

Effect of an Educational Program about Colorectal Cancer on Elders' Knowledge and their Performance of Screening

*Heba Noshay Abd El-Aziz Mohamed, Nadia Mohamed Hassan Saleh
and Neamat Ibrahim Elemam Ahmed Elashri*

Gerontological Nursing – Faculty of Nursing- Mansoura University, Mansoura – Egypt

Abstract: Colorectal cancer is the second leading cause of cancer related mortality worldwide and the fourth most commonly diagnosed malignant disease. CRC is common in the elderly; age is an important risk factor. It can be prevented and successfully treated through early detection using education and screening. This study aimed to determine the effect of an educational program about colorectal cancer on elders' knowledge and their performance of screening. This study was conducted in El-Amal elderly club in Mansoura city affiliated to ministry of social solidarity. One hundred older adults selected from the elderly club using convenient sample. Three tools were used: Socio demographic and clinical data structured interview schedule, study subject's knowledge related to CRC and its screening Structured Interview schedule and educational program about colorectal cancer and its screening methods. Results showed that after application of the educational program the elders who have low level of knowledge regarding CRC and its screening reported improvement in their level of knowledge. It can be concluded that significant improvement in the total mean score of knowledge and CRC screening for the majority of the study subjects after application of the program. It can be recommended that a developed illustrated booklet to be distributed to all elders in the elderly clubs in Mansoura city through responsible personnel.

Key words: Educational Program • Colorectal Cancer • Elders • Knowledge • Screening

INTRODUCTION

Colorectal cancer (CRC) is the second leading cause of cancer related mortality worldwide and the fourth most commonly diagnosed malignant disease [1]. In 2012 there were nearly 1.4 million new cases of CRC diagnosed in the world with over 2.4 million new cases of colorectal cancer expected to be diagnosed worldwide by 2035. CRC is common in the elderly; age is an important risk factor. Approximately 90% of new CRC is diagnosed in patients over 50 years with the median age of diagnosis being 69 years [2]. Furthermore, the incidence of CRC dramatically rises as one ages. In Egypt CRC is the 7th commonest cancer, representing 3.47% of male cancers and 3% of female cancers [3]. In Saudi Arabia, CRC ranks second in incidence among all cancers with a median age of diagnosis of 60 years for males and 58 years for females [4].

Early detection and screening of cancer among older adults are considered of vital importance [5]. Cancer screening for early detection is promoted globally because of the link between an ageing population and an increase in the prevalence of cancer worldwide; this will improve the prognosis of cancer patients and may be beneficial for older people [6]. Awareness and preventive screening programs help in early diagnosis and improving the survival rate of such patients [7]. More than 20 million of African Americans over the age of 50 were not screened for CRC [8]. A major determinant of the success of CRC screening programs is the rate of uptake by the targeted population. Knowledge is only one factor that affects participation in CRC screening programs [9].

Previous researches suggested that the level of knowledge of CRC was poor both in developed and developing countries; with even lower levels of knowledge about the well-established screening tools and

their benefits. The lack of knowledge is a significant CRC risk factor and is a potential barrier towards effective screening [10]. Also, other study done in Australia reported that awareness and knowledge of CRC and screening among the studied elderly were low [11].

Having knowledge about CRC is important because it affects the possibility that an individual will engage in appropriate primary prevention behaviors [12]. Knowledge of CRC risk factors was significantly associated with high intention to adhere to colorectal cancer screening follow-up [13]. The increase in knowledge and understanding towards CRC and its screening methods could overcome the negative views towards screening and inform elderly of the benefits and increase their adherence of CRC screening [14]. It is of vital importance to raise knowledge on CRC-related risk factors in order to increase screening uptake especially for the high risk group especially elderly populations [15].

Health education is important for older adults to increase their awareness of factors that could be related to cancer. Changing life style such as smoking cessation, eating a well-balanced diet, performing physical activities and screening are recommended. Health-care providers should increase knowledge of the elderly about the importance of performing the screening[16]. So that, the health education programs for community dwelling older adults are effective in raising the awareness of health promotion behaviors[17]. Therefore this study was conducted to determine the effect of an educational program about colorectal cancer on elders' knowledge and their performance of screening.

