

The effect of lifestyle modification on severity of constipation and quality of life of elders in nursing homes at Ismailia city, Egypt

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ABSTRACT

Background: Constipation has a significant impact on the quality of life (QOL). Lifestyle modification is widely accepted and recommended by experts as first-line therapy. **Aim:** This study aimed at using education on lifestyle modification to improve the QOL of the elderly in nursing homes suffering from functional constipation (FC). **Materials and Methods:** This study was conducted in nursing homes in Ismailia city, Egypt. It involved 23 elderly patients suffering from FC, who were randomly selected according to the sample equation. They fulfilled the inclusion criteria of being ≥ 60 years age and according to Rome II criteria. Participants completed personal characteristics and lifestyle questionnaire, the Patient Assessment of Constipation Symptom questionnaire (PAC-SYM) to assess the severity of symptoms, and the Patient Assessment of Constipation Quality of Life Questionnaire (PAC-QOL) to assess pre- and post-intervention. The intervention was conducted in three sessions, of 30 min each, 2 weeks apart using group discussions to educate the sample about dietary pattern, fluid intake, regular physical activity, and the use of laxatives. Statistical analysis: Data were analyzed using a statistical package for social sciences (SPSS version 20). **Results:** The lifestyle modification education on constipation significantly reduced the severity of symptoms as measured by PAC-SYM, including its total score and subscores ($P < 0.001$). It also improved the QOL of elderly suffering from constipation as measured by PAC-QOL and reduced total scores of dissatisfaction ($P = 0.001$) with the exception of the psychosocial subscale. It also significantly increased the satisfaction subscale of PAC-SYM ($P < 0.001$). **Conclusion:** Education on lifestyle modification leads to an improvement in the severity of the symptoms of constipation and the QOL of the elderly in nursing homes.

Key words: Elderly, functional constipation, quality of life, severity

INTRODUCTION

Constipation is related to multiple factors, and when it is untreated or not properly treated, results in complications, such as impaction or perforation and death.^[1] Constipation represents an economic burden for the patient and healthcare provider.^[2,3] Chronic functional constipation (FC) affects 17-40% of the elderly and reduces the quality

of life (QOL).^[4,5] In nursing homes, the prevalence of severe constipation might be up to 74%.^[4,6] FC is diagnosed when no secondary causes can be identified. In the elderly, with chronic constipation, history and physical examination to exclude medication-induced constipation and secondary causes are the first step.^[7,8]

The impact of constipation on QOL is significant and comparable with other common chronic conditions (allergies, musculoskeletal conditions, and inflammatory bowel disease).^[9] The scores of the QOL better reflect the healthy status of the FC patients than laboratory tests and the clinical symptoms.^[10] The emerging concept in the treatment of chronic constipation is the use of both objective measures such as frequency and ease of defecation and subjective parameters such as impact on

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QOL.^[11,12] Improving management may prove to be an effective way of improving QOL for a substantial number of patients.^[9]

The aims of the management of chronic constipation are to relieve symptoms, restore normal bowel habit, namely, the passage of a soft and formed stool at least three times a week, without straining, and to improve the QOL with minimal adverse effects.^[13] Lifestyle modification is widely accepted and recommended by experts as first-line therapy.^[14-16]

Aim of the study

This study aimed to reduce severity of symptoms and improve the QOL in the elderly people who have constipation using an education program on lifestyle modification.

MATERIALS AND METHODS

This was a pre-post intervention study. It was carried out in two elderly nursing homes in Ismailia city, Egypt. The first stage was screening for chronic FC among 90 elderly residents in two nursing homes for the elderly, in Ismailia city, based on the inclusion criteria of being 60-years old or more and fulfilling Rome II criteria:^[17]

Two or more of the following for at least 12 weeks in the preceding 12 months:

- Straining in more than 25% of defecations
- Lumpy or hard stools in more than 25% of defecations
- Sensation of incomplete evacuation in more than 25% of defecations
- Sensation of anorectal obstruction or blockage in more than 25% of defecations
- Manual maneuvers (e.g. digital evacuation, support of the pelvic floor) to facilitate more than 25% of defecations
- Fewer than three defecations per week
- Loose stools are not present, and there are insufficient criteria for the diagnosis of irritable bowel syndrome.

