questionnaire: The researchers created this tool after reviewing pertinent literature. It includes two parts**: Part 1: Socio-demographic data as;** age, sex, marital status, educational level, and occupation prior to retirement, monthly income, living condition, and place of residence. **Part two: Health Related Data** such as presence of co-morbidities and self-rated health status. One question was used to evaluate self-rated health status " How would you rate your health?" ratings ranged from 1 (poor) to 5 (very good).

Tool II: Healthy Aging Instrument (HAI): The HAI was crafted by Thiamwong et al., 2008 [20] to measure a process of healthy aging among community-dwelling older adults. The HAI comprises of 35 items under nine factors: 1) Being Self-Sufficient and Living Simply, 2) Managing Stress, 3) Having Social Relationships and Support, 4) Making Merit and Good Deeds, 5) Practicing Self-Care and Self-Awareness, 6) Staying Physically Active, 7) Staying Cognitively Active, 8) Having Social Participation, and 9) Accepting Aging. Each factor is measured using a likert-type scale, with 1 denoting "Absolutely Not", 2 "Less likely", 3 "Not sure", 4"More likely", and 5"Absolutely Yes". The range of total scores is 35 to 175. A higher score indicates a healthier aging person.

Tool III: Modified Wellbeing Assessment Tool: It was developed by Shiney A.T., 2011[21] to evaluate older persons' physical, emotional, social, spiritual, and intellectual wellbeing. It is adapted from Mckinly University of Illinois Wellbeing Assessment Tool. It consists of fifty items to measure older adult's perception of their wellbeing. The tool has five domains, each containing ten statements. The following are the domains of wellbeing: physical wellbeing, spiritual wellbeing, social wellbeing, emotional wellbeing, and intellectual wellbeing. A 4-point Likert scale with response options for always taking a score of 4, often= 3, sometimes =2, and rarely / never =1. Reversibly scoring is used to negative items (i.e., a score of "4" is re-coded as a "1", a score of "1" is recoded as a "4" and so on). The range of total scores is 50 to 200. A higher score indicates a higher perception of wellbeing.

Tool IV: Health Promoting Lifestyle Profile-II Questionnaire (HPLP-II):
Health Promotion Lifestyle Profile- II (HPLP-II) questionnaire was established by Walker et al., 1987 [22] to measure health-promoting lifestyle. The questionnaire consists of 52 items of health promoting behaviour that are categorized into six dimensions: health accountability (9 items), physical activity (8 items), nutrition (9 items), spiritual growth (9 items), stress management (8 items), and interpersonal

relationships (9 items). A Likert-type scale was used to measure each behaviour, with ranges of never =1, sometimes=2=, often= 3, and routinely=4. The mean of the individual's responses to all 52 items is used to get a score for overall health-promoting lifestyle; similarly six subscale scores are obtained by calculating a mean of the responses to subscale items. The use of means rather than sums of scale items was used to retain the 1 to 4 metric of item responses and to allow meaningful comparisons of scores across subscales. The total score of the HPLP- II ranges from 52 to 208 with a higher score denoting higher level of health-promoting behaviours. The scale utilized in this study was the Arabic version translated by (Haddad et al. 1998) [23] with Cronbach's alpha coefficients ranging from 0.70 and 0.88 for the subscales and 0.92 for the entire scale.

4.5. *Procedure*

1. In order to obtain the approval to carry out the study, official letters were issued from the Faculty of Nursing, Mansoura University and were forwarded to the manager of each health care center /unit separately.
2. The researchers developed Tool I (the structured interview questionnaire sheet) after reviewing pertinent literature.
3. Two bilingual translators translated Tool II and III into Arabic, then back into English and were examined for its content validity and reliability using test-retest method. To ensure that the original English versions preserve the essence of the translation and to verify the tools. The reliability was assured by using spearman correlation coefficient (r = 0. 96).
4. A jury of five experts in the related fields of the study tested Tool II and III for content validity. The required adjustments were performed accordingly.
5. Tool IV (Health Promoting Lifestyle Profile-II Questionnaire (HPLP-II) Arabic version was utilized.
6. Prior to the data collection a pilot sample was conducted on 10% (n=9) of older adults from Al Badalah health unit for estimating the clarity, ambiguity, and applicability of the study tools. This data was excluded from the study sample. Thus, the needed adjustments were done, and the tools were put into their final form.
7. Before the program implementation for the study subject in both groups, Pre-test using the study tools (tool II, III, and IV) was done by interviewing each older adult. Each interview took between fifteen and thirty minutes.
8. According to health care centres/unit's routine care. The control group was managed. However, after the end of the study, one of the nursing staff at health

centres/units held training sessions to them to ensure adherence to ethical principles.

