Effect of education program about COVID-19 vaccine on elderly peoples' awareness and attitude

Saieda AbdElhameedAbdElaziz1, Neama Mohamed El Magrabi Hassan2, Naglaa Mohammed Amein Ghanem 3

1) Assistant Professor of Gerontological Nursing, College of Nursing, Assiut University
2) Professor of Community Health Nursing, Faculty of Nursing, Assiut University
3) Assistant Professor of Community Health Nursing, Faculty of Nursing, Minia University

Corresponding Author: Saieda AbdElhameedAbdElaziz E-mail:saieda@aun.edu.eg

Abstract
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Background: Vaccination is one of the most important steps in controlling COVID-19 outbreak. Targeted instruction programs can be used to enhance elderly protection strategies and vaccination attitudes. **Aim of the study:** Assess effect of an educational program about the COVID-19 vaccine on elderly peoples' awareness and attitude. **Subject and Method:** A quasi-experimental research design (pre and posttest) was conduct. The study was contained 190 elderly patients in outpatients' clinics at main Assiut University Hospital. **Data collection tools involved:** demographic characteristics, medical history, elderly awareness and attitude about COVID-19 vaccine. **Results:** 80.5%, of the studied elderly had poor score of knowledge in pretest compared to 8.9 % in posttest and 67.4% of elderly people had positive attitude in pretest compared to 83.7% in posttest. **Conclusion:** There were statistically significant improvement in the knowledge and attitudes of the elderly participants toward the COVID-19 vaccine following the education program. **Recommendations:** Implement continuous health education programs for the elderly toward vaccination, with content adapted to their literacy levels and health needs.

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Key Words: Awareness &Attitude, Covid-19 vaccine, Elderly, Education program.
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Introduction
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Coronavirus disease 2019 (COVID-19) was called a pandemic by the World Health Organization (WHO) on March 11, 2020 **(Cucinotta &Vanelli, 2020).** This means it has spread to almost every country in the world. So far, this survey has affected 223 countries, resulting in over 133.978 million reported cases and 2.9 million deaths **(WHO, 2021).** Coronaviruses have a significant morbidity and fatality rate in the elderly. Even during recent antibiotic rounds, the elderly may be a specific group of high-risk individuals with COVID-19 who have rapidly worsening clinical conditions **(Dadamo et al., 2020).**

Egypt began its vaccination campaign on 10 December 2020 Egypt received 50,000 doses of the Sinopharm BIBP vaccine , followed by 50,000 doses of the AstraZeneca vaccine on 31 January 2021 **(WHO, 2021).** In February, March and May 2021, Egypt received 1.1 million doses of the Sinopharm BIBP vaccine and 2.55 million doses of the Oxford–AstraZeneca vaccine. Egypt began vaccination against COVID-19 following a global strategy to prioritize older people after healthcare workers. Later on, the vaccine was available for free for all citizens who reserved shots on MoHP website application **(Abdel-Rahm*an* et al., *2022).***

Vaccines are the most crucial public health intervention and the most effective way to protect the population against COVID-19 because Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is a highly contagious virus that affects populations all over the world **(Sharma et al., 2021).**

Age is a significant risk factor for severe COVID-19 disease **(Nanda et al., 2020 & Witham et al., 2021).** Elderly people and those

with underlying chronic health issues are given priority for the COVID-19 vaccine because they are more likely to get a severe variant of the virus if infected. Additionally, older persons are more likely to experience negative health consequences from the COVID-19 infection, including hospitalization, admissions to intensive care units, and mortality **(Chen et al., 2021 & Dhama et al., 2020).**

The factors affecting older people's acceptance of the COVID-19 vaccine may differ from those influencing their younger counterparts.   These factors involved socio demographic factors such as age and educational level **(Wang, et al., 2022),** a history of seasonal influenza vaccination **(Basta et al., 2022; Contoli et al., 2021),** perceived risk and severe COVID-19 complications **(Basta et al., 2022),** trust in vaccination information from friends, family, or social media, and higher social support **(Macinko et al., 2021).**

Vaccine hesitation and refusal (VHR) is defined as the unwillingness or refusal to get vaccinated in spite of the fact that vaccines are available. In 2019, VHR was named one of the top 10 global health challenges **(WHO, 2021).**VHR typically results from mistrust, skepticism, and concerns about the safety, effectiveness, and protection of vaccines. The media has a significant impact on this issue, especially among older adults **(Puri et al., 2020)**.

Awareness is the ability to directly know, experience, and feel through perception and knowledge A condition of elementary or undifferentiated consciousness that puts a person in an awake cognitive state so they can be aware of the circumstance is created by intelligently inferring knowledge from their own perception or from outside information **(Teo et al., 2021)**.

The key strategy for managing the pandemic is mass vaccination, which has emerged as the most popular intervention for reducing the spread of COVID-19 **(WHO, 2020).** To prevent COVID-19-related morbidity and mortality in older adults, vaccination against the virus is both safe and effective **(Soiza et al., 2021).** Despite the fact that older adults are the most in need of the COVID-19 vaccine, age-related immune senescence makes it the most challenging task because older adults lose the capacity to develop immunity through vaccination, making it ineffective in this population **(Wong et al., 2021).**

Nurses play an essential role in caring for elderly people. Therefore, proper education of nurses regarding vaccine safety would increase communication of the same to older adults. Gerontological nurses play a leading role in assessing, educating and implementing safe vaccination for older adults. Regular evaluation of trust levels with a focus on deliberate initiatives to build trust in vaccination program is a critical step towards closing the gap in vaccine confidence **(Barría, 2021)**.

