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Using An Educational Program Based On Health Belief Model To Improve The Nutritional Behaviors Of Elderly Against Cancer Diseases

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Abstract

Background: Cancer patients often have inadequate knowledge about the nature, risk factors and cancer related complications, and this negatively affects their attitudes and practices towards its care. Hence, elderly education regarding cancer disease and nutrition self-care practices. **Aim of the study** was aimed to evaluate the effect of health belief model on nutritional behavior to prevent Cancer among elderly **Design:** A quasi experimental design**. Settings:** The study was carried out in the geriatric homes in Beni Suef city. All available geriatric homes in Beni Suef governorate will be included **Study subjects:** A convenience sample of 100 from geriatric homes selected by random sampling. **Data collection tools: Interview questionnaire Part I:** Socio-demographic characteristics **Part II:** Medical history **Part III: Assessing** elderly' knowledge (Pre/ Post) **Second tool:** The health belief model scale (Pre /Post) **Results: The** study finding indicated that, there was positive correlation between elderly's total compliance with therapeutic health behaviors and their HBM constructs (perceived susceptibility, severity, benefits and barriers) pre/post program at P<0. 001.. Conclusion: Cancer's elderly in the current study lacked appropriate knowledge and health beliefs regarding Cancer's disease in general and nutrition specifically in the pre-program phase and their compliance with nutrition health behaviors and Cancer's prevention were mostly unsatisfactory**. Recommendations**: Health education programs should be developed with a multidisciplinary team including, nutritionists. So, it is essential to introduce training programs and workshops aims to prepare enough, nutritionists including, nutritionist's educators and, nutritionist's dietitian across the country.

Keywords: health belief model, elderly, nutritional behaviors, cancer.

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Introduction

Older adults aged 65 years expected to be double in the next 2 decades worldwide it was predicted that around 20 million Egyptians will be categorized as elderly by 2050; with the rapid increase in the number of older adults the global cancer burden rapidly increased. In 2012, there were 14.1 million new cancer cases. by 2035 it's estimated to increase the cancer cases to 24 million. In male older adult it represents from 3.9 to 8.5 million (118% increase) while in female older adult represent from 2.8 to 5.7 million (104% increase) **(1).**

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The incidence of cancer in Egypt estimates that, cancer cases expected to increase from 2013-2050 due to change in population growth and change in population structure. The estimated of cancer incidence was 114, 985 in 2013, projection to 2050 estimates the incidence of cancer in Egypt to be 333,169 **(2).**

In Egypt, in 2018, there were about 134,632 new cancer cases and 89,042 cancer related deaths in Egypt. Liver (20.7%) and breast (16.4%), bladder (7.9%), lung (4.9%) and Other cancers (44.7%). Cancers are the most common tumors in terms of incidence and mortality. Risk of developing cancer before the age of 75 years **(3,4).**

Health theories and models have been valued in the field of health education and promotion via behavior change. They are vital in explaining health risk factors and changing behavior. Health belief model (HBM) considered one of the earliest behaviors change models to give an explanation for human health behaviors and decision-making. The model constructs help to predict whether individuals will take action to avoid, screen for, and management of health problems ***(5).***

The core assumption of the Health Belief Model **(HBM)** is primarily based on the idea that changing the health belief is the milestone for behavior change which contributes to improve person's health status. HBM is composed of four main constructs. First, perceived susceptibility: to realize and believe that they are exposed to the risk. Second, perceived severity: To understand and belief that the disease is a serious health problem, and it can lead to serious complications. Third, perceived barriers: to identify psychological, physical, or financial, barriers that can hinder healthy behaviors so that the person can overcome it to assume healthy behavior. Fourth, perceived benefits: it refers to the insight to the constructive consequences that are caused by a specific act ***(6).***

Nutritionist health (NH) have an accountability to assist, and support elders to recognize their health-related experiences and to enhance their abilities to make informed choices. Nutritionist health has an effective role in prevention of foot ulcers and lower limb amputation by educational interventions, screening high-risk people and providing health care, they can use HBM to clarify elderly's perceptions of risk; this enables them to apply strategies that influence them to make healthy lifestyle changes that play a positive role in compliance with a therapeutic regimen and prevent further complications and consequences of diabetes ***(7,8).***

Significance of the study

Cancer cause significant burden and affect the quality of life for the patients and their families, so they need supportive and palliative care services. and there are many barriers and challenges to access these services **(9).** These Challenges of elderly people with cancer represented in increasing numbers of patients being waited for cure, by considering their age-related metabolic changes, co morbidities, the lack of guidelines and efforts achieved to solve

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this huge problem, and above of all increasing the incidence of malignancies after the age of 65 years 11-fold compared to younger adults **(10)**.

Health education of elderly is a basic indicator used to assess the quality of health to the patient and further planning for the care**(10)**. . So that the current study aimed to evaluate the effect of health belief model on nutritional behavior to prevent Cancer among elderly.

The findings of this study will provide the knowledge that lead to understand and identify the relation between healthy diet of the elderly to prevent and decrease cancer to access bring new changes or modification of the attuited of elderly toward nutrition and determine the key factors that influence the health of elderly.

Aim of the study

This study aims to evaluate the effect of health belief model on nutritional behavior to prevent Cancer among elderly through:

1- Assessing elderly' knowledge toward Cancer.
2- Assessing elderly' health beliefs toward Cancer.
3- Assessing elderly' nutrition self-care practices.
4- Designing and implementing program based on HBM for correlation between nutrition and Cancer regimen according to their needs.
5- Evaluating the effectiveness of HBM based program on elderly's knowledge, health beliefs toward Cancer and nutrition health behaviors and practices regarding nutrition behavior.

Study Hypothesis:

The investigator hypothesized that implementing health belief model-based education program for elderly would expect to promote their level of knowledge, health beliefs toward cancer and nutrition, and practices regarding food habits.

Subjects and Method

Research design: -

The current study used a quasi-experimental research approach (one group pre/post - test).

Setting: -

The study was conducted at the all available geriatric homes in Beni Suef governorate (These were namely Dar Elkheir (A) and Dar Ahalina (B)).