The Aim of the Study Was To: Determine the effect of an educational program about colorectal cancer on elders' knowledge and their performance of screening.

Research Hypothesis: Elders' knowledge regarding colorectal cancer and their performance of screening will be improved after exposure to the educational program.

MATERIALS AND METHODS

Materials

Design: The study used a quasi-experimental research design (pre-post intervention study).

Setting: The study was carried out at El-Amal elderly club in Mansoura city; it is a social club affiliated to ministry of social Solidarity.

Subjects: A convenience sample of 100 older adults out of 143 of regular attendants of the elderly club during the period of one week, aged 60 years and above, able to comprehend and communicate and willing to participate in the study.

Tools: Three Tools Were Used to Collect the Necessary Data

Tool I: Socio Demographic characteristics and Clinical Data Structured Interview_Schedule. This tool was developed by the researcher based on review of relevant literature; it divided into three parts:

Part I: Socio Demographic characteristics of the study subjects such as age, gender, educational level, occupation before retirement and income.

Part II: Medical history of the study subjects such as history of chronic disease and family history of CRC.

Part III: Intention of elderly to perform colorectal cancer screening and actual performance of screening before and after implementation of the program.

Tool II: Knowledge Related to CRC and its Screening Structured Interview Schedule: This tool was developed by the researcher based on review of relevant literatures to assess knowledge of the elderly related to colorectal cancer and its screening methods; it includes questions about meaning of CRC, its causes, signs and symptoms, risk factors and screening methods. The total number of questions are twenty three, a score of zero for (do not know and incorrect answer) and a score of one for (correct answer). The scores for CRC knowledge depended on the number of grades obtained regarding all questions. The total score is (23).

Tool III: - Educational Program about Colorectal Cancer and its Screening Methods: This tool was developed by the researcher based on review of the literature. The content of the program include introduction about colorectal cancer, causes and risk factors, sign and symptoms, stages of colorectal cancer development, different screening methods of colorectal cancer, treatment and prevention of colorectal cancer.

Method:

- Official letter was obtained from the Faculty of Nursing, Mansoura University and forwarded to the director of the elderly club to obtain their approval to carry out the study

- Tool I (Socio Demographic characteristics and Clinical Data Structured Interview Schedule), tool II (Study Subject's Knowledge related to CRC and its screening Structured Interview Schedule) and tool III (educational program about colorectal cancer and its screening methods) were developed by the researcher based on review of relevant literatures.
- Educational booklet which contained information about colorectal cancer written in simple Arabic language with colored pictures and large sized font to accommodate age related visual changes to enhance the learning process was developed by the researcher and given to each elder participated in the study.
- The study tools were revised by 5 experts in the field of gerontological nursing, as a jury to test its content validity and feasibility and necessary modification were done.
- A pilot study was carried out on 14 elderly selected from El-Amal elderly club to test and ascertain clarity and feasibility of the study tools. The older adults who were included in the pilot study were excluded from the study sample.
- Each study subject was interviewed individually by the researcher to collect the necessary data using study tools, took nearly 30 to 45 minutes.
- The studied elders were divided into small groups; each group consisted of 10 elders.
- The researcher used to start each session by reemphasizing the important points in the previous session.
- The educational program was covered in four sessions for provision of knowledge. Program was implemented over 4 weeks period, one session per week; the duration for each session took about 30 to 45 minutes approximately. The researcher visited the club twice a week on Saturday and Tuesday from 10 AM to 2 PM.

Colorectal Cancer Knowledge Program Sessions Were as Follows:

First session

Simple Introduction: including meaning of colorectal cancer, incidence, causes and risk factors.

Second Session

Presentation of Colorectal Cancer: Including sign and symptoms, stages of colorectal cancer development.

Third session

Detection of Colorectal Cancer: Including different screening methods of colorectal cancer detection.

Fourth Session

Management of Colorectal cancer: different methods of treatment including surgical, chemotherapy, radiotherapy and prevention of colorectal cancer.

Teaching Methods:

- Lecture - discussion
- PowerPoint presentation
- Booklet (handout).