Therefore, the purpose of this study is to evaluate how an educational program regarding the COVID-19 vaccine affects the awareness and attitude of elderly people.erformance (**Khan et al., 2021**).

Significance of the study

Because SARS-CoV-2 is a highly contagious virus that affects populations all over the world, vaccines are the most significant public health intervention and the most effective technique to protect the population against COVID-19. The effort to find a COVID-19 vaccine to prevent the disease's spread and devastating effects is still continuing strong **(Wibawa, 2021),** and as the pandemic progresses, more, more potent vaccines will probably be created. Examining community acceptance of COVID-19 immunizations is crucial now that vaccine distribution is under way **(Reiter et al., 2020).**

Globally, growing older is a significant risk factor forCOVID-19's serious consequences and mortality **(Kang & Jung, 2020).** Comorbidity and overall weakness make elderly persons more vulnerable to COVID-19. In comparison, the infection incidence among individuals over 70 is 7%, while the death rate from COVID-19 among those over 60 is 60% in Egypt **(WHO, 2020).**

Aim of the Study:

This study aimed to assess effect of an educational program about COVID-19 vaccine on elderly peoples' awareness and attitude This

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Specific objectives:-

- Assess elderly knowledge and attitudes about the COVID-19 vaccine
- Plan, implement and evaluate educational program about the COVID-19 vaccine on elderly awareness.

Research hypothesis:

- The education program about COVID-19 vaccine will substantially enhance the awareness and attitude of elderly.

Null hypothesis:

- The education program about COVID-19 vaccine will not substantially enhance the awareness and attitude of elderly.

Subject and method

Research design:

- A quasi-experimental research design (pre and post-test) was conduct to achieve the objectives of the current study.

Settings:

- The study was carried out in outpatient clinics at the main Assiut University Hospital in Assiut Governorate. It included the following clinics: cardiac, diabetes, and chest, which are the largest clinics for receiving cases of elderly patients from the urban and rural areas of Assiut, which are near to Assiut Governorate.

Sample Size and Sampling Technique

The total number of elderly patients who attended the selected previous clinics at the main Assiut University Hospital in the six months from January to June 2021 was 3360. The sample size was determined using Epi-info version 7.2, with an expected frequency of 50% and a confidence level of 95%. The estimated sample size was 345. To prevent dropout and refusal, the sample size was increased by approximately 10% to 380, and the program was completed with 190 cases. A convenient sample was used in the present study.

Inclusion criteria:

- Elderly people aged 60 years and above.
- Alert and able to communicate.

Data Collection Tools: After reviewing the pertinent literature to gather information, the researchers included two appropriate tools in this study.

Tool (1): The researchers design an interview questionnaire which divided into two parts:

Part (1): Demographic characteristics of participants; it included age, gender, education, occupation, marital status, and residence.

Part (2): Medical history of participants about chronic diseases; it included type of disease, types of medication used, and whether they had ever taken the Covid-19 vaccine.

Tool (2): Included two parts
Part (1): Elderly awareness about covid19 vaccine; **this questionnaire adapted by Zingg & Siegrist (2012) and Islam et al., (2021)** and developed by researchers. It consisted of 14 questions as follows: types of vaccine, doses of covid19 vaccine, side effect of covid19 vaccine, people who vaccinated first, people who not allowed to take the vaccine, COVID-19 vaccine free or not, effectiveness of vaccine, get the flu vaccine with COVID-19 vaccine, get vaccine if had COVID-19,   get vaccine if currently sick with COVID-19, take medicine for pain or fever before getting vaccine, take medicine for pain or fever after getting vaccine, can get or spread COVID-19   after receiving vaccine and preventive measures of COVID-19.

Scoring system:
It included 14 questions, with a 3-point rating scale ranging from 0 to 2. The answer score is 2 = correct answer and complete, 1 = correct answer but not complete, and 0 = wrong or not know.
The total scores for knowledge of 28 points regarding covid19 vaccine divided into three levels as the following:
- Poor knowledge level < 50 % (< 14 scores)
- Fair knowledge level 50 -70 % (14-20 scores)
- Good knowledge level > 70% (>20 scores)

Part (2):Elderly attitude toward COVID-19 vaccine; **this questionnaire adopted by Zingg &Siegrist (2012) and Islam et al., (2021)** it included; 6-items (The newly discovered COVID-19 vaccine is safe; The COVID-19 vaccine is essential for us; I will take the COVID-19 vaccine without any hesitation, I will also encourage my family/friends/relatives to get vaccinated, It is not possible to reduce the incidence of COVID-19 without vaccination, The COVID-19 vaccine should be distributed fairly to all of us). The response of each items was indicated on a three-point Likert scale (i.e., 0 = Disagree, 1 = Undecided, and 2 = Agree). Greater scores indicate more positive attitudes towards COVID-19 vaccine.