Beni-Suef Governorate is situated 110 km South to Cairo.

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Subjects:

Convenience sampling was used in the current study.

Sample criteria: All elderly persons residing in any of the two selected geriatric homes formed the sampling population.

Tools for data collection

First tool: The investigator created a structured interviewing questionnaire in Arabic after researching the literature and consulting specialists, and it consisted of the following parts:

Part I: Socio-demographic characteristics of the elderly including age, gender, marital status, occupation, monthly income, level of education, and place of living of the old (Q1 to Q7).

Part II: Medical history of the elderly including chronic diseases, associated comorbidity, current treatment and family history of chronic diseases and cancer (Q8 to Q12).

Part III: Assessing elderly' knowledge (Pre/ Post) (Q1 to Q34) through asking questions. It covered the following knowledge about cancer in general.

Knowledge regarding cancer in general. It was composed of 12 items (Q1 to Q12) as; meaning of cancer, it's risk factors, types, signs and symptoms, complications, diagnostic tests, causes as well as knowledge about goals of therapeutic diet for cancer, food should be avoided, food to be eaten in moderation.

B. Knowledge regarding Diet of cancer, smoking and periodic examination. It was composed of18 items (Q13 to Q31) as; meaning of Diet, it's characteristics of the food and(ect.....).

Scoring system

Each correct answer was scored by one grade and each wrong or "don't know "answer was scored by Zero, a total of 50% and above were considered satisfactory and less than 50% were considered unsatisfactory.

Second tool: The health belief model scale (Pre /Post) was adapted from Sharifirad et al. ***(11)***. Modification was done by the investigator on Arabic language. It was used to assess the elderly' health beliefs about cancer and diet . The main HBM sub-constructs which used in this study were perceived susceptibility (possibility of cancer occurrence (9 items), perceived severity (perceived seriousness of cancer (9 items), perceived benefits (benefits of adopting preventive health behaviors (8 items), and perceived barriers (barriers of adopting preventive health behaviors (11 items).

Scoring system: The scale included 37 items on a three points likert scale for each variable. All statements were scored on a scale from 1-3. Elderly responses were scored as follows; agree =3, neither agree nor disagree = 2, while disagree = 1 for all parts of the scale except the part of the perceived barriers was coded as the following: agree=1, neither agree nor disagree=2, disagree =3. The optimal total scores of the scale were 115 and subjects who reach 50% and more considered to have positive response and who got less than 50% otherwise considered to have negative response.

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Operational Design: -

The operational design includes preparatory phase, validity, reliability, pilot study and field work.

- **Preparatory phase:**

It includes reviewing literature and different studies related to HBM for cancer prevention using books, articles, periodicals, and the internet, as well as designing and translating study tools into Arabic after reviewing recent, current, national, and international related literature in various aspects of the problems. A detailed assessment of the literature and other accessible resources was used to outline all topics to be covered in the HBM-based program and educational brochure.

- **Content validity:**

The data collection techniques were validated and reviewed for content validity by five experts in nutrition and medicine specialties in order to meet the study's standards for trustworthiness. They were professors and assistant professors from Beni-Suef University's college of pharmacy and medicine. To determine the tools' relevance, clarity, application, and completeness. Minor changes, such as rephrasing and reordering of some sentences, were made in response to expert comments and recommendations.

- **Tool reliability:**

Table (1) The reliability of tools was assessed through measuring their internal consistency by Cronbach Alpha Coefficient test:

Tools	Number of items	Cronbach's Alpha
Elderly' knowledge.	42	.940
Elderly' compliance.	26	.783
Health belief model scale.	39	.830

Pilot study:

A pilot study of 10 % (10) of the elderly was conducted to assess the study tools for clarity, feasibility, application, and time required to complete the questionnaires. The necessary changes were made by removing unnecessary or repeated questions and adjusting prior to data collection based on the findings of the pilot study. The older participants in the pilot trial were not included in the main study sample.

Field work:

The study was started and finished through the following phases:

Once the official approvals for carrying out the study were obtained, the researcher met with the Director of each of the two geriatric homes to explain the study's purpose and obtain agreement and cooperation in setting up a convenient time for data collection. Two days per week (Monday &Wednesday), from 9.00 AM. to 1.00 PM. The data collection lasted over three months starting from the beginning of January to the end of March 2021. The investigator

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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 acceptance from elderly to participate in the present study. The elderly was interviewed to assess their socio-demographic data, their knowledge and health beliefs regarding cancer and diet (pre/ test).

According to the elderly's questions, explanations and clarifications were given. The patient filled out the written questionnaire in front of the investigator, or the investigator filled it out for illiterate patients, and the investigator double-checked that all information on the sheet was correct. The questionnaires took an average of 25-30 minutes to complete. The number of old people interviewed per week ranged from one to five. The investigator created the program using information from pre-assessment tools.

B) Program implementation:

The investigator developed a comprehensive HBM-based education program with simple Arabic language to suit elderly' level of understanding, which aimed to improve elderly' knowledge, modify their health beliefs, and empower them to make health decisions for compliance with therapeutic health behaviors for the prevention of cancer based on the needs identified in the assessment phase and review of literatures. The investigator devised a timeline for implementing the program. The objectives, learning activities, teaching techniques, and media were all planned ahead of time. The textbook, periodicals, and the Internet were used to compile the program's materials. The educational program was built using HBM structures (perceived susceptibility, perceived severity, perceived benefits, and perceived barriers).

Regarding the elderly's barriers, the program includes methods to reduce perceived barriers among the elderly, such as providing information about proper nutrition and its contents for cancer, as well as ways to reduce the completion of cancer, and educating patients about diet and physical exercise in a simple way to improve blood circulation and strengthen each limb that does not take a long time, as well as providing psychological support to cope with this chronic disease. The main items discussed during the program including the meaning of cancer, its forms, signs, and symptoms, risk factors, acute and chronic cancer consequences, negative impacts of cancer, its causes, and complications (to improve elderly perceptions of susceptibility and severity) were among the primary topics presented during the program. Encourage the elderly to follow their treatment plan to avoid cancer and its problems, such as (medical treatment, nutrition education, physical activity, regular check-ups, regular laboratory testing, and smoking cessation (to improve the elderly's perception of benefits).