9. The researchers developed the health promotion program after reviewing the literature. The content of the program was covered the topics about proper nutrition, physical activity, health responsibility, stress management, relationship and communications, and spiritual aspects. Then, the validity of the program package' content was approved by a jury of five experts in gerontological nursing.

10. To get the attention of older adults and encourage them to learn and practice, a booklet with the program's components was created and written in simple Arabic. It was then supplemented with images and pictures.

11. There were eight sessions in the intervention group, with one training session per week, and nine groups of three to five older persons each. Every session covered a single topic, with varying times according to the subject. Every session ended with ten minutes set up for clarifications, and answering questions from older adults' participants.

12. Before the start of these sessions, the researchers welcomed each older adult, ensured that the older adult was seated comfortably, and the researchers introduced themselves and explained the purpose of the study. The planned program was as follow:

- **1st session** was about the proper nutrition and divided into two parts:
  -**1st part** for explaining the importance of healthy nutrients, element, daily needs of different nutrients, nutrition recommendations, nutrients that fight aging, and nutrition guidance on maintaining and controlling weight, such as promoting regular breakfast meals.
  -**2nd part** for explaining the specific therapeutic diet according to the medical problems of the participants.

- **2nd session** was about physical exercises. This session was divided into two parts:
  -**1st part** for explaining the importance of physical exercise, types, and the precautions that should be put into consideration during practice exercises.
  -**2nd part** was about practicing walking for 20 to 30 minutes, three times a week, and receiving practical instruction in active-assisted range of motion (AAROM) and active range of motion (AROM).

- **3ʳᵈ session** was about cognitive activities and its importance as counting, naming, mathematical operations by using Sudoku puzzles. It is a type of combinatorial, logic-based number placement game. The goal of traditional Sudoku was to fill a 9 x 9 grid with numbers so that every row, every column, and every one of the nine 3×3 sub grids that make up the grid included every number from 1 to 9.

- **4ᵗʰ session** was about health responsibilities. It included simple information about the importance of weight reduction, rest and sleep, smoking cessation, medical check-up, and vaccinations.

- **5ᵗʰ session** was about proper stress management and psychological wellbeing. It was divided into two parts:

  - 1ˢᵗ part included simple information about causes of stress in older adults as well as coping mechanism including activities participation, listening to music, and repetitive prayer.

  -2ⁿᵈ part included pursed lip breathing exercise, the older adults instructed to practice pursed lip breathing at any time for 4 to 5 times a day through:
  - Relax the shoulders and neck.
  - Keeping the mouth closed, inhale slowly through the nose for 2 counts.
  - purse lips while whistling
  - Blow air through the pursed lips slowly for four counts.

- **6ᵗʰ session** was about healthy interpersonal relationship and communications. It covered the value of social interaction for leading a happy life, how to communicate with loved ones and past acquaintances, and how to lessen feelings of loneliness.

- **7ᵗʰ session** was about spiritual wellbeing. It involved taking part in religious rituals including praying, reciting passages from the Quran, and seeing sacred sites.

- **8ᵗʰ session** included revision about all previous sessions and for answering any questions.

13. Simple audio-visual materials such as a PowerPoint presentation on a lab top, illustrated pictures, and videos were used by the researchers to assist in transmitting ideas and maintaining the interest of the older adults during sessions.

14. Older adults teaching strategies were followed by the researchers as using concise, clear, and simple words in presentation, large, printed materials and a conclusion was given at the end of each session about the important points.

15. To make sure the programs effective and the older adults were satisfied, the researchers phoned them in between sessions and during the three months of the study. They also followed up with phone calls to solicit suggestions and demands from the older adults.

16. Using all study tools (tools II, III, and IV), post-tests 1 (conducted immediately after program implementation) and 2 (conducted after two months) were conducted for both groups to assess the impact of the program on older adults' health-promoting lifestyle behaviours, level of wellbeing, and process of healthy aging.

17. Data collection took place between August 1 to December 31, 2023.

4.6. Ethical considerations

Mansoura University Faculty of Nursing Research Ethics Committee accepted the study protocol. Each health centre/unit official permission was obtained from the responsible authorities. After explanation of the study aim, benefits, risks, and procedures the written informed consent was taken from older adults who agreed to participate in the study. The safety of, anonymity, and privacy of the older adults, and confidentiality of the collected data was maintained throughout the study. Older adults were informed that collected data was used only for the research purpose and their participation is voluntary and they can withdraw from the study at any time without giving a reason.