Scoring system:

Total scores were 6 for 12 grades. The score of the items was stumped up and then converted into percentage grades, classified into two levels:
- Positive attitude ≥ 75% (≥ 9 scores)
- Negative attitude < 75% (< 9 scores)

Validity and Reliability: The tools were tested for content validity by 5 experts of academic gerontological nursing staff from the faculty of nursing at Assiut University. Modifications were done accordingly, and then the tools were designed in its final format and tested for reliability by using internal consistency for the tools measured using the Cronbach alpha test. The Cronbach alpha test of knowledge items was 0.68 and for attitudes items was 0.77.

Administrative Design: An official approval letter was obtained from the Dean of the Faculty of Nursing at Assiut University to the director of outpatient clinics at the main Assiut University Hospital. This letter contained brief explanations of the purpose of the study and permission to apply the study.

Pilot study

A pilot study was conducted with 19 (10%) of the participants, which was included in the study sample for the non-presence of any modification. The goal of the pilot study was to make sure that the items were clear and that the tools were applicable and relevant. It also aimed to identify any potential issues or roadblocks during the data collection process, test the wording of the questions, and estimate the amount of time needed to collect the study sample.

Ethical Consideration: Ethical approval to conduct the study was obtained from the Scientific Research Ethical Committee of the Faculty of Nursing, Assiut University, on May 2021. The research proposal was approved by the ethical committee in the Faculty of Nursing at Assiut University. There was no risk for studied elderly during the application of research; the study followed the common ethical principles in clinical research. Informed consent was obtained from participants, who participated in the study after explaining the nature and purpose of the study, confidentiality and anonymity were assured, and study participants had the right to refuse to participate or withdraw from the study.

Field work

Data were gathered from the previously mentioned setting from the period beginning in July 2021 to the end of November 2021. The researchers first introduced themselves to the participants, explained the purpose of the study, and obtained their informed consent. After that, the researchers started filling the sheet by face-to-face individual interviews. The average time taken for completing the questionnaire was around 20-30 minutes or more, depending on the personnel responding to a question. It's consumed around 5 months, two days weekly, for collecting the questionnaire sheet; every week about (10) sheets were collected.

Educational program: This program was designed to enhance elderly awareness about the COVID-19 vaccine and was developed based on relevant literature .A brochure and an educational booklet were prepared, which included simple summarized information about the description of the covid-19 vaccine, types of covid-19 vaccines, and side effects of covid-19 vaccines..

Content of the program:
- Description of the meaning of COVID-19 vaccine.
- Types of the COVID-19 vaccine.
- Side effects of the COVID-19 vaccine

Schedule of the program:
Assessment (pre-test) stage: At the beginning of the interview, the researchers greeted the elderly people and introduced themselves to each one in this study. This phase involved interviewing the studied sample to collect baseline data. The pre-test questionnaire was implemented to assess the elderly knowledge, and attitudes towards COVID-19 vaccinations.
Planning and implementation stage (Time and number of sessions): Before beginning the first session, an orientation to the program and its purpose was done for elderly people. Each session started with a revision of what was given during the previous session and the objectives of the new topics. The content of the program included:

- **The 1st session**: This session focused on an open discussion for identifying the group, clarifying its aim, and establishing the training program's timetable. The researchers brainstormed about the meaning of COVID-19 disease, COVID-19 vaccine, number of doses, benefits of COVID-19 vaccine, and different types of the COVID-19 vaccine and how work.
- **The 2nd session**: This session provided a summary of the previous session's content and included an explanation of the side effects of the COVID-19 vaccine and how to deal with side effect.

- **The 3rd session**: At the beginning , researchers reviewed the knowledge provided at the previous session and then explained the name of places where the patients could get the COVID-19 vaccine, answered common questions related to the COVID-19 vaccine and protective measures after getting vaccine.

Evaluation of program effect (immediate post- test stage):
This phase was carried out immediately after the implementation of the program (post -test).

Program teaching methods and media:

Teaching methods included lecture, discussion, video; demonstration and re-demonstration are carefully selected based on the literacy levels and sensory abilities of the elderly people. Pictures and posters were used.

Statistical analysis: -

Statistical analysis Data entry and data analysis were done using SPSS version 26 (Statistical Package for Social Science). Data were presented as number, percentage, mean, standard deviation, and median. The chi-square test was used to compare the qualitative variables. A p-value is considered statistically significant when $p < 0.05$.

Results

Table (1): Shows that 73.7%of the studied sample their age ranged from 60-74 with mean age of **69.20±7.65 (60-90)** and 58.9%of them were female. Concerning occupation, it was observed that 38.4% of them not work. Regarding the level of education, 80.5% of the studied elderly were illiterate and only 1.6% of them had a university education. Marital status data revealed that 65.8% of the studied samples were married and 90.0% of them suffering from chronic diseases. Regarding COVID-19 vaccine it was observed that 71.1% of them did not obtain the vaccine.

Figure (1): Reveals that 80.5% the of studied elderly had poor score of knowledge in the pretest compared to 8.9 % in the posttest and 0.0% of them had good score of knowledge in the pretest compared to 51.1%   in the posttest. There was a highly statistical difference regarding knowledge level among elderly about the COVID-19 vaccine in the pre and the post-test. P-value = (0.001**).