General objectives of the program:

By the end of the program implementation each elderly person will be able to:

1-Acquire basic knowledge about cancer.
2-Recognize simple information about diet.
3-Gain knowledge about ways of prevention of cancer.
4- Apply ideal health practices in eating.
5- Change their practices and beliefs toward food which can reduce cancer.

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- **Specific objectives:** By the end of each session elderly should be able to:
- Recognize meaning of cancer.
- Mention different types of cancer.
- Enumerate signs and symptoms of cancer.
- Identify risk factors of cancer.
- Mention acute and chronic complications of cancer.
- Describe negative effects of diabetes on feet.
- Know meaning of nutrition.
- Recognize aims and benefits of therapeutic nutrition for cancer
- Determine healthy diet including type and amount of food according to the food pyramid.
- Know benefits of compliance with regular check-up, laboratory tests and smoking cessation.
- Identify barriers of adopting health behaviors and how to resolve it.

Implementation of the program is based on holding sessions utilizing various educational methods and media, as well as the use of a guiding handbook, handouts, and explanatory photographs that are specifically designed and developed to meet the needs of the elderly. The elderly who was allocated to group teaching were split into 20 groups of 4-5 people each. Each group's information and skills were updated. Time was set out for students to ask questions and get answers, as well as to provide feedback on the teaching session. This phase lasted five months and two weeks, commencing in early April 2021 and ending in late August Plus two weeks in September 2021.

Program sessions:

The investigator visited the chosen location two days a week (Monday and Wednesday) from 9.00 a.m. to 1.00 p.m. to implement the program. The investigator established the program's content and objectives over the course of seven sessions for theory. The total time spent on the sessions was 4:10 hours, with each session lasting between 25 and 45 minutes, depending on the elderly's comprehension and attention span. The clinic and waiting area were used for teaching sessions.

An introduction to the program and its goals was given at the start of the first session. It was decided during the sessions with the elderly. From the second session onwards, each session began with a recap of what had been covered in the previous one, as well as the next session's goals. A summary was written at the end of each session.

Each program session has general and specific objectives that are achieved through a variety of teaching methods and media such as lecture, group discussion, brainstorming, posters, guidance booklets, illustrative pictures, and handouts that include instructions and information for the elderly to use as a reference during and after program implementation.

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C) Evaluation phase: -

This phase aimed to evaluate the level of improvement in elderly' knowledge, health beliefs toward cancer and food which can reduce cancer, compliance with healthy diet. Evaluation of outcome of the program was carried out by the investigator after two weeks of program implementation (post-test I) then follow-up after two months (post- test II) by using the same study tools that have been used in pretest.

IV. Administrative approval:

Approval was obtained from the authorities of the from National Institute of Longevity Elderly Science, Beni suef, then written official letters sent to the director of Social Affairs to each geriatric home to explain the aim of the study and get official approvals., include the aim of the study and steps of the program obtained to elderly in geriatric home.

V. Ethical consideration:

The ethical research considerations in this study includes the following: A written initial approval was obtained from the research ethical committee at the National Institute of Longevity Elderly Science Beni- suef University, individual oral consent was obtained from each participant elderly after explaining the nature and benefits of the study. Anonymity and confidentiality were also assured. The investigator cleared the objectives and aim of the study to the elderly persons and allowed them to choose to participate or not in the study and given the right to withdraw at any time from the study.

Limitation of the study

The COVID-19 pandemic posed a major barrier for data collection, so that the fieldwork was extended to six months to obtain the required sample size with no dropouts.

VI. Statistical Design:

The collected data were organized and analyzed using appropriate statistically significant tests. The data were collected and coded using the Computer Statistical Package for Social Science (SPSS), version 19, and was also used to do the statistical analysis of data. Data were presented using descriptive statistics in the form of frequencies and percentages. Chi-square, ANOVA and Pearson tests were used to compare frequencies and correlation between study variables.

Degrees of significance of results were considered as follows:

p-value > 0.05 Not significant (NS).

p-value ≤ 0.05 Significant (S). p-value ≤ 0.01 Highly Significant (HS).

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Results:

Table (2): Table 1. Sociodemographic Characteristics among Studied Subjects. (n=100)

	No.	Percentage
Age		
Less than 60	13	13.0
From 60 to 70	68	68.0
70 or more	19	19.0
Mean±SD	64.11±5.58	
Gender		
Male	55	55.0
Female	45	45.0
Education		
Illiterate	40	40.0
Read and write	15	15.0
Primary	2	2.0
Secondary	26	26.0
University	17	17.0
Marital status		
Single	0	0.0
Married	18	18.0
Widow/divorced	82	82.0
Occupation		
No work	8	8.0
Farmer	9	9.0
Housewife	33	33.0
Employee	20	20.0
Teacher	11	11.0
Freelancer	6	6.0
Worker/cleaner	11	11.0
Nurse	2	2.0
Residence		
Rural	66	66.0
Urban	34	34.0
Income		
Sufficient	19	19.0
Insufficient	71	71.0
More than sufficient	10	10.0
Do you have relatives with cancer? *		
None	58	58.0
One of the parents	14	14.0
Parents together	12	12.0
Brother or sister	8	8.0
Grandfather or grandmother	6	6.0
Uncle	12	12.0

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Table (2): shows that; 68.0. % of the elderly their ages ranged from 60 to less than 70 years old with mean age 64.11±5.58. 45.0% were females and 82.0% of them were Widow/divorced. Regarding occupation, 33.0% were housewives. As regards to monthly income, 71.0% didn't earn enough monthly income and only 19.0% of them had enough monthly income. In relation to level of education, 40.0% were illiterateand 17.0% had university education. 66.0% of elderly in the sample belonged to rural areas. 58.0% had relatives with cancer.