4.7. Statistical analysis

The Statistical Package for the Social Sciences, version 22, (SPSS software) was used to arrange, tabulate, and statistically analyse the data that were gathered. The Kolmogrov-Smirnov test was used to check for normalcy in quantitative data. Data with a normal distribution were shown as mean ± SD. When variables are parametric and continuous at different measurements, a two-way ANOVA test was used to examine differences in repeated measures. To compare the two groups, the student t-test was employed. When comparing more than two groups, one-way AVOVA is utilized. Data that was not parametric was displayed as min, max, and median. The Mann-Whitney test was employed to compare the groups. Kruskal-Walli's test was used to compare between more than two groups. Friedman test was utilized for used to study the changes in different scores during various assessment periods (pre-post

program and follow program) of implementation. The Chi-square test, Fisher's exact test, and Monte Carlo test were used to compare two groups' worth of baseline demographic and medical data. A test of the Pearson correlation coefficient was used to determine whether two continuous variables were related. A significance threshold of 0.05 or less was established.

5. Results

Table (1): Demographic data of the studied older adults in the study and control groups

Demographic data	Study group		Control group		Test of significance
	No (35)	(%)	No (40)	(%)	
Age					
From 60 to less than 65	13	37.1	16	40.0	$\chi2 = 0.065$ (0.968)
From 65 to less than 70	10	28.6	11	27.5	
More than 70	12	34.3	13	32.5	
Mean ± SD	*68.17± 6.29*		*67.85± 5.87*		
Sex					
Male	17	48.6	18	45.0	$\chi2 =0.096$ (0.757)
Female	18	51.4	22	55.0	
Marital status					
Married	18	51.4	25	62.5	MC = 1.312 (0.519)
Widow	12	34.3	12	30.0	
Divorced	5	14.3	3	7.5	
Educational level					
Read and write	17	48.6	20	50.0	MC = 0.333 (0.847)
Primary	13	37.1	16	40.0	
University	5	14.3	4	10.0	
Current work					
No	23	65.7	29	72.5	$\chi2 = 0.404$ (0.525)
Yes	12	34.3	11	27.5	
Income					
Enough	12	34.3	11	27.5	$\chi2 = 0.404$ (0.525)
Not enough	23	65.7	29	72.5	
Living condition					
Alone	13	37.1	16	40.0	MC = 0.333 (0.847)
With the husband / wife	17	48.6	20	50.0	
With one of the children	5	14.3	4	10.0	

(*) Statistically significant at p ≤0.05, χ^2 = chi square, MC: Monte Carlo test, FE: Fisher Exact test

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As shown in Table (1): this program is conducted on 75 older adults. They were divided into study group (n=35) and control group (n=40). Both groups are parallel in all characteristics. Regarding their age, the mean age (±SD) of the study and control group is 68.17±6.29 and 67.85±5.87 years, respectively. As regards the age, sex, living condition, income, and educational level there is no statistically significant difference (p>0.05) between both groups was found.

Table (2): Medical history of the studied older adults in the study and control groups

Medical history	Study group		Control group		Test of significance
	No (35)	(%)	No (40)	(%)	
Presence of chronic disease					
No	12	34.3	14	35.0	$\chi2 = 0.004$ (0.948)
Yes	23	65.7	26	65.0	
Type of chronic diseases#	n=23		n=26		
Diabetes mellitus	19	54.3	21	52.5	$\chi2 = 0.024$ (0.877)
Hypertension	15	42.9	19	47.5	$\chi2 = 0.162$ (0.687)
Cardiovascular disease	11	31.4	15	37.5	$\chi2 = 0.304$ (0.582)
GIT problems	6	17.1	5	12.5	$\chi2 = 0.322$ (0.571)
Liver diseases	5	14.3	4	10.0	FE=0.325 (0.569)
Respiratory disease	4	11.4	3	7.5	FE= 0.340 (0.560)
Number of chronic diseases	**n=23**		**n=26**		
Mean ± SD	4.82±1.26		4.72±1.13		t = 0.306 (0.761)
Self-rated health status					
Very bad	8	22.9	8	20.0	MC = 0.223 (0.994)
Bad	3	8.6	3	7.5	
Moderate	10	28.6	11	27.5	
Good	6	17.1	8	20.0	
Very good	8	22.9	10	25.0	

(*) Statistically significant at p ≤0.05, χ^2 = chi square, MC: Monte Carlo test, FE: Fisher Exact test, t: Student test
#More than one answer

Table (2) demonstrates that the two groups do not differ statistically significantly (p>0.05) regarding the presence, types, and numbers of chronic disease. As regards self-rated health status the table shows most of both group were moderate health status without significant difference was found between them (p>0.05).