Figure (2): Revealed that 67.4% of the elderly people had positive attitude in the pre-test compared to 83.7% in the post test.

Figure (3): Constant a statistical significant positive correlation between knowledge and attitude in elderly people before and after

educational program regarding COVID-19 vaccine (r=0.180 P value =0.013*).

Table (2): Demonstrates the comparison between the elderly knowledge about COVID-19 vaccine with their demographic data and chronic disease in before and after the education Program for the studied sample, it was found that there was statistically significant difference between elderly age , levels` of education , marital status and suffering of chronic diseases-P value =(0.004,.002, .001, .004) respectively.

Table (3): Displays the comparison between elderly attitude about the COVID-19 vaccine with their demographic data and chronic disease in before and after the education program for the studied sample, it was found that there was significant differences presented in gender P-value =(0.009**).

Table (4): shows that highly significant differences present in age, education level, marital status and chronic diseases P-value = (0.003**, 0.009**, 0.013*) respectively.

Table (5): Reveals multivariate Linear regression model for demographic data and chronic disease for elderly peoples on attitude about the COVID-19 vaccine there was significant differences present in gender only in pre and posttest P-value = (0.046*, 0.007) respectively.

Table (1): Distribution of elderly people according to demographic characteristics and medical history in outpatient clinics at Assiut city, (n=190)

| Demographic characteristics and medical history	No	%
Age group		
From 60-74 years	140	73.6
from 75-84 years	40	21.1
From 85 years and more	10	5.3
Mean±SD(range)	69.20±7.65(60-90)	
Gender		
Male	78	41.1
Female	112	58.9
Occupation		
Farmer	35	18.4
Craftsman (carpenter, builder, mechanic)	2	1.1
Professional worker (teacher - lawyer - doctor)	3	1.6
Commercial Worker (Grocery - Trader)	7	3.7
Seasonal worker	6	3.2
Retirement	11	5.8
House wife	53	27.9
does not work	73	38.4
Education		
Illiterate	153	80.5
read and write	23	12.2
Primary education	4	2.1
Secondary education	4	2.1
University	3	1.6
Postgraduate	3	1.6
Marital status		
Married	125	65.8
Divorced	15	7.9
Widow	48	25.3
Single	2	1.0
Residence		
Urban	27	14.2
Rural	163	85.8
Do you suffer from any of the following chronic diseases?		
No	19	10.0
Yes	171	90.0
If Yes		
High blood pressure	122	71.3
Diabetes	108	63.2
Atherosclerosis	45	26.3
Heart disease	57	33.3
Enlarged prostate	19	11.1
Presbyopia	17	9.9
Chest disease	16	9.4
Are you currently taking any medication		
Yes	166	87.4
No	24	12.6
Do you obtain the COVID-19 vaccine?		
Yes	55	28.9
No	135	71.1
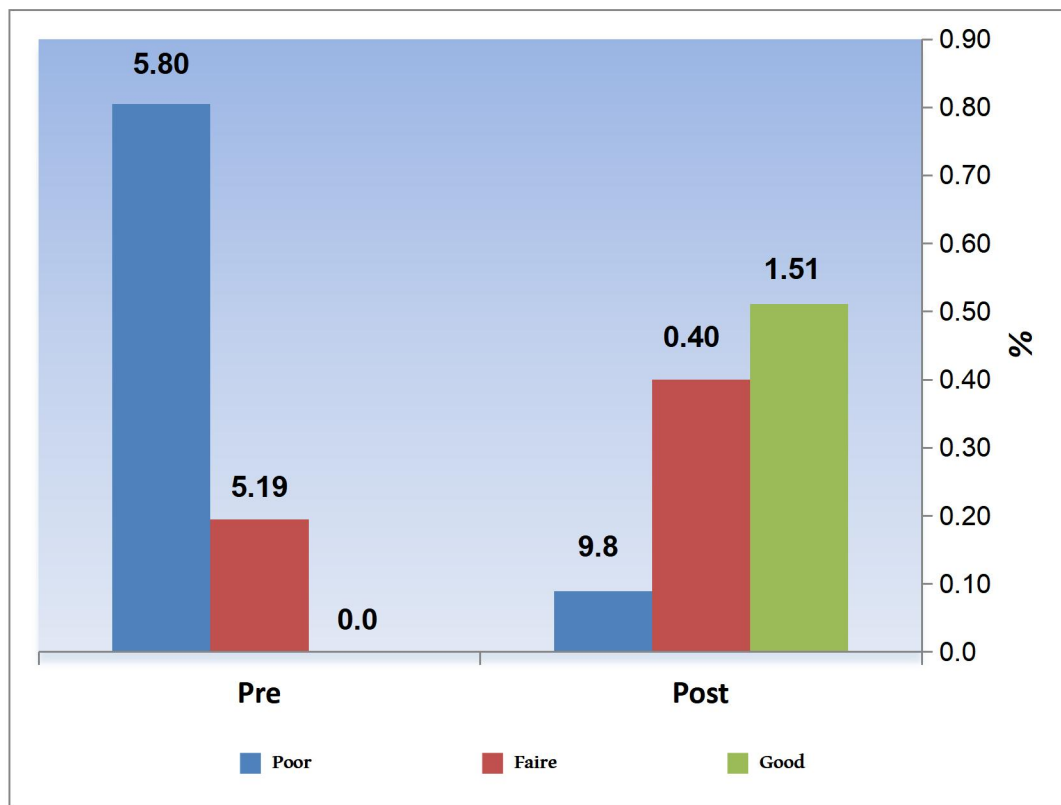
Figure (1): Total knowledge level among the Studied Elderly about the COVID-19 vaccine in the pre and post-test (n=190)
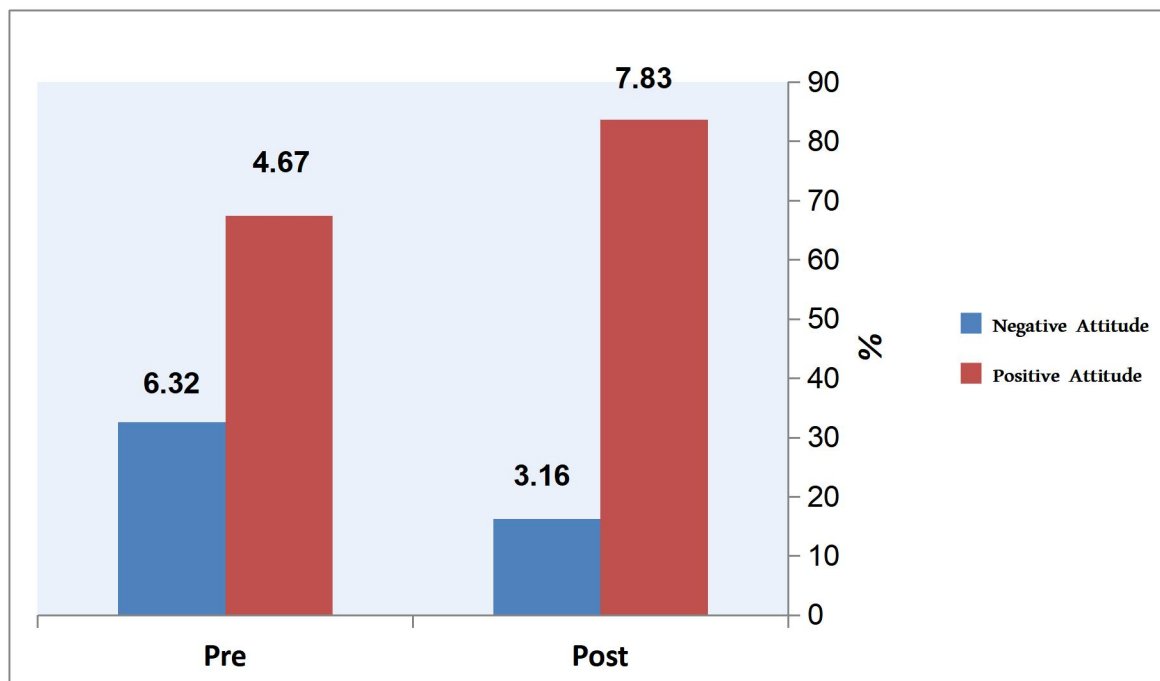