Table 3. Medical History among Studied Subjects. (n=100)

	No.	Percentage
Medical Problems *		
None	29	29.0
Diabetes mellitus	38	38.0
Hypertension	47	47.0
Heart disease	10	10.0
Kidney disease	5	5.0
Liver disease	5	5.0
Gastrointestinal diseases	9	9.0
Asthma	3	3.0
Tumors	2	2.0
Rheumatoid	5	5.0
Joint stiffness	4	4.0
Epilepsy	1	1.0
Vertigo	1	1.0
Fainting	1	1.0
Do you have poor urine or stool control?		
Yes	12	12.0
No	88	88.0
Do you have a disability? *		
None	88	88.0
In vision	5	5.0
In hearing	4	4.0
In motion	4	4.0
In balance	1	1.0

* Numbers are not mutually exclusive.

Table (3): illustrates distribution of the elderly according to their medical history; the diagnosed as Hypertension, 47.0% of them 38.0% of them had diabetes. As regards to 10.0% of the elderly had heart disease, and 36.4% complains from more than one problem. 12.0% of the elderly had poor urine or stool control. 14.0% of the elderly hada disability.

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Table 4. Knowledge among Studied Subjects. (n=100)

	Pre-program		Post-program		X^2 (Sig.)
	Incorrect	Correct	Incorrect	Correct	
What is cancer?	91	9	20	80	102.055 (0.000**)
What are the factors that contributeto the occurrence of cancer?	93	7	14	86	125.435 (0.000**)
What are the types of cancer?	70	30	9	91	77.853 (0.000**)
Symptoms of cancer	92	8	49	51	44.452 (0.000**)
Complications of cancer	92	8	48	52	46.095 (0.000**)
Tests that help diagnose cancer	91	8	9	91	158.421[FE] (0.000**)
Factors that contribute to the highincidence of cancer	98	2	34	66	91.266 (0.000**)
What are the causes of low immunityin a cancer patient?	90	10	22	78	93.831 (0.000**)
What is the goal of therapeuticnutrition for a cancer patient?	82	18	5	95	120.618 (0.000**)
What food should a cancer patientavoid?	83	17	1	99	138.013 (0.000**)
What are the foods that can be eaten?	70	30	4	96	93.436 (0.000**)

X^2 Chi square test
[FE] Expected cell count less than 5, Fisher's Exact test was used.
** Highly statistically significant at $p \leq 0.01$

Table (4): represents that, there were highly statistically significant differences were found between pre/ post the program implementation, 91% of the elderly had incorrect answer about the meaning of cancer preprogram, which decreased to 20% in the post program. 7% only of the elderly know the factors that contribute to the occurrence of cancer preprogram, which increased to 86% in the post program. Only 8% of the elderly know the complications of cancer versus to 91%in the post program. The table shows that, 83 % of the elderly had incorrect answer about types of foods that a cancer. patient should avoid pre program, which decreased to 1% in the post program.

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Table 5. Nutrition among Studied Subjects. (n=100)

	Pre-program			Post-program			X^2 (Sig.)
	Yes	Maybe	No	Yes	Maybe	No	
Do you plan and organize your meals?	15	31	54	53	30	17	40.533 (0.000**)
Are you interested in taking proper portions of fruits and vegetables?	32	39	29	60	36	4	27.581 (0.000**)
Are you keen to stay away from foods rich in sugars and fats?	14	51	35	55	36	9	42.312 (0.000**)
Do you moderate your intake of starchy foods such as rice, pasta, potatoes, bread… .....?	20	43	37	60	28	12	35.924 (0.000**)
Do you mind dividing meals into small meals and avoiding foods in large quantities in one meal?	17	27	56	50	26	24	29.073 (0.000**)
Do you avoid eating fast food and soft drinks (Pepsi, Miranda, Coca-Cola, and canned juices)?	25	42	33	62	26	12	29.300 (0.000**)
Interested in drinking 6 glasses of water or more daily?	19	38	43	54	29	17	29.256 (0.000**)
Do you moderate in eating materials?	14	46	40	54	25	21	35.659 (0.000**)

X^2 Chi square test
** Highly statistically significant at $p \leq 0.01$

Table (5): reveals that, there were highly statistically significant differences were found between pre/ post the program implementation, 15 % of the elderly had plan andorganize meals pre program, this percentage improved to 53% post program, which 20% of the studied sample have moderate your intake of starchy foods such as rice, pasta, potatoes, bread this percentage increased to 60% in the post program. 33% ofthe elderly eating fast food and soft drinks pre program versus 12% post program.

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Table 6 Health Believe Model Subscale A among Studied Subjects. (n=100)

Health belief model scale.		Pre-program		Post-program		X^2	Sig.
		No.	%	No.	%		
Perceived susceptibility (possibility of cancer complications)							
Cancer can be serious disease if I don't control it	Disagree	7	7.0	0	0.0	20.356	0.000**
	Neutral	13	13.0	1	1.0		
	Agree	80	80.0	99	99.0		
I believe I will susceptible to many complications affected my whole body systems.	Disagree	18	18.0	7	7.0	21.255	0.000**
	Neutral	39	39.0	18	18.0		
	Agree	43	43.0	75	75.0		
I feel like I will have problems some time during my life.	Disagree	22	22.0	12	12.0	8.363	0.015*
	Neutral	33	33.0	23	23.0		
	Agree	45	45.0	65	65.0		
There is a possibility of getting foot ulceration in the current time.	Disagree	49	49.0	37	37.0	5.296	0.071
	Neutral	18	18.0	14	14.0		
	Agree	33	33.0	49	49.0		
My physical condition makes it more likely that I will get a Cancer.	Disagree	38	38.0	30	30.0	19.176	0.000**
	Neutral	31	31.0	11	11.0		
	Agree	31	31.0	59	59.0		
My chance of getting Cancer.in the next few years are high.	Disagree	34	34.0	31	31.0	4.103	0.129
	Neutral	38	38.0	28	28.0		
	Agree	28	28.0	41	41.0		
When I think of my chance of getting Cancer I feel very scared.	Disagree	11	11.0	5	5.0	3.809	0.149
	Neutral	19	19.0	14	14.0		
	Agree	70	70.0	81	81.0		
If I had Cancer, the illness would be very bad and cause several complications.	Disagree	12	12.0	5	5.0	12.279	0.002**
	Neutral	26	26.0	11	11.0		
	Agree	62	62.0	84	84.0		
My financial security would be endangered if I got Cancer.	Disagree	11	11.0	2	2.0	9.672	0.008**
	Neutral	27	27.0	19	19.0		
	Agree	62	62.0	79	79.0		