Table 3: Comparison of the score of total and factors of healthy aging score between study and control group throughout the study phases

Healthy Aging factors	Group	Pre Median(IQR)	Post1 Median (IQR)	Post2 Median (IQR)	Significance test Fr (P)
Being Self-Sufficient and Living Simply	Study	12.00 (3.00)	20.00 (7.00)	20.00 (4.00)	59.558(<0.0001)**
	Control	10.50 (3.00)	10.50 (3.00)	10.00 (3.00)	4.667 (0.097)
U-test (p)		*0.123(0.902)*	*5.025(<0.0001)** *	*6.074(<0.0001)** *	
Managing Stress	Study	16 (11.00)	20 (19.00)	23.00 (4.00)	58.207(<0.0001)**
	Control	12.00 (3.00)	9.50 (4.00)	9.50 (4.00)	0.000 (1.000)
U-test (p)		*0.216(0.282)*	*4.452(<0.0001)** *	*6.104(<0.0001)** *	
Having Social Relationships Support	Study	12.00 (4.00)	16.00 (12.00)	20.00 (4.00)	57.826(<0.0001)**
	Control	10.00 (4.00)	9.50 (4.00)	9.50 (4.00)	0.667 (0.717)
U-test (p)		*0.123(0.902)*	*3.717(<0.0001)** *	*6.934(<0.0001)** *	
Making Merit & Good Deeds	Study	11.00 (9.00)	15.00 (10.00)	15.00 (2.00)	55.592(<0.0001)**
	Control	9.50 (9.00)	9.00 (4.00)	9.00 (4.00)	0.667 (0.717)
U-test (p)		*0.217(0.822)*	*4.765(<0.0001)** *	*5.497(<0.0001)** *	
Practicing Self-Care & Self-Awareness	Study	12.00 (5.00)	16.00 (13.00)	20.00 (7.00)	57.150(<0.0001)**
	Control	9.50 (5.00)	9.00 (5.00)	9.00 (5.00)	4.667 (0.097)
U-test (p)		*0.123(0.902)*	*4.444(<0.0001)** *	*6.866(<0.0001)** *	
Staying Physically Active	Study	12.00 (8.00)	16.00 (16	16.00 (4.00)	50.843(<0.0001)**
	Control	8.00 (8.00)	7.50 (8.00)	7.50 (8.00)	4.500 (0.093)
U-test (p)		*0.477 (0.655)*	*4.452(<0.0001)** *	*5.821(<0.0001)** *	
Staying Cognitively Active	Study	12.00 (8.00)	16.00 (16.00)	19.00 (4.00)	54.889(<0.0001)**
	Control	8.00 (8.00)	7.50 (8.00)	7.50 (8.00)	5.600 (0.061)
U-test (p)		*0.480(0.631)*	*4.452(<0.0001)** *	*6.135(<0.0001)** *	
Having Social Participation	Study	9.00 (3.00)	12.00 (9.00)	15.00 (3.00)	56.482(<0.0001)**
	Control	7.50 (3.00)	7.00 (3.00)	7.00 (3.00)	4.667 (0.097)
U-test (p)		*0.123(0.902)*	*3.756(<0.0001)** *	*6.709(<0.0001)** *	
Accepting Aging	Study	6.00 (6.00)	8.00 (3.00)	9.00 (3.00)	58.358(<0.0001)**
	Control	5.00 (6.00)	4.50 (6.00)	4.00 (6.00)	4.667 (0.097)
U-test (p)		*0.000(1.000)*	*3.872(<0.0001)** *	*5.884(<0.0001)** *	
Total score for healthy aging	Study	105.00 (57.00)	140.00(105.00)	158.00(39.00)	63.323(<0.0001)**
	Control	79.50 (49.00)	77.00 (57.00)	75.50(57.00)	3.457 (0.178)
U-test (p)		*0.135 (0.893)*	*5.377(<0.0001)** *	*5.997(<0.0001)** *	

Higher scores indicate healthier aging persons\ IQR= interquartile range\ fr=Friedman Test\ U=Mann-Whitney

Table (3) represents that there is a highly statistically significant difference in the median scores of all healthy aging factors and its total score of the study group (p<0.001) throughout all study phases. However, there is no statistically significant difference in the median scores of all of these factors or its total score in the control group (p>0.05) at the pre, post I, and post II. Also, there is a highly statistically significant difference in the median scores of all healthy aging factors and its total score (p<0.001) between study and control group in post 1 and II.

Table 4: Comparison of the total and domains of wellbeing scores between study and control group throughout the study phases