Figure (2): Total Attitude score among the Studied Elderly about the COVID-19 vaccine in the pre and the post-test (n=190)
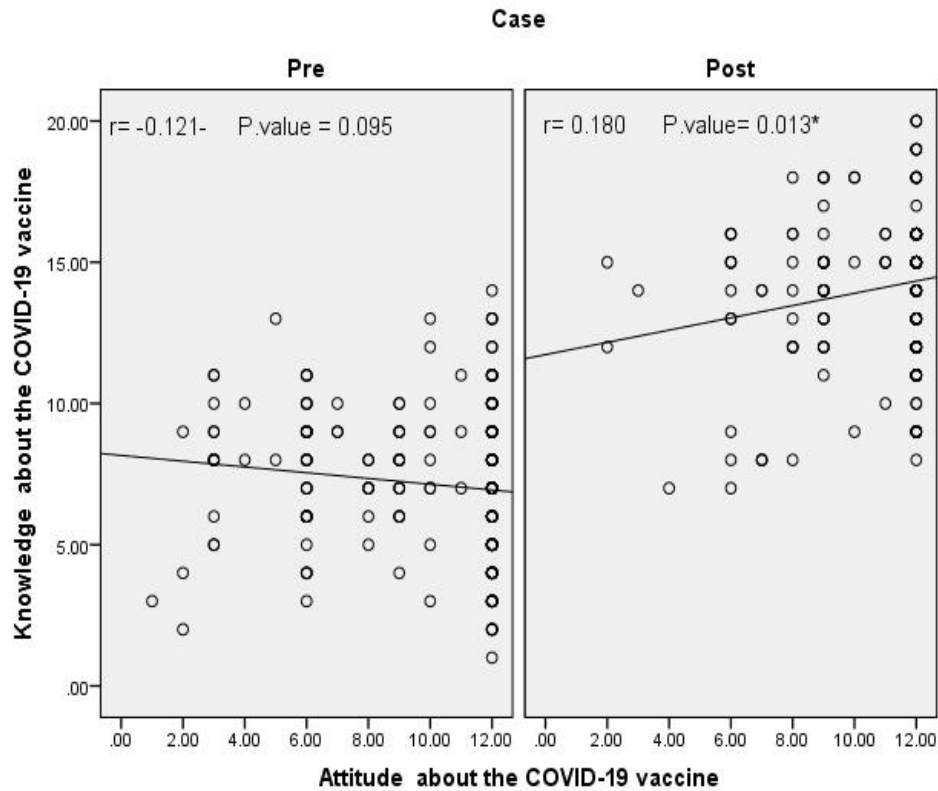
Figure (3):- Correlation Co-efficient between Knowledge about covid-19 vaccine and Attitude before and after education Program

Table (2):- Comparison between knowledge about the covid-19 vaccine with Demographic Data and chronic disease before and after education Program for the Studied Elderly (n=190).