Excluded were those with the following: neurological disorders as stroke, hypothyroidism, gastrointestinal obstruction, spinal cord dysfunction, conditions such as strictures or colorectal cancer, chronic renal failure, depression, dementia, or acute confusion. FC was diagnosed in 28 elders. The sample was calculated and then 23 out of 28 elders with constipation were chosen by simple random sample technique. Sample size was calculated using this equation.^[18]

$$n = \frac{(P_1q_1 + P_2q_2) K}{(P_1 - P_2)^2}$$

At α error = 0.05, β error = 0.20, and power = 0.80. P = (prevalence of participants felt in control of their situation “all of the time” as part (PAC-QOL)).^[19] P_1 = prevalence before intervention = 0, P_2 = prevalence after intervention = 26.9%, K (constant) = 7.8, $q_1 = 1 - p_1$, and $q_2 = 1 - p_2$. The sample size was calculated by the equation (21 elders) +10% drop out (two elders) =23 elders.

Questionnaires

Questionnaire I was applied to all elderly residents (90) in the two nursing homes to select those with chronic FC for inclusion in the study. It had the name of nursing home, name of the resident, and his age together with Rome II criteria.

Pre- and post-intervention questionnaires were applied to the sample of 23 elderly patients:

Questionnaire II was used to get sociodemographic data of participants with FC including name of the nursing home, period spent in the nursing home, participant's name, age, gender, social status, education, crowding index, and income. Also the lifestyle of participants and the use of laxatives: Diet, fluid intake, exercise, medications, and laxative use.

Questionnaire III on Patient Assessment of Constipation Symptoms (PAC-SYM):^[20] was used to assess the self-reported severity of the symptoms of constipation in the previous 2 weeks. Participants were asked to assess their symptoms as absent, mild, moderate, severe, or very severe. The score was on 5 Likert scale, which contained 12 items forming three subscales: abdominal (four items), rectal (three items), and stool (five items). Total and subtotal scores were calculated and divided by the number of complete items. A higher score indicated more severe symptoms.

Questionnaire IV, Patient Assessment of Constipation Quality of life (PAC-QOL):^[21] was used to assess the self-reported impact of constipation on the QOL in the previous 2 weeks. It contained 28 items forming four subscales and an overall scale.

(PAC-QOL) Dissatisfaction subscales: Physical discomfort included four items, psychosocial discomfort included eight items, and worries and concerns included 12 items. Score based on 5 point-Likert scale ranged from 0 to 96 (where lower scores corresponded to better QOL).

(PAC-QOL) Satisfaction subscale included four items with a global score ranging from 0 to 16 (where higher scores corresponded to better satisfaction and better QOL).^[22]

The questionnaire was translated into Arabic and it was retranslated into English by a bilingual consultant. The two translators met for any necessary modifications, restatement, and rewording. A pilot study was carried out before the study to assess the feasibility and reliability of the questionnaire. The nurse or social worker in the nursing homes helped the participants to complete the questionnaires under the supervision of researcher.

The intervention phase: Health education on lifestyle modification was conducted for the participants. This included the definition of constipation, its aggravating factors and complications, the importance of regular bowel habits, best position for defecation, a healthy balanced diet, adequate fluid intake, benefit of exercise, selection of suitable exercise, and an indication of laxative use. It was conducted in three separate sessions at intervals of 2 weeks from April to July 2011. Group discussions were 30 min per session, and booklets were distributed to the participants on educational items of lifestyle modification.

Ethical consideration

The study was approved by the Ethics Committee of Faculty of Medicine, Suez Canal University and was performed in accordance with the ethical standards laid down in the Declaration of Helsinki (1964). Informed consents were obtained from both the administration of the nursing homes and the elderly who participated in the study. The questionnaire did not contain any critical questions, and confidentiality of data was maintained.