Wellbeing domains	Group	Pre	Post1	Post2	Significance test
		Mean ± SD	Mean ± SD	Mean ± SD	F (P)
Physical wellbeing	Study	22.86±4.22	24.86±4.22	27.86±4.22	137.680(<0.0001)**
	Control	22.88±4.19	22.68±4.18	22.75±4.12	1.091 (0.321)
t-test (p)		0.018(0.985)	2.245 (0.028)*	5.299(<0.0001)**	
Social wellbeing	Study	20.77±4.89	23.34±4.26	25.77±4.89	102.111(<0.0001)**
	Control	20.98±5.6	20.98±5.6	20.93±5.56	0.218 (0.643)
t-test (p)		0.167(0.868)	2.039 (0.045)*	3.980(<0.0001)**	
Emotional wellbeing	Study	24.94±4.52	27.94±4.52	29.94±4.52	101.414(<0.0001)**
	Control	24.85±4.42	24.78±4.41	24.75±4.35	1.187 (0.302)
t-test (p)		0.090(0.929)	3.068 (0.003)**	5.067(<0.0001)**	
Spiritual wellbeing	Study	16.06±4.29	19.06±4.29	21.06±4.29	157.846(<0.0001)**
	Control	16.5±4.42	16.45±4.39	16.43±4.37	0.773 (0.465)
t-test (p)		0.439(0.662)	2.593 (0.011)*	4.617(<0.0001)**	
Intellectual wellbeing	Study	21.97±2.49	22.97±2.49	23.97±2.49	146.893(<0.0001)**
	Control	22.18±2.59	22.08±2.53	22.05±2.53	1.108 (0.324)
t-test (p)		0.346 (0.731)	1.543 (0.127)	3.304(<0.0001)**	
Total score for wellbeing	Study	106.6±19.57	118.71±19.37	128.6±19.57	401.631(<0.0001)**
	Control	107.38±20.14	106.93±20.05	106.93±19.81	0.819 (0.406)
t-test (p)		0.168 (0.867)	2.581 (0.012)*	4.753(<0.0001)**	

Higher scores indicate better wellbeing\ F=repeated ANOVA\ t=student t test

Table (4) reflects that there is a highly statistically significant difference in the mean scores of total and all domains of wellbeing of the study group (p<0.001) throughout all study phases. While, there is no statistically significant difference in the mean scores of all these domains or its total score in the control group (p>0.05) at

the pre, post I, and post II. Moreover, there is a highly statistically significant difference in the mean scores of total and all domains of wellbeing (p<0.001) between study and control group in post 1 and II except for intellectual wellbeing in Post 1.

Table 5: Comparison of the total and dimensions of health promoting behaviour score between study and control group throughout the study phases

Health promoting Lifestyle dimensions	Group	Pre Mean ± SD	Post1 Mean ± SD	Post2 Mean ± SD	Significance test F (P)
Health accountability	Study	1.83±0.17	2.53±0.47	3.16±0.47	124.598*(<0.0001)**
	Control	1.84±0.16	1.83±0.16	1.88±0.33	0.735 (0.402)
t-test (p)		0.186 (0.853)	8.853(<0.0001)**	13.821(<0.0001)**	
Physical activity	Study	1.93±0.19	2.63±0.6	3.18±0.45	97.859*(<0.0001)**
	Control	1.94±0.19	1.93±0.19	1.93±0.19	1.519 (0.228)
t-test (p)		0.122 (0.903)	6.971(<0.0001)**	16.159(<0.0001)**	
Nutrition	Study	2±0.22	2.42±0.4	3.32±0.37	193.006*(<0.0001)**
	Control	2.01±0.22	2±0.22	1.99±0.21	1.519 (0.228)
t-test (p)		0.170 (0.865)	5.695(<0.0001)**	19.399(<0.0001)**	
Spiritual growth	Study	1.89±0.05	2.36±0.32	3.13±0.34	217.955*(<0.0001)**
	Control	1.83±0.06	1.84±0.06	1.84±0.07	1.518 (0.225)
t-test (p)		0.122 (0.903)	10.082(<0.0001)**	21.793(<0.0001)**	
Stress management	Study	2±0.13	2.38±0.26	3.15±0.48	167.533*(<0.0001)**
	Control	2.03±0.12	2±0.12	2±0.12	1.053 (0.260)
t-test (p)		0.218 (0.828)	8.313(<0.0001)**	14.653(<0.0001)**	
Interpersonal relationships	Study	2±0.13	2.33±0.2	2.99±0.44	109.817*(<0.0001)**
	Control	2.03±0.12	1.99±0.12	1.99±0.12	1.000 (0.373)
t-test (p)		0.016 (0.987)	8.919	13.823	
Total score for health behaviour	Study	1.93±0.15	2.44±0.26	3.15±0.27	397.258*(<0.0001)**
	Control	1.94±0.14	1.94±0.14	1.93±0.14	0.398 (0.673)
t-test (p)		0.146 (0.885)	10.609(<0.0001)**	24.490(<0.0001)**	

Higher scores indicate better health promoting behaviour\ F=repeated ANOVA\ t=student t test

Table (5) clarifies that there is a highly statistically significant difference was found in the total and dimensions of health promoting behaviour mean score of the study group (p<0.001) throughout all study phases. Whereas, there is no statistically significant difference in the mean scores of all these dimensions or its total score in the control group (p>0.05) at the pre, post I, and post II. Furthermore, there is a highly statistically significant difference in the total and all dimensions of health

promoting behaviour mean score (p<0.001) between study and control group in post 1 and II except for interpersonal relationship dimension.