X^2 Chi square test
* Statistically significant at p≤0.05
** Highly statistically significant at p≤0.01

Table 6: denotes that there were statistically significant differences were found between pre/ post the program implementation; 80% of the elderly believed that, cancer can be serious disease if they don't control it pre program, which increased to99 % in post program, while 18% of them don't believe that susceptible to many complications affected my whole body systems. Also, 62% of the elderly believed that cancer very bad and cause several complications versus 84% in post program

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Table.7Health Believe Model Subscale B among Studied Subjects. (n=100)

Health belief model scale.		Pre-program		Post-program		X^2	Sig.
		No.	%	No.	%		
Perceived severity (perceived seriousness of cancer)							
Cancer will have a bad effect on my health.	Disagree	6	6.0	3	3.0	7.381 FE	0.021*
	Neutral	17	17.0	6	6.0		
	Agree	77	77.0	91	91.0		
Cancer will cause me to besick a lot.	Disagree	10	10.0	2	2.0	11.15	0.004**
	Neutral	23	23.0	12	12.0		
	Agree	67	67.0	86	86.0		
I think I will always need a proper diet and medication to maintain my health.	Disagree	9	9.0	1	1.0	47.034	0.000**
	Neutral	42	42.0	6	6.0		
	Agree	49	49.0	93	93.0		
Problems I would experience from Cancer would last a long time.	Disagree	14	14.0	6	6.0	19.811	0.000**
	Neutral	43	43.0	20	20.0		
	Agree	43	43.0	74	74.0		
My whole life would change ifI had Cancer problems	Disagree	14	14.0	7	7.0	6.416	0.040*
	Neutral	36	36.0	26	26.0		
	Agree	50	50.0	67	67.0		
If I Cancer, it would be more serious than other diseases.	Disagree	15	15.0	8	8.0	13.081	0.001**
	Neutral	37	37.0	19	19.0		
	Agree	48	48.0	73	73.0		
Having a Cancer will threaten my relationship with my significant others.	Disagree	32	32.0	17	17.0	15.003	0.001**
	Neutral	36	36.0	24	24.0		
	Agree	32	32.0	59	59.0		
Cancer may lead to death.	Disagree	14	14.0	11	11.0	25.188	0.000**
	Neutral	31	31.0	5	5.0		
	Agree	55	55.0	84	84.0		
If I got Cancer, my activities of daily living will be affected significantly.	Disagree	13	13.0	4	4.0	18.53	0.000**
	Neutral	38	38.0	18	18.0		
	Agree	49	49.0	78	78.0		

X^2 Chi square test

FE Expected cell count less than 5, Fisher's Exact test was used.

* Statistically significant at p≤0.05

** Highly statistically significant at p≤0.01

Table 7: clarify that there were statistically significant differences were found between pre/ post the program implementation; 77 % of the elderly believed that cancer will have a bad effect on my health pre program, which increased to 91% in post program, while 9% of them don't believe that need a proper diet and medication to maintain health at pre program versus to 1% post program. Also, 55% of the elderlybelieved that cancer may lead to death this percentage increased to 84% in post program.

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Table 8. Health Believe Model Subscale C among Studied Subjects. (n=100)

Health belief model scale.		Pre-program		Post-program		X^2	Sig.
		No.	%	No.	%		
Perceived benefits (benefits of adopting preventive health behaviors).							
Maintaining a healthy diet helps prevent cancer.	Disagree	14	14.0	2	2.0	52.114	0.000**
	Neutral	40	40.0	5	5.0		
	Agree	46	46.0	93	93.0		
Eating a healthy breakfast daily is essential to good health.	Disagree	7	7.0	0	0.0	39.494 FE	0.000**
	Neutral	36	36.0	6	6.0		
	Agree	57	57.0	94	94.0		
. Eating healthy meals at regular times improves the work of the digestive system and reduces the incidence of diseases, including stomach cancer.	Disagree	19	19.0	13	13.0	21.594	0.000**
	Neutral	38	38.0	13	13.0		
	Agree	43	43.0	74	74.0		
Having a healthy diet and correct treatment reduces the chance of dying from Cancer	Disagree	25	25.0	5	5.0	33.781	0.000**
	Neutral	45	45.0	26	26.0		
	Agree	30	30.0	69	69.0		
Reducing the intake of sugar, salt and saturated fats helps prevent cancer.	Disagree	6	6.0	0	0.0	39.417 FE	0.000**
	Neutral	42	42.0	9	9.0		
	Agree	52	52.0	91	91.0		
Complications of cancer can be prevented if a plan is made at the beginning of the disease to control it.	Disagree	11	11.0	0	0.0	55.396	0.000**
	Neutral	43	43.0	6	6.0		
	Agree	46	46.0	94	94.0		
Not neglecting fluids and drinking enough of them helps to improve health and avoid diseases.	Disagree	33	33.0	3	3.0	72.296	0.000**
	Neutral	40	40.0	11	11.0		
	Agree	27	27.0	86	86.0		
Maintaining the diet of Cancer is useful in controlling the disease and its complications.	Disagree	27	27.0	6	6.0	53.289	0.000**
	Neutral	41	41.0	11	11.0		
	Agree	32	32.0	83	83.0		

X^2 Chi square test
FE Expected cell count less than 5, Fisher's Exact test was used.
** Highly statistically significant at $p \leq 0.01$

Table 8 : represented that there were statistically significant differences were found between pre/ post the program implementation; 46% of the elderly believed that, maintaining a healthy diet helps prevent cancer pre program, which increased to 93% in post program, while 11% of them don't believe that complications of cancer can be prevented if a plan is made at the beginning of the disease to control it versus to 0% post program. Also, 52% of the elderly believed that, reducing the intake of sugar, salt and saturated fats helps prevent cancer this percentage increased to 91% in post program.