Items	N	Knowledge about the COVID-19 vaccine			
		Before educational program		After educational program	
		Mean±SD	range	Mean±SD	range
Age group					
From 60-74 years	140	7.49±2.56	2-14	14.41±2.52	8-20
from 75-84 years	40	6.3±3.03	1-13	13.18±2.82	7-18
From 85 years and more	10	6.7±2.31	3-11	12.3±3.3	7-18
Test Used		**F=3.32**	**P= 0.038***	**5.77**	**P= 0.004****
Gender					
Male	78	7.12±2.84	1-14	14.04±2.92	8-20
Female	112	7.26±2.59	2-13	14.04±2.54	7-20
Test Used		**T=0.13**	**P=0.718**	**T=0.00**	**P=0.988**
Education level					
Illiterate	153	6.71±2.43	1-13	13.69±2.65	7-20
read and write	23	9.26±3	2-14	15.52±2.35	9-19
Primary education	4	8±4.32	2-12	13.75±2.63	11-16
Secondary education	4	9.25±0.96	8-10	14.75±1.71	13-17
University	3	10.67±2.08	9-13	17±2.65	14-19
Other	3	9.33±0.58	9-10	17.33±2.31	16-20
Test Used		**F=6.46**	**P=0.000****	**F=3.87**	**P=0.002****
Marital status					
Married	125	7.56±2.53	2-14	14.47±2.5	8-20
Divorced	15	6.8±3.12	1-11	13.73±2.76	8-18
Widow	48	6.4±2.85	2-13	12.88±2.81	7-18
Single	2	7±2.83	5-9	17.5±2.12	16-19
Test Used		**F=2.34**	**P=0.075**	**F=5.60**	**P=0.001****
Residence					
Urban	27	7.56±2.86	2-14	14.11±2.65	9-20
Rural	163	7.14±2.66	1-13	14.03±2.71	7-20
Test Used		**T=0.55**	**P=0.460**	**T=0.02**	**P=0.886**
Do you suffer from any of the following chronic diseases?					
No	19	8.68±2.93	2-13	15.74±3.05	9-20
Yes	171	7.04±2.62	1-14	13.85±2.6	7-20
Test Used		**T=6.62**	**P=0.011***	**T=8.68**	**P=0.004****
Are you currently taking any medication					
Yes	166	7.02±2.62	1-14	13.9±2.54	7-20
No	24	8.42±2.9	2-13	15±3.49	7-20
Test Used		**T=5.77**	**P=0.017***	**T=3.51**	**P=0.062**

*Independent T-test quantitative data between the two groups - One-way Anova T-test quantitative data between the Three groups or more *Significant level at P value < 0.05, **Significant level at P value < 0.01*

Table (3):- Comparison between Attitudes about the COVID-19 vaccine with demographic data and chronic disease before and after education Program for the studied sample (n=190)

Items	N	Attitude about the COVID-19 vaccine			
		Before education program		After education program	
		Mean±SD	range	Mean±SD	Range
Age group					
From 60-75 years	140	9.55±3.2	1-12	10.69±2.22	2-12
from 75-85 years	40	8.85±3.32	3-12	10.35±2.39	3-12
From 85 years and more	10	10.1±2.69	6-12	11.2±1.69	8-12
Test Used		**F=0.97**	**P=0.380**	**F=0.69**	**P=0.504**
Gender					
Male	78	10±2.94	3-12	11.15±1.64	6-12
Female	112	9.04±3.33	1-12	10.29±2.51	2-12
Test Used		**T=4.24**	**P=0.041***	**T=7.02**	**P=0.009****
Education level					
Illiterate	153	9.38±3.16	1-12	10.56±2.3	2-12
read and write	23	9.22±3.64	3-12	10.87±2.18	6-12
Primary education	4	9.5±5	2-12	10.75±2.5	7-12
Secondary education	4	10.25±2.87	6-12	11±1.41	9-12
Univeristy	3	11±1.73	9-12	12±0	12-12
Other	3	11±1.73	9-12	11.67±0.58	11-12
Test Used		**F=0.36**	**P=0.873**	**F=0.46**	**P=0.808**
Marital status					
Married	125	9.35±3.17	2-12	10.5±2.37	2-12
Divorced	15	10.53±2.95	3-12	11.33±1.45	7-12
Widow	48	9.23±3.38	1-12	10.75±2.09	4-12
Single	2	11±1.41	10-12	12±0	12-12
Test Used		**F=0.84**	**P=0.474**	**F=0.92**	**P=0.432**
Residence					
Urban	27	8.74±2.81	3-12	9.96±2.31	6-12
Rural	163	9.55±3.26	1-12	10.76±2.21	2-12
Test Used		**T=1.47**	**P=0.227**	**T=2.98**	**P=0.086**
Do you suffer from any of the following chronic diseases?					
No	19	9.84±3.35	3-12	10.58±2.34	6-12
Yes	171	9.39±3.19	1-12	10.65±2.23	2-12
Test Used		**T=0.35**	**P=0.557**	**T=0.02**	**P=0.889**
Are you currently taking any medication					
Yes	166	9.37±3.2	1-12	10.64±2.23	2-12
No	24	9.83±3.23	3-12	10.67±2.28	6-12
Test Used		**T=0.43**	**P=0.512**	**T=0.00**	**P=0.964**