Table 6: Variation in mean of (post 2 minus pre) healthy aging, wellbeing and health promoting behaviour with demographic factors and self-reported health status in the study group (n=35)

Item	The difference in healthy aging score	The difference in wellbeing score	The difference in health promoting behaviour score
	Mean Rank	**Mean ± SD**	**Mean ± SD**
Age			
From 60 to less than 65	22.04	21.85±0.55	1.45±0.19
From 65 to less than 70	17.08	21.75±2.86	1.19±0.26
More than 70	14.35	19.3±2.06	0.96±0.2
Test of significant	5.045 (0.027)*	F= 5.417(0.009)*	F=14.659 (<0.0001)**
Sex			
Male	11.94	20.53±2.96	1.03±0.22
Female	23.72	21.61±1.24	1.4±0.24
Test of significant	Z=3.431 (0.001)*	T=1.424 (0.164)	T=4.801 (0.002)**
Marital status			
Married	25.50	21.75±2.86	1.3±0.3
Widow	23.44	21.17±1.69	1.19±0.26
Divorced	13.13	19.2±1.92	1.01±0.28
Test of significant	K=5.944 (0.030)*	F=2.417 (0.105)	F=2.248 (0.122)
Educational level			
Read and write	15.00	19.2±1.92	1.01±0.28
Primary	17.08	21.06±2.88	1.11±0.26
University	19.59	21.85±0.55	1.45±0.19
Test of significant	K=0.960 (0.619)	F=2.674(0.084)	F=10.312 (<0.0001)**
Current work			
No	17.08	20.7±2.72	1.09±0.25
Yes	18.48	21.83±0.58	1.47±0.19
Test of significant	Z=0.386 (0.700)	T=1.422(0.164)	T=4.549 (<0.0001)**
Income			
Enough	18.48	21.83±0.58	1.47±0.19
Not enough	17.08	20.7±2.72	1.09±0.25
Test of significant	Z=0.386 (0.700)	T=1.422 (0.164)	T=4.549(<0.0001)**
Living condition			
Alone	19.08	19.2±1.92	1.03±0.33
With the husband / wife	20.20	21.54±1.2	1.37±0.19
With one of the children	16.53	21.29±2.78	1.17±0.32
Test of significant	K=0.738 (0.691)	F=2.179 (0.130)	F=3.320 (0.049)*
Self-rated health status			
Poor	10.36	19.3±2.06	0.96±0.2
Moderate	16.00	21.73±3	1.19±0.27
Good	29.44	21.86±0.53	1.44±0.19
Test of significant	K=20.738(<0.0001)**	F=5.424 (0.009)*	F=13.781(<0.0001)**

Table (6) shows a highly statistically significant improvement in the mean score of health promoting behaviours among young old female, with university education, who still working and had enough income p (<0.0001). Also, there was a significant improvement of mean score of healthy aging and wellbeing among young older adults and married female respectively (p= 0.027, 0.030, 0.001). As regards the improvement in relation to self-rated health status the table shows the highly statistically significant improvement in all mean scores of healthy aging, wellbeing, and health promoting behaviours among older adults with good health status (p<0.0001, = 0.009, <0.0001) respectively.

Table 7: Correlation between health promoting behaviour, wellbeing and healthy aging in the study group (n-35)

Item		Health promoting behaviour		
		Pre	Post 1	Post 2
Wellbeing	r	0.095	0.604	0.645
	p	0.586	(<0.0001)**	(<0.0001)**
Healthy aging	r	0.127	0.806	0.833
	p	0.468	(<0.0001)**	(<0.0001)**

r=Pearson Correlation **Correlation is significant at the 0.01 level (2-tailed).

Table (7) illustrates that there are highly statistically significant positive correlations (p<0.001) was found between wellbeing, healthy aging, and health promoting behaviours in the study group.

6. Discussion

As people age, one of the most essential tasks that societies and social-service programs play is to establish supportive environments that address the needs and rights of older adults, as well as to provide training and education programs that encourage health and wellness in their later years. Furthermore, encouraging older persons to engage in active and healthful behaviours is essential [24]. Therefore this

study aimed to investigate the effects of health promotion program on healthy aging, wellbeing and health promoting behaviour among community dwelling older adults.

The program of the study is conducted on 75 older adults. They were divided into study group (n=35) and control group (n=40). Both groups are matched in all demographic characteristic and medical history; there is no statistically significant difference between them.

The functional abilities, intrinsic capacity being, the outcome of physical and mental abilities of older people, impact of physical and social environment and well-being, are all components of healthy aging. With advanced age these healthy aging factors are deteriorated because of increased prevalence of chronic diseases, feeling of loneliness, depression, poverty, and impaired mobility. So, promoting healthy behaviour is one strategy for realizing healthy aging which assist individuals to maximize their health potential through individual, community and organizational change [19].