Evaluation of the program

- Evaluation of the educational program was done immediately after the implementation of the program and second reassessment was done after 3 months.
- Data were collected during a period of 6 months (from the beginning of March 2018 until the end of August of 2018).

Ethical Considerations of the Study: Research Ethics Committee approval of the Faculty of Nursing (Mansoura University) was obtained. Verbal consent was obtained from elderly persons after complete explanation of the study purpose. Privacy, confidentiality, anonymity and the right to withdraw at any time was assured.

Data Analysis: Data were analyzed using SPSS program version 16. Qualitative variables were presented as number and percent. McNemar test was used for the pre-post comparison. Quantitative variables were found to be normally distributed and were presented as mean and SD. Repeated measure ANOVA was used to test the significance of changes in baseline and at the two follow-ups. Paired t-test was used for post-hoc multiple comparison between paired observation. $P \leq 0.001$ was considered statistically significant.

RESULTS

Table 1 displays distribution of the study subjects according to their socio-demographic characteristics. This table revealed that, the age of the study subjects ranged from 60 to 85 years, 88.0% of the study subjects aged from 60 years to less than 75 years and 12.0% aged from 75 years to 85 years with a mean of 67.66 ± 5.75 years.

Table 1: Distribution of the study subjects according to their socio-demographic characteristics.

	Study subjects	
	N=(100)	%
Age(year):		
- 60-	88	88.0
- 75- 85	12	12.0
Mean± SD	67.66±5.75	
Sex:		
- Male	54	54.0
- Female	46	46.0
- Marital status:		
- Married	52	52.0
- Unmarried *	48	48.0
Education:		
- Illiterate/read &write	21	21.0
- Basic education *	28	28.0
- Secondary education	34	34.0
- University education	17	17.0
Income:		
- Enough	30	30.0
- Not enough	70	70.0

*Widowhood, divorced and single * Basic education (primary and preparatory)

Table 2: Distribution of the study subjects according to their medical and family history.

Items	Study subjects	
	N=(100)	%
Medical history: *		
- Cardiovascular disorders	64	64.0
- Diabetes mellitus	52	52.0
- Musculoskeletal disorders	42	42.0
- Renal disorders	18	18.0
- Cancer	11	11.0
- Hepatic disorders	8	8.0
- Respiratory disorders	5	5.0
Family history of cancer:		
- cancer	39	39.0
- cancer colon	21	21.0
Degree of kinship:	N= 21	
- First degree	4	19.0
- Second degree	17	81.0

*Categories are not mutually exclusive

Regarding sex, male constituted 54.0% of the study subjects. With regard to the marital status, 52.0% are married, while unmarried were found in 48.0% of the study subjects. As for the educational level, secondary education was prevailing among 34.0% of the study subjects. 17.0% of them have university education, basic education was found in 28.0%, while illiterate, read and write are found in 21.0%. Concerning the monthly income, 70.0% of the study subjects haven't enough income and 30.0% reported enough income.

Table 2 shows distribution of the study subjects according to their medical and family history. It can be observed from the table that, cardiovascular disorders

were reported by 64.0% of the study subjects, diabetes mellitus in 52.0%, musculoskeletal disorders in 42.0% and renal disorders in 18.0%. While cancer, hepatic and respiratory disorders were found in (11.0, 8.0and 5.0% respectively). As regards to family history, 39.0% of the study subjects reported that they have family history of cancer, 21.0% of them with positive family history of cancer colon and 81.0% of the study subjects are from the second degree.

Table 3 illustrates total mean scores obtained by the study subjects according to their Knowledge about colorectal cancer before and after implementation of the program. It can be observed from the table that, before

Table 3: Total mean score obtained by the study subjects according to their knowledge about colorectal cancer before and after implementation of the program knowledge about colorectal cancer

Before the implementation N=100	Immediately after the implementation N=97 #	3 month after the implementation N=89 #	
Mean± SD	Mean± SD	Mean± SD	
5.71±2.5	19.1±2.6	15.4±3.1	F= 1526.0, ≤ 0.001

The older adults died (3), the older adults withdrew from the study (8).

* The difference is statistically significant at $P \leq 0.01$.