*The Independent T-test quantitative data between the two groups- One-way Anova T-test quantitative data between the Three groups or more *Significant level at P value < 0.05, **Significant level at P value < 0.01*

Table (4):-Multivariate Linear regression model for the Demographic Data and chronic disease for elderly peoples on Knowledge about the COVID-19 vaccine before and after the education program

Items	Before education program			After education program		
	Beta	t	Sig.	Beta	t	Sig.
Age	**-0.092**	**-1.312**	**0.191**	**-0.205**	**-2.964**	**0.003****
Gender	0.058	0.813	0.417	0.033	0.474	0.636
Education level	**0.269**	**3.810**	**0.000****	**0.184**	**2.654**	**0.009****
Marital status	**-0.161**	**-2.274**	**0.024***	**-0.175**	**-2.510**	**0.013***
Residence	-0.036	-0.514	0.608	0.005	0.073	0.942
Do you suffer from any of the following chronic diseases?	**-0.061**	**-0.427**	**0.670**	**-0.325**	**-2.299**	**0.023***
Are you currently taking any medication	0.061	0.425	0.671	-0.206	-1.465	0.145

*Dependent variable is Knowledge about the COVID-19 vaccine *statistically Significant Factor at P. value<0.05*
*   **statistically Significant Factor at P. value <0.01*

Table (5):-Multivariate Linear regression model for Demographic Data and chronic disease for elderly peoples on Attitude before and after the education program

Items	Before education program			After education program		
	Beta	t	Sig.	Beta	t	Sig.
Age group	-0.031	-0.417	0.677	-0.012	-0.166	0.869
Gender	**-0.152**	**-2.011**	**0.046***	**-0.201**	**-2.709**	**0.007****
Education level	0.075	0.998	0.320	0.114	1.551	0.123
Marital status	0.061	0.814	0.417	0.135	1.826	0.070
Residence	0.078	1.058	0.291	0.114	1.575	0.117
Do you suffer from any of the following chronic diseases?	0.026	0.170	0.865	0.098	0.655	0.513
Are you currently taking any medication	0.072	0.470	0.639	0.093	0.620	0.536

*The Dependent variable is The Attitude about the COVID-19 vaccine *statistically Significant Factor at P. value <0.05 **statistically Significant Factor at P. value <0.01*

Discussion

The elderly patients are more likely to become compromised, and they are often more likely to develop severe complications **Guo et al., (2020)** Vaccines are the most significant public health intervention and the most efficient method for protecting the population from the COVID-19 **Rhodes, et al.,(2021).**Since the beginning of the immunization program, older adults have been acknowledged as the most important group. The COVID-19 vaccine was widely approved by senior citizens around the world **Nikolovski et al.,(2021).**

During the pandemic, research on older individuals' awareness and attitudes of COVID-19 vaccinations was crucial. Due to their increased vulnerability to serious sickness and mortality from the virus, the elderly were given priority vaccination. Overall, research indicates that although a large percentage of older persons were still apprehensive or worried about getting vaccinated, many were willing to do so.

The findings of the current study provide significant insights into the demographic and health-related characteristics of the studied sample. A large proportion of the participants were aged between 60 and 74 years, with a mean age of 69.20 ± 7.65 years. More than half of them were females, which is consistent with global demographic trends where women tend to have a longer life expectancy than men. **These**

results in line with Varshan et al., (2021) & Burcu et al., (2022) who found that the majority of the populations were females within the age group 60-70 years.

Regarding Occupation, more than one third of studied sample were not working, which is expected in an elderly population where retirement is common. **From the researchers' view** this status has potential implications for income security, access to healthcare, and social engagement—all critical factors influencing the well-being of older adults. Educational level in the studied sample was markedly low, with more than three quarters identified as illiterate. **From the researchers' view** this indicates a substantial gap in educational attainment, which could impact the participants' health literacy, ability to access information, and compliance with health interventions, including public health campaigns such as those related to COVID-19. Conversely, the findings challenged those of **Neamit et al., (2021)** and found that only one third of studied sample were illiterate. This may be due to different places and cultural habits and most of this studied sample were females as in Upper Egypt they are not concerned with female education.