The findings in the present study represents that there was a highly statistically significant difference in the median scores of all healthy aging factors and its total score in the study group immediately and post 2 months. Likewise, there is a highly statistically significant difference in the median scores of all healthy aging factors and its total score between study and control group in post 1 and II. These results may reflect that the implemented group-based health promotion program is applicable, effective, and efficient. The possible explanation of this improvement may be due to the chance that the program was applied for the participants through group-based sessions that encouraged them to interact with each other and share their experience and gain more positive involvement and social support. In addition, the program encourages older adults to be more active and promote their feeling of capability, helping them to get more involved in related activities to their own health; additionally, it attends to their psychological and social needs.

These results are supported by studies done in Iran by **Davodi et al. (2023)**[19] who stated that healthy aging was positively and significantly impacted by health promotion education programs in the older adults when addressing attention to their psychological and social needs. In the same line, a study done in Korea by **Lee (2020)** [25] concluded that older individuals' lifestyles have been influenced by the health promotion strategy, with self-sufficiency being a key component of healthy aging. This result is similar with another study done in Malaysia by **Loke (2020)** [26] who stated that active people had positive health responsibility, and health promotion

beliefs. Another study done by **Zhang (2018)** [27] reported that adopting a better lifestyle, even just one, can have a significant positive influence on lowering the risk of incident impairment in older persons. This result is consistent with a study in Iran by **Maher et al., (2019)** [28] who concluded that the active participation of older adults in healthy lifestyle education programs can increase their happiness and satisfaction with life. They added that educational programs should involve the older adults in decision making and prevention or health promotion programs.

According to the bio psychosocial model of health, health promotion initiatives ought to focus on both biological and psychological aspect related to health and wellbeing. Well-being is a life-long process, for people have the possibility of behaving in ways that promote their own happiness and wellness, and, if they are fortunate, significant others may behave toward them in ways that facilitate their well-being. Social policy priorities continue to include improving the health and wellbeing of community dwelling older adults. Many additional factors, such as lifestyle behaviours, influence people's well-being as they age in addition to their physiological health [15, 24].

The current results reflects that there was a highly statistically significant difference in the mean scores of the overall domains of wellbeing of the study group throughout all study phases at the pre, post I, and post II. Moreover, there is a highly statistically significant difference in the mean scores of total and all domains of wellbeing between study and control group in post 1 and II except for intellectual wellbeing in Post 1. The possible explanation for these results may be justified by the applied health promotion program includes in its session active exercises, and cognitive exercise which enhance older adults' independence. Also, it includes social participation which enhances communication with others and helps older adults to express their feelings. Furthermore, stress management strategies sessions that improve older adults' wellbeing. Also, the enhancement of older adult's healthy aging reflected on their feeling of wellbeing.

This result is consistent with the research of many other studies [19, 29]. Also, **Behzadnia, (2020)** [24] ,and **Rodrigues, (2023)** [30] revealed that supporting older individuals' overall well-being and exercise behaviour are related to basic psychological needs and intrinsic motivation. Additionally, **Davodi et al., 2023**[19] found that health-promoting group training activities were useful interventions for promoting the health of older adults who faced the risk of weakness and fatigue. These activities can also have a positive impact on older adults' health and increase

their independence. On occasion, the older adults' cognitive function was affected by these activities, which resulted in increased independence and activity in this group. The health promotion strategy has influenced older individuals' lifestyles, with self-sufficiency being a key component of active aging.

Regarding health promoting behaviour, the finding of the current study found that, a highly statistically significant difference found in all dimensions of health promoting behaviour mean score of the study group throughout entirely study phases. Whereas there was no statistically significant difference in the mean scores of all these dimensions or its total score in the control group at the pre, immediately and 2 months post program. The existing study results are consistent with those of the similar studies done in Taiwan by **Chiu, Hu, Lo, & Chang, (2020)** [5]. Similarly, studies done in Turkey by **Polat, & Karasu, (2022)** [31], in China by **Du, et al., (2022)** [32] and in Iran by **Bieyabanie, Mohammad-Alizadeh & Mirghafourvand (2021)** [33] supported this finding. **Estebsari et al., 2014** [34] reported that the mean total score of health-promoting behaviours and its subscales showed a significant increase after educational programs in the intervention group while no changes were observed in the control group. In addition, a statistically significant difference between the control and the intervention groups in the total score of health promotion behaviours and its subscales was reported, indicating the effectiveness of such educational programs.