Table 4: Intention to have colorectal cancer screening in the future and the actual performance of colorectal cancer screening by the study subjects before and 3 months after implementation of the program.

Items	Total N	Study subjects	
		N	%
Intention to have screening :			
- Before the implementation	100	16	16.0
- 3 months after the implementation	89	62	69.7
Z Test (P)=		P ≤ 0.001*	
Actual Performance of screening:			
- Before the implementation	100	1	1.0
- 3 months after the implementation	89	20	22.5
Z Test (P)=		P ≤ 0.001*	
3 months after the implementation of the program:		(62)	(62.0)
Intention to have screening by (type): #			
- Fecal occult blood test		45	72.6
- CT scan		11	17.7
- Flexible Sigmoidoscopy		9	14.5
Type of screening performed :		N=20	
- Fecal occult blood test		14	70.0
- CT scan		6	30.0

* The difference is statistically significant at $P \leq 0.01$

More than one answer

implementation of the program the total mean score of knowledge of the study subjects about colorectal cancer was 5.71±2.5, increased to 19.1±2.6 immediately after implementation of the program and then decreased slightly to 15.4±3.1 three months after implementation of the program and the difference is statistically significant ($P \leq 0.001$).

Table 4 shows that, 16.0 % of the study subjects reported having intention to perform colorectal cancer screening before the implementation of the program, while after the implementation 69.7% of them reported having intention to perform colorectal cancer screening and the difference is statistically significant ($P \leq 0.001$). 72.6% reported having intention to perform fecal occult blood test, 17.7% CT scan and 14.5% flexible sigmoidoscopy. As regards to the actual performance of screening 1.0% of the study subjects performed the colorectal cancer screening before the implementation, while after the implementation 22.5% of the study subjects performed the colorectal cancer screening and the difference is statistically significant ($P \leq 0.001$), 70.0% of the study subjects performed fecal occult blood test, while 30.0% of them performed CT scan.

Table 5 shows the variation of knowledge about colorectal cancer according to screening practice by the study subjects 3 months after implementation of the program. The table shows that three months after implementation of the program knowledge score of those performing screening is significantly higher than those not performing screening and the significant difference was found between knowledge and performance of screening ($P \leq 0.001$).

Table 6 shows that, before implementation of the program the mean knowledge score of the study subjects about CRC was lower in all age groups. Immediately after implementation of the program the mean knowledge score increased significantly for young elderly than older elderly and then slightly decreased 3 months after the implementation.

Concerning the sex, before implementation of the program the mean knowledge score of the study subjects about CRC was lower in males and females. Immediately after implementation of the program the mean knowledge score increased significantly in males than in females and then slightly decreased 3 months after the implementation.

Table 5: Variation of knowledge about colorectal cancer according to screening practice by the study subjects 3 months after implementation of the program.

Performing screening	N=89(%)	knowledge about colorectal cancer Mean± SD	P-Value
3 month after the implementation			
Yes	20 (22.5)	17.65±2.36	0.001*
No	69 (77.5)	14.72±3.02	

Table 6: Relation between Sociodemographic characteristics of the study subjects and mean knowledge score about colorectal cancer before and after implementation of the program:

Items	Before the implementation N=100		Immediately after the implementation N=97		3 month after the implementation N=89		Test of significance
	No	Mean± SD	No	Mean± SD	No	Mean± SD	
Age (in years):							
60-	88	6.02±2.45 ^{A,B}	85	19.48±2.58 ^{A,C}	79	15.70±3.09 ^{B,C}	F= 1.831, P≤0.001
75-85	12	4.40 ±2.11 ^{A,B}	12	17.50±1.35 ^{A,C}	10	12.80±2.09 ^{B,C}	F= 249.302, P≤0.001
Sex:							
Male	54	5.66±2.61 ^{A,B}	53	19.37±2.42 ^{A,C}	51	15.47±3.16 ^{B,C}	F= 1.175, P≤0.001
Female	46	5.93±2.25 ^{A,B}	44	19.10±2.72 ^{A,C}	38	15.26±3.11 ^{B,C}	F=891.893, P≤0.001
Marital status:							
Married	52	6.48±2.39 ^{A,B}	52	19.62±2.69 ^{A,C}	45	15.91±3.23 ^{B,C}	F= 1.170, P≤0.001
Unmarried	48	5.18±2.37 ^{A,B}	45	18.88±2.35 ^{A,C}	44	14.84±2.95 ^{B,C}	F=915.237, P≤0.001
Education:							
Illiterate/read& write	21	3.69±2.17 ^{A,B}	21	16.46±1.80 ^{A,C}	13	11.69±1.49 ^{B,C}	F=265.788, P≤0.001
Basic	28	5.20±2.25 ^{A,B}	25	17.88±2.43 ^{A,C}	25	13.40±2.34 ^{B,C}	F= 459.885, P≤0.001
Secondary	34	5.85±1.92 ^{A,B}	34	20.09±1.64 ^{A,C}	34	16.68±2.16 ^{B,C}	F=1.285, P≤0.001
University	17	8.41±1.77 ^{A,B}	17	21.76±1.15 ^{A,C}	17	18.53±1.74 ^{B,C}	F= 667.100, P≤0.001

A,B,C significant differences between the corresponding time by paired t-test

As regards marital status, before implementation of the program the mean knowledge score of the study subjects about CRC was lower in married and unmarried elderly. Immediately after implementation of the program the mean knowledge score increased significantly in married elderly than unmarried elderly and then slightly decreased 3 months after the implementation.

Regarding the level of education, before implementation of the program knowledge of the study subjects about CRC was lower in all levels of education. Immediately after implementation of the program the mean knowledge score increased significantly in elderly who had secondary and university education than illiterate elderly and those who had basic education and then slightly decreased 3 months after the implementation.

DISCUSSION

CRC is a disease that can be prevented and successfully treated through early detection using screening, education and changes in lifestyle behaviors [8]. Therefore this study was conducted to determine the effect of an educational program about colorectal cancer on elders' knowledge and their performance of screening.

The present study demonstrated a major deficiency in the knowledge of the elderly regarding the colorectal cancer. This was particularly evident in their knowledge about risk factors and colorectal cancer screening before the intervention. While after the implementation of the educational program to the elderly of the present study led to significant improvement in their knowledge. This was noticed in all the areas assessed as well as in total knowledge and the difference is statistically significant (Table 3). This finding is consistent with the results of other studies conducted by Su *et al.* [19] and Sharbatti *et al.* [20] who reported that their findings demonstrated generally low levels of satisfactory knowledge related to CRC risk factors, warning signs and methods for early detection of the disease at the pre-intervention phase. Also, significant improvement in the knowledge of the study subjects was shown at the post-intervention phase.

Three months after the implementation of the educational program knowledge of the study subjects about CRC decreased and the difference is statistically significant (Table 3). This finding is expected as retention of knowledge decreases as time goes on; also with advancing age forgetfulness is possible. The same result

was reported by Abd Allah *et al.* [21] and Abuadas *et al.* [22] who reported a decline in knowledge retention of the studied subjects three months after implementation of the program.

CRC screening is an effective mean of reducing the mortality and improving the prognosis [23]. Only 40% of bowel cancers are detected in early stages, making screening an invaluable tool for cancer prevention [24]. In the present study before implementation of the program, the majority of the study subjects never had intention to perform colorectal cancer screening, while three months after the implementation of the educational program significant improvement is observed regarding intention of the study subjects to perform colorectal cancer screening (Table 4). This is in agreement with a study conducted in Australia by Christou and Thompson [11] noted that nearly two-thirds of the elderly reported intending to participate in screening and with almost two-thirds reporting they would undertake Fecal Occult Blood Test in the future [11]. Similar supporting studies for our results were reported by Antonio *et al.* [25] and Hol *et al.* [26]. Also, a study done in Iran by Baghianimoghadam *et al.* [27] reported that the respondent's intention to make colorectal cancer screening was increased after education significantly.