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Table 9 Health Believe Model Subscale D among Studied Subjects. (n=100)

Health belief model scale.		Pre-program		Post-program		X^2	Sig.
		No.	%	No.	%		
Perceived barriers (barriers of adopting preventive health behaviors)							
I cannot properly understand everything about the diet of Cancer..	Disagree	54	54.0	26	26.0	40.434	0.000**
	Neutral	32	32.0	17	17.0		
	Agree	14	14.0	57	57.0		
The diet of Cancer makes eating difficult, boring and unappealing.	Disagree	51	51.0	24	24.0	22.253	0.000**
	Neutral	35	35.0	36	36.0		
	Agree	14	14.0	40	40.0		
Family and social attachments affect my diet.	Disagree	44	44.0	41	41.0	0.226	0.893
	Neutral	36	36.0	39	39.0		
	Agree	20	20.0	20	20.0		
It is important to take all medication as recommended by the physician to achieve good control of Cancer.	Disagree	34	34.0	22	22.0	31.453	0.000**
	Neutral	38	38.0	12	12.0		
	Agree	28	28.0	66	66.0		
Feeling stressed and depressed prevent me from controlling my cancer.	Disagree	45	45.0	40	40.0	1.603	0.449
	Neutral	39	39.0	37	37.0		
	Agree	16	16.0	23	23.0		
Forgetting is one of the reasons for not following a proper diet for cancer.	Disagree	38	38.0	45	45.0	2.367	0.306
	Neutral	36	36.0	26	26.0		
	Agree	26	26.0	29	29.0		
There are no great feats in trying to control cancer because cancer complications will occur anyway.	Disagree	36	36.0	26	26.0	8.684	0.013*
	Neutral	38	38.0	28	28.0		
	Agree	26	26.0	46	46.0		
As a result of my movement was weak, I could not organize the timing of meals.	Disagree	24	24.0	16	16.0	11.657	0.003**
	Neutral	43	43.0	27	27.0		
	Agree	33	33.0	57	57.0		
Periodic inspection is not necessary as long as there are no problems.	Disagree	30	30.0	6	6.0	33.818	0.000**
	Neutral	32	32.0	17	17.0		
	Agree	38	38.0	77	77.0		
Daily or monthly periodic examination is necessary, it is a waste of time	Disagree	23	23.0	7	7.0	28.847	0.000**
	Neutral	35	35.0	14	14.0		
	Agree	42	42.0	79	79.0		
I do have sufficient information on how Periodic inspection.	Disagree	54	54.0	21	21.0	26.021	0.000**
	Neutral	26	26.0	32	32.0		
	Agree	20	20.0	47	47.0		

X^2 Chi square test
* Statistically significant at p≤0.05
** Highly statistically significant at p≤0.01

Table 9 : represented that there were statistically significant differences were foundbetween pre/ post the program implementation; 28% of the elderly believed that It is important to take all medication as recommended by the physician to achieve good

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control of cancer pre program, which increased to 66% in post program, while 16% ofthem believe that feeling stressed and depressed prevent me from controlling my cancer versus to 23% post program. Also, 42% of the elderly believed that daily or monthly periodic examination is necessary, this percentage increased to 79% in post program.

Fig.(1): shows that, the mean score of perceived susceptibility to cancer pre programwas 11.52, which changed to 14.3 in the post program . While the mean score of perceived severity was12.43 pre program which changes to15.46 in post program.

Regarding perceived benefits the mean score of it was 9.91 pre program versus to13.46 in the post. Moreover, the mean score of perceived barriers was 9.44 duringpre program, which changed to13.67 in the post. The figure denotes that, the mean score of total health beliefs were 43.3 pre program versus to57.71 in post program.

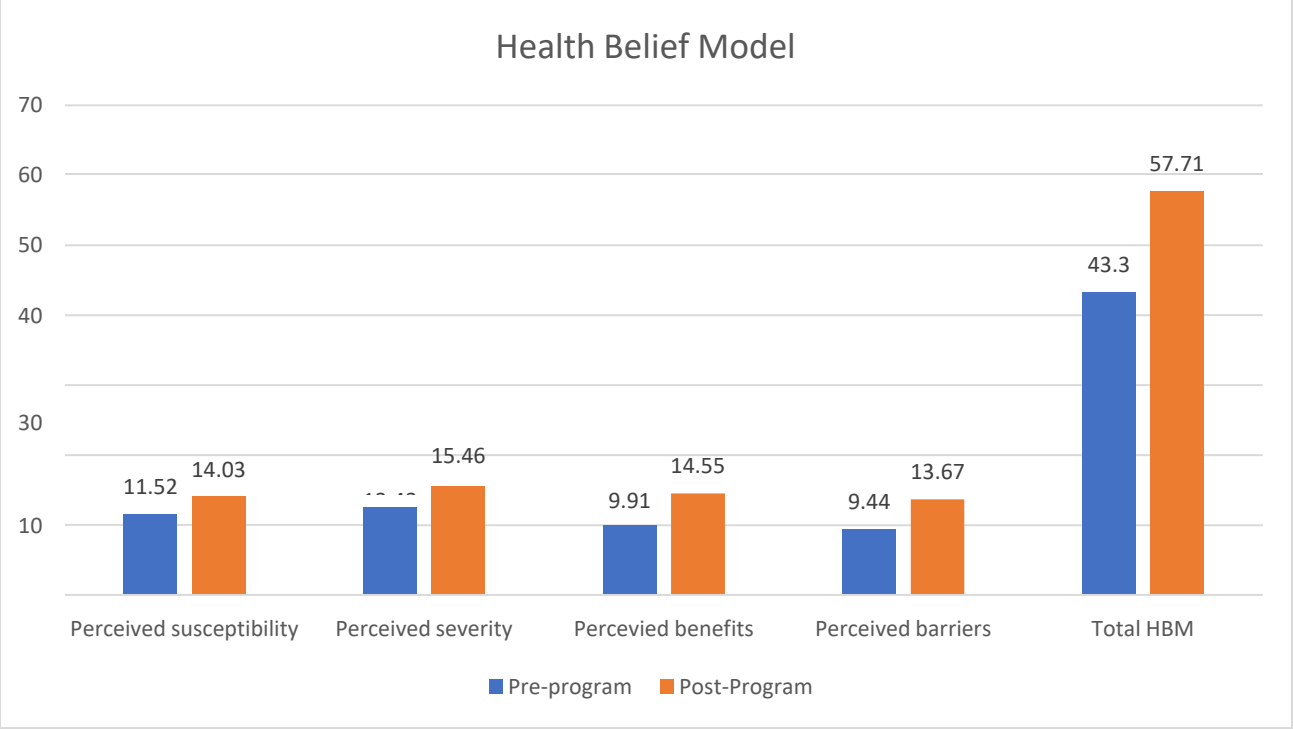

Figure 1. Mean Score Change regarding Health Belief Model Total and Subscales Score amongStudied Subjects.