Furthermore, a meta-analysis study conducted by **Moshfeghy, Riazi, Hajian, & Montazeri, (2023)** [35] revealed that following the intervention, the intervention group's mean score of the health-promoting lifestyle was significantly higher compared to the control group. Additionally, **Chafjiri1 et al., 2018** [36] came to the conclusion that educational programs are crucial in incorporating a healthy lifestyle to motivate older adults to take greater responsibility for their health, continued physical fitness, a balanced diet, positive interpersonal relationships, anticipated spiritual growth, and effective stress and anxiety management. On the other hand, in Netherlands, a study performed by **Marcus-Varwijk et al. 2020** [37] reported that older people who participate in community health consultation offices did not significantly improve in any health-related outcomes (such as self-reported health status, falls and fractures, biometric measures, health-related behaviours, and health profiles (CHCO). They rationalized that the CHCO intervention was too brief. The CHCO intervention consisted of only two/three consultation moments between the older adults and the community nurse. They added another explanation for not

finding improvements in health-related outcomes that the Netherlands has a strong primary health care system. Because basic health insurance is obligatory in the Netherlands, all citizens have free access to almost all primary and secondary care, providing support to older adults. May be, the CHCO intervention did not provide extra care benefits compared with older adults living in the community who receive care as usual, in which care is mainly provided by the general practitioner who acts as a gate keeper for specialized medical care.

Regarding variation in mean of healthy aging, wellbeing and health promoting behaviour with demographic factors and self-reported health status in the study group, the current results indicated that there was a highly statistically significant improvement in the mean score of health promoting behaviours among young-old female, those with university education, and who still working and had enough income. In addition, the present study results presented that significant improvement of mean score of healthy aging and wellbeing among young older adults and married female. This results is in line with a study done in Tawin by **Chia et al., (2023)** [38] and in China by **Dev et al., (2020)** [39]. This positive relationship may be attributed to the fact that higher-income and educated older adults have more ability, information and time designated for leisure activities and outdoor exercises. In addition, married female may receive social support and effective social network which has a vital role in enhancing the social interaction of older adults and helping them to adhere more to health promoting behaviours, including interpersonal relations.

This agrees with the findings reported in Taiwan by **Chai et al., (2023)** [38] which indicated that female older adults had a significant improvement in healthy aging and health promoting behaviours and they attributes the results to the praise they received by their friends when exercising. This social support was most effective in helping female older adults to form health-promoting lifestyles. Furthermore, female older persons were able to participate in higher levels of physical activity, which indicates better assistance, and were more likely to be active as a result of this support. They also had greater access to social support (family, spouses, children, or friends). The same result was reported in Taiwan by **Chang et al., (2017)** [40] who came to the conclusion that there is a positive correlation between marital status and perceived health and that people who were married or living together scored higher on the post-test when it came to perceived health. This finding is in line with **Dahlheim-Englund, Carlsson, Nyström, (2019)** [41]. Nonetheless, older persons with lower

socioeconomic status are less likely to participate in health-promoting behaviours because they are not as informed about them [42].

Interestingly, older adult participants who lived with significant other (spouse, children, or others) had better health-promoting behaviours than those who lived alone. This can justify by the living in family members make elderly people feel cared and warmth which help them to adhere with such programs. This finding was consistent with those of study done by **Benson et al., (2019)** [43] and **Ryan & Deci, (2017)** [44] who found that socialization was correlated with healthy aging and good health-promoting behaviours. Similarly, different study founded that exercise time and health promoting behaviours increased among the male and female older adults who had a partner to exercise with and who was obtain companionship [38].

Additionally, current result showed that there was a highly statistically significant relationship between self-rated health status and healthy aging score, wellbeing score, and health promoting behaviour score. This outcome is in line with findings from more recent research conducted by **Testad et al. (2020)** [45] who showed a statistically significant change toward higher self-rated health values in their self-rated health between the baseline and follow-up. Regarding correlation between healths promoting behaviour, wellbeing and healthy aging in the study group, this study results show that there was a highly statistically significant positive correlation between wellbeing, healthy aging, and health promoting behaviours in the study group. This finding on the same line with other studies [38, 46, 47]. This may be justified by the enhancement of health promoting behaviours assists older adults to take more control over their health which is reflected on their feeling of wellbeing and healthy aging which means that all these variables were interrelated.

Conclusion

Health promotion program has a positive effect on healthy aging, wellbeing, and health promoting behaviour. Moreover, young old, female sex, married, higher educational level, currently work, and enough income were the most factors significantly associated with higher healthy aging, wellbeing, and health promoting behaviours' scores.

Recommendations

o To reach the goal of promoting the health of the older adults and to reduce chronic diseases and multiple complications due to the lack of a healthy

lifestyle in a wide range it is recommended to implement health promotion lifestyle programs.

o The nurses should provide older adults with information about community services available that may improve one's ability to carry out the activities recommended to them and lower environmental barriers.

o This program should be used in health care facilities by health care monitoring personnel, particularly nurses.

o It is advised that the developed program should be used in different clinical settings as a successful nursing intervention to help older adults maintain their health as they age.

o Aging related problems can be prevented and decreased by focusing on healthy aging, wellbeing and adopting health promotion lifestyle. This decreases the financial burden and related costs. This is particularly crucial for the health system's policy and decision-makers.

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