Knowledge is only one factor that affects participation in CRC screening programs [9]. The results of the present study showed that a significant relation is found between older adult's knowledge about colorectal cancer and performing screenings. Knowledge scores of those practicing screening were significantly higher than those not practicing screening. Also, nearly all of the study subjects never performed a screening for colorectal cancer detection, while three months after the implementation of the educational program the majority of the study subjects performed (FOBT) Fecal Occult Blood Test, followed by CT scan actually (Table 5). This may be related to that test (FOBT) is cheaper and more available in primary laboratories in Mansoura city. This result is in harmony with that of other studies conducted by Hol *et al.* [26] and Bidouei *et al.* [28]. Also, a study done by Wu *et al.* [29] reported that after the intervention the screening rates increased from 37 to 66% among Asian American participants. Also, another study done by Bidouei *et al.* [28] noticed that colorectal cancer knowledge is an important predictor of CRC screening behaviours. In addition, Sanchez *et al.* [30] found that a positive relation between subjects' CRC knowledge levels and their participation in screenings. In contrast to our study results a study conducted in Turkey

by ILgaz and Gpzum [31] who found no association between knowledge of the studied elders about colorectal cancer and participation in screenings.

Regarding the relation between knowledge of the study subjects about colorectal cancer and sociodemographic characteristics, the present study revealed that a higher mean score of knowledge was found in the young elderly than in the older elderly and the difference was statistically significant after implementation of the program (Table 6). This finding may be due to normal age related changes that affect the ability of the elders to retain information for long time. This finding comes in consistence with that of other studies done by Galal *et al.* [32] and Lu *et al.* [33] who noticed that young old participants reported higher score on CRC knowledge. Also, the study done by Ma *et al.* [34] noted that the level of knowledge about CRC was significantly affected by age of the elders.

In contrast to our study results, other studies conducted in Oman by Al- Hadabi *et al.* [35] and Hillel and Sohmer [36] who found no association between age and knowledge of the studied elders.

As for sex, increased of knowledge about CRC was found in males than in females and the difference is statistically significant between sex of the study subjects and their knowledge about CRC after implementation of the program (Table 6). This may be attributed to males are more likely to be better educated than females. These results are in agreement with a study conducted in Malaysia by Al Naggar *et al.* [37] which noticed that males had significantly higher knowledge about CRC than females. In contrast, other studies done by Galal *et al.* [32] and Lu *et al.* [33] contradicting the present study who found that females have greater knowledge about CRC than males.

Regarding the relation between marital status of the study subjects and their knowledge about colorectal cancer, married elders reported increased knowledge than those who are either unmarried after implementation of the program and the difference is statistically significant between marital status of the study subjects and their knowledge about CRC (Table 6). This result is in agreement with Lu *et al.* [33] and, Ghanaei *et al.* [38] who found that being married was associated with higher mean score of knowledge about colorectal cancer.

The education level can be considered a determinant factor in the effectiveness of an educational program, the present study showed that the elders who have higher level of education reported higher mean score of knowledge about colorectal cancer than those with lower

educational level and the difference is statistically significant (Table 6). This can be justified by the fact that lack of education will result in ignorance of risk factors of colorectal cancer. Furthermore, education helps elders to view their abilities and acquire sense of control over risk factors of the disease. This is in accordance with that of other studies; Christou and Thompson [11], Galal *et al.* [32] and Lu *et al.* [33] which revealed that those with the highest levels of education have an advantage in terms of greater understanding of the disease, its risk factors and methods of prevention. Also, Abuadas *et al.* [22] and Lu *et al.* [33] reported that education could apply an immediate impact on health of elders as more education have a better ability to get, process and comprehend basic health information and services needed to make appropriate health decision.

CONCLUSION

Based on findings of the present study it can be concluded that, significant improvement in the total mean score of knowledge and increasing the screening rates regarding CRC for the majority of the study subjects was noticed after application of the educational program. These findings confirm the importance of colorectal cancer educational program.

Recommendations: Based on the results of the study, the following recommendations are suggested:

- The developed illustrated booklet to be distributed to all elders in the elderly clubs and outpatient clinics in Mansoura city through responsible personnel.
- Development of training program for nurses and health care personnel who work in primary care offices and community clinics could play an important role in increasing CRC screening rates among community dwelling older adults through providing an appropriate health education intervention for patients and their families.

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