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Table 10 . Relation between Sociodemographic Characteristics and Knowledge among studiedSubjects.

		No.	Knowledge	
			Pre-program	Post-program
			Mean±SD	Mean±SD
Age	Less than 60	13	9.85±4.83	16.69±1.89
	From 60 to 70	68	6.60±3.11	17.06±2.09
	70 or more	19	5.26±2.81	16.95±3.19
	F (Sig.)		7.634 (0.001**)	0.141 (0.868)
Gender	Male	55	6.78±3.45	16.75±2.01
	Female	45	6.76±3.68	17.29±2.58
	T (Sig.)		0.037 (0.971)	1.183 (0.240)
Education	Illiterate	40	6.23±3.63	17.45±2.50
	Read and write	15	6.80±3.10	17.07±2.43
	Primary	2	5.00±4.24	15.50±3.54
	Secondary	26	6.62±2.77	16.88±2.10
	University	17	8.47±4.39	16.18±1.67
	F (Sig.)		1.382 (0.246)	1.178 (0.325)
Income	Sufficient	19	6.95±3.06	17.21±1.84
	Insufficient	71	6.76±3.68	16.83±2.48
	More than sufficient	10	6.50±3.60	17.70±1.49
	F (Sig.)		0.052 (0.949)	0.736 (0.482)
Residence	Rural	66	6.55±3.54	17.27±2.03
	Urban	34	7.21±3.52	16.44±2.68
	T (Sig.)		0.885 (0.379)	1.738 (0.085)

T Independent samples t testF ANOVA test

** Highly statistically significant at p≤0.01

Table (10): shows that; there was highly statistically significant relationship (P≤0.01) between elderly' total knowledge score and their age , gender, education ,income and residence pre/post program.

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Table 11. Relation between Sociodemographic Characteristics and Nutrition among studiedSubjects.

		No.	Nutrition	
			Pre-program	Post-program
			Mean±SD	Mean±SD
Age	Less than 60	13	9.00±5.40	10.77±4.71
	From 60 to 70	68	6.03±3.83	11.51±4.12
	70 or more	19	5.37±4.21	11.00±5.39
	F (Sig.)		3.416 (0.037*)	0.213 (0.808)
Gender	Male	55	6.29±3.71	11.36±4.26
	Female	45	6.29±4.83	11.27±4.65
	T (Sig.)		0.002 (0.998)	0.109 (0.914)
Education	Illiterate	40	5.58±4.05	11.53±4.97
	Read and write	15	6.53±4.45	11.13±4.21
	Primary	2	2.50±0.71	10.00±2.83
	Secondary	26	6.23±4.21	10.77±4.69
	University	17	8.29±4.24	12.00±2.98
	F (Sig.)		1.707 (0.155)	0.266 (0.899)
Income	Sufficient	19	5.68±3.23	10.47±4.46
	Insufficient	71	6.17±4.34	11.48±4.43
	More than sufficient	10	8.30±4.85	11.80±4.49
	F (Sig.)		1.367 (0.260)	0.448 (0.640)
Residence	Rural	66	6.35±4.19	11.61±4.20
	Urban	34	6.18±4.34	10.76±4.83
	T (Sig.)		0.192 (0.848)	0.901 (0.370)

T Independent samples t testF ANOVA test
* Statistically significant at p≤0.05

Table (11): clarify that; there was statistically significant relationship (P≤0.05) between elderly' total nutrition score and their age, gender, education, income and residence pre/post program.

Discussion:

Elderly people are defined by the United Nations as a person who is over 60 years of age. However, families and communities often use other socio-cultural referents to define age, including family status (grandparents), physical appearance, or age-related health conditions (**12**).

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Cancer of the elderly exhibits slower growth because their body already has a slower rate of cell development than those of young ones. However, some data show that elderly with tumors have worse prognosis because of delayed diagnosis. Thus, the elderly should learn about the right attitude and knowledge to combat cancer. ***(13)***

One of the significant theories of health education is the HBM, which considers behavior as a function of knowledge and attitude of individuals. The aim of this model is to increase the perception of individuals about a health threat and direct their behaviors towards health. This model represents the association between beliefs and behaviors and plays a significant role in prevention of disease. So, understanding individuals' viewpoints and beliefs is essential for developing the strategies of controlling diabetes ***(14).***

Regarding socio-demographic characteristics of the elderly. The current study revealed that, two third of the elderly their ages ranged from 60 to less than 70 years old with mean age 64.11±5.58 **(Table 2).** This was in conformity with a previous study in Egypt by**. (8)** who studied the effect of cancer prevention program on elderly adults' outcome in El-Minia Governorate, Egypt, stated that, less than three quarters of the elderly their ages between 60 to less than 75 years .The current study result also consistent with **(15)** who assessed risk factors of cancer among elderly at Zagazig city, Egypt, the study found that, almost half of the patients were 60-65 years old.

In the current study finding, the highest percentage of elderly depending on oral tablets and no one depends on therapeutic diet this could be due to lack of awareness about the importance of therapeutic diet and exercise to control and prevention many diseases or lack of knowledge about the component of suitable diet for prevent cancer .

Based on research hypothesis, which stated as the implementing health belief model-based education program for cancer prevention elderly would expect to promote their level of knowledge, health beliefs toward cancer prevention well as their level of compliance with diet.