Marital status data revealed that about two third of the studied sample were married. Being married in old age can provide emotional support, increase social interaction, and serve as a protective factor against mental and physical health deterioration. Alarmingly, the majority of the studied sample reported suffering from chronic diseases. **From the researchers' view** this high prevalence underscores the heavy burden of chronic illnesses among older adults, necessitating comprehensive and continuous care strategies, particularly in areas such as medication management, routine monitoring, and preventive healthcare services. These findings were consistent with **Neamit et al., (2021)** who found two third of the studied elders had a history of chronic diseases.

In relation to COVID-19 vaccination, only more than one quarter of the participants had received the vaccine. The limited vaccination rate could be attributed to several factors, including vaccine hesitancy, misinformation, access barriers, or low health literacy, especially in a population with a high rate of illiteracy. These findings were inconsistent with **Chirag et al., (2022)** who reported that about three quarters of participants said they would receive the vaccine.

The results of the present study demonstrated a substantial improvement in the level of knowledge among the elderly participants regarding the COVID-19 vaccine following the educational program. In the pretest, the majority of the participants exhibited a poor level of knowledge, while none achieved a good score. This indicates a significant lack of awareness or understanding of the COVID-19 vaccine prior to the education program, which may be attributed to factors such as limited access to accurate health information, high illiteracy rates (as noted earlier in the study), and possibly mistrust or misconceptions about vaccination.

Following the intervention, there was a remarkable improvement: only about nine percent of participants remained in the poor knowledge category, and more than half achieved a good knowledge score. This dramatic shift clearly highlights the effectiveness of the educational program or awareness campaign implemented as part of the study**.** There was a highly statistically significant difference regarding the knowledge level among elderly about covid-19 vaccine in the pre and the post-test. P-value = (0.001**) This finding is similar to studies by **Islam et al., (2021)** and reported that the knowledge regarding COVID-19 vaccinations was low among more than half of the population.

The findings of this study revealed a statistically significant improvement in the attitudes of elderly participants toward the COVID-19 vaccine following the education program. In the pretest, many participants likely held negative or uncertain views regarding the vaccine, which may have been influenced by misinformation, fear of side effects, low health literacy, or limited trust in the healthcare system. However, after the education program, participants demonstrated more positive attitudes across all measured items, with a **highly significant p-value (0.001)**

indicating a meaningful change. This aligned with **Islam et al., (2021)** who emphasized that the majority of participants showed positive attitude towards COVID-19 vaccine. Also in Saudi Arabia, **Marzo et al**. **(2022)** reported that participants showed a positive and optimistic attitude toward COVID-19 vaccine.

From the researchers' view, the significant relationship between pre- and posttest attitudes suggests that when provided with appropriate information and support, older adults are capable of changing their views in a way that can lead to better health decisions. These results emphasize the importance of a targeted, accessible health education program in overcoming vaccine hesitancy and encouraging protective health behaviors in vulnerable groups.

The present study demonstrated a statistically significant positive correlation between knowledge and attitude among the elderly participants both before and after the implementation of the education program on the COVID-19 vaccine. This suggests that as the level of knowledge regarding the vaccine increased, participants' attitudes toward vaccination also became more favorable. These results are in agreement with previous studies conducted in China by **Zhong et a l., (2020)** and reported that patients with poor levels of knowledge were more likely to have poor levels of attitudes.

The present study revealed a statistically significant relationship between elderly participants' knowledge about the COVID-19 vaccine and several demographic characteristics, both before and after the educational program. Specifically, age, level of education, marital status, and presence of chronic diseases were significantly associated with knowledge levels. These findings suggest that demographic and health-related factors play an influential role in how elderly individuals acquire and retain health-related information. This finding is similar to other studies in Bangladesh demonstrating no significant sex differences in knowledge regarding COVID-19 vaccine **Ferdous et al., (2020).** Knowledge was significantly associated with education.

The study findings showed a statistically significant difference in attitudes toward the COVID-19 vaccine in relation to gender before and after the education program. In addition, the results of the multivariate linear regression analysis revealed that gender was the only personal variable significantly associated with elderly participants' attitudes toward the COVID-19 vaccine; indicating that gender played a meaningful role in shaping participants' attitudes. This result suggests that male and female elderly participants responded differently to the education program, which may be attributed to various socio-cultural, psychological, or informational factors.

These findings were in the same line with **Islam et al., (2021)** adjusted multiple regressions, using only variables that were statistically significant in bivariate analysis, retained being female. Conversely, the findings challenged those of **Wang et al., (2020)** study in China found that male participants were more likely to accept the COVID-19 vaccine.

Conclusions

Based on the results of this study there was a statistically significant improvement in the knowledge and attitudes of the elderly participants toward the COVID-19 vaccine following the education program. In the pre-test, the majority of the participants exhibited a poor level of knowledge, and many participants' likely held negative or uncertain views regarding the vaccine.

Recommendations

Based on the findings, the following recommendations proposed:

1. Implement continuous health education programs for the elderly toward vaccination, with content adapted to their literacy levels and health needs.

2. Address vaccine hesitancy through trusted community channels such as local healthcare providers, and community health workers to deliver vaccine-related information and counteract myths or misinformation.

3. Develop national or regional policies to support elderly vaccine awareness.

4. Continuous and accessible education strategies, especially in populations with limited formal education, to promote informed health behaviors and improve public health outcomes.

5. Apply further research in large samples of elderly people and another setting for generalization of the results.

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