Regarding to elderly' general knowledge about cancer, the current study concluded that, highly statistically significant differences were found between pre/ post the program implementation .This current finding was in agreement with **(16)** who conducted study in Iranian, to evaluate the effect of nutrition education for cancer prevention based on health belief model on nutrition knowledge, attitude, and practice, the study showed that, patients' knowledge about cancer was generally low at the pre-guidelines phase. The post test showed significant improvements in all aspects of patients' knowledge about

Cancer and these improvements persisted at the follow-up test with minimal non-significant declines in some areas. This study finding also, correlates with study done by **(17)** developed study about the healthy eating for successful living in older adults community education program

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evaluation of lifestyle behaviors: A randomized controlled trial , they showed in their study, knowledge of patients regarding different aspects of cancer meaning ,symptoms ,causes diagnosis, management was low and after the awareness program, the rates of patients with optimal knowledge improved significantly.

Health education is a low-cost intervention technique for reducing the incidence, morbidity, and mortality of chronic disorders. Implementation of behavioral change theories into health education is fundamental for achieving desired behavioral changes leading to positive health outcomes **(18).**

Regarding to elderly' health beliefs toward nutritional behavior to prevent cancer among elderly, the current study displayed that, there were highly statistically significant improvements in elderly' perceived susceptibility between pre/post implementation of HBM based educational program (P<0.001)**.** This present study finding was in accordance with study conducted in Iran by **(19)** to examine the Effect of Health Belief Model-Based Education on Knowledge and Prostate Cancer Screening Behaviors: A Randomized Controlled Trial, they reported that, the educational program had a positive and significant impact on extended HBM constructs including perceived susceptibility and self-efficacy in experimental group, 3 and 6 months after the intervention. Another study in Iran by **(20)** entitled as "A Theoretically Based Behavioral Nutrition Intervention for Elderly: A Cluster Randomized Controlled Trial" showed that, the mean scores of susceptibilities, and self-efficacy were not different between the two groups before the educational training. The finding of the present study could be due to the program encouraging the elderly to know more about the negative consequences of cancer and its complications.

Regarding relationship between elderly' total knowledge about cancer and their socio-demographic characteristics, the current study affirmed that, there was highly statistically significant (P<0.01) relationship between elderly' total knowledge score, and their age, gender, education, income and residence**.** This finding was supported by **(16)** who conducted study to assess The effect of nutrition education for cancer prevention based on health belief model on nutrition knowledge, attitude, and practice of Iranian women, they reported that, there was statistical significant relationship between elderly' total knowledge score, and their age, gender, education ,income and residence . This finding also in agreement with study conducted in Saudi Arabia by **(21)** about cancer prevention with nutrition and lifestyle they reported that, the good awareness was significantly associated with higher educational levels

According to the investigator' opinion, in the current study the significant association between elderly' knowledge and level of education could be because people with higher education are more likely to understand, use health information resources and having a better chance to get information from courses and social media than those who are illiterate. As regards the significant relationship between knowledge and residence in the present study could be explained as patients

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residing rural areas have lower levels of education and limited sources of awareness that result in their poor knowledge about different diseases. In relation to significant relationship with occupation could be explained as those who were jobless had a lower knowledge median score due to lower socioeconomic status which considered a risk factor for having patients with inadequate knowledge and practices; therefore, putting them at a higher risk for having cancer prevention and complications.

Regarding correlation between elderly' total knowledge and HBM sub-scale (perceived severity, susceptibility, benefits, barriers). The current study found that, there was positive statistically significant correlation between elderly' total knowledge score and their perceived severity, susceptibility, benefits and barriers. This finding coincides with study conducted by **(19)** they found that there was positive statistical significant correlation between elderly' total knowledge score and their perceived severity, susceptibility, benefits and barriers.

Similarly, study by **(22)** entitled as" The health belief model and colorectal cancer screening in the general population: A systematic review " showed that, there was highly statistically significant correlation between elderly' total knowledge score and their perceived severity, susceptibility and benefits. According to investigator opinion, the finding of the present study could be due to knowledge can play an essential role in shaping individuals' health beliefs and participation in proper health maintenance practices. Thus, it is a basic component for behavior change along with individuals' beliefs and attitudes.

Concerning correlation between elderly' total practices regarding food habit. and HBM sub-scale (perceived severity, susceptibility, benefits, barriers). The current study found that, there was positive highly statistically significant ($P<0.001$) correlation between elderly' total practices regarding food habit and their perceived severity, susceptibility, benefits, and barriers**.** This finding together with study conducted by **(23)** who found in their study the four health belief factors (perceived severity, susceptibility, benefits, barriers) were associated with practices regarding food habits. In the same line, study conducted by **(24)** to assess the Health Belief Model-based intervention to improve nutritional behavior among elderly women. The findings of the present study reflect the effect of HBM component on practice of food habits.

To sum up, the present study was grounded on the research hypothesis which confirmed that, the HBM based education program had statistical significant positive effect on elderly knowledge, health beliefs, nutrition diet practices as well as compliance with therapeutic health behaviors.

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Conclusion

- **In the light of the present findings, it can be concluded that:**

Cancer's elderly in the current study lacked appropriate knowledge and health beliefs regarding Cancer's disease in general and nutrition specifically in the pre-program phase and their compliance with nutrition health behaviors and Cancer's prevention were mostly unsatisfactory. After implementation of HBM based educational program, significant improvements were noticed in elderly' knowledge, health beliefs, compliance with nutrition health behaviors and Cancer's prevention. Therefore, the HBM based education program was successful in attaining its aim and hypothesis.

Recommendations

The findings of the present study, suggested the following recommendations:

- Conducting HBM based educational programs at different settings to reach all targeted elderly to increase their positive behaviors towards cancer in general and healthy nutrition in specific.

- Developing booklets about cancer and healthy nutrition based on HBM and should be available in geriatric home in Arabic versions and given to each elderly person for free.

- Further research on comparing different models of health education is recommended to test the sustainability of knowledge and practice improvement as well as the long-term benefits in healthy nutrition which reduce cancer complications.

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