Statistical analysis

Data were collected and processed by using a statistical package for social sciences (SPSS version 20). Frequencies and percentages were used for qualitative variables. Means, standard deviations, and medians were obtained for quantitative variables. Chi-square test was used for categorical variables and Mann-Whitney test was used for comparisons of pre-post intervention regarding PAC-SYM and PAC-QOL means. Regression analysis was used to identify the various predictors of changes of both PAC-SYM and PAC-QOL scores. Results were considered statistically significant if $P < 0.05$ and very highly statistically significant if $P < 0.001$.

RESULTS

Of the 23 elderly suffering FC, half of them (52.2%) were aged between 70-80 years. More than two-thirds (69.6%) were females. The great majority of the sample was divorced or widowed (82.6%). Half of the sample (52.2%) had no formal education. Approximately two-thirds of the sample (65.2%) had crowding index of <2 and with sufficient income.

Pre-post intervention changes in dietary and exercise habits and laxative use

The present study revealed highly statistically significant changes in the study sample in pre–post intervention. There was an increase in participants on regular three meals from 21.7 to 82.6%, increase in those taking foods rich in fiber from 13 to 73.9%, and an increase in those on regular physical activity from 17.4 to 69.6%, ($P < 0.001$). There was also a statistically significant increase in the fluid intake of >1.5 liters/day in the elderly from 39.1 to 87% in pre–post intervention, ($P < 0.01$). There was, however, a highly statistically significant decrease in the users of laxatives from 82.6 to 34.8% in pre–post intervention, ($P < 0.01$) [Figure 1].

Pre-post intervention changes in the severity of symptoms and QOL scores

The present study showed a highly statistically significant improvement in post-intervention regarding the severity of symptoms of constipation according to PAC-SYM including total score and subscores ($P < 0.001$). It also showed statistically significant improvement of patient QOL post-intervention according to PAC-QOL satisfaction scores (<0.001) and total PAC-QOL dissatisfaction scores ($P = 0.001$) with its subscores except the psychological domain [Table 1].

The best predictors of pre-post changes in the severity of symptoms and QOL scores

Best fitting multiple linear regression model for pre–post changes in PAC-SYM and PAC-QAL scores as dependant variables and the lifestyle modification education program and sociodemographic of the elderly suffering FC as independent variables revealed that the income of the participants and the intervention programs were statistically significant independent negative predictors of score change of PAC-SYM ($P < 0.001$). The model explains 76% of the variations of PAC-SYM score, as indicated by the value of r-square [Table 2].

Female sex, education, crowding index of the participants, and intervention program were statistically significant

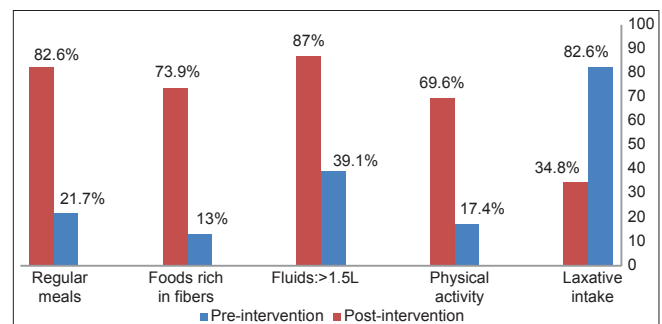


Figure 1: Comparison of pre-post intervention dietary and exercise habits and laxative intake of the studied subjects (n = 23)

Table 1: Comparison of pre-post intervention symptoms severity by PAC-SYM and QOL PAC-QOL scores among studied subjects (n=23)

	Time (n=23)				Mann-Whitney test	P value
	Pre		Post			
	Mean±SD	Median	Mean±SD	Median		
PAC-SYM:						
Abdominal	5.6±2.9	7.00	2.5±1.8	3.00	12.15	<0.001*
Rectal	1.7±1.1	2.00	0.3±0.5	0.00	16.53	<0.001*
Stools	8.1±2.4	8.00	3.2±0.9	4.00	34.68	<0.001*
Total	15.4±4.4	14.00	6.0±2.1	6.00	34.17	<0.001*
PAC-QOL:						
1-Dissatisfaction						
Physical	2.6±1.3	3.00	0.5±0.8	0.00	21.50	<0.001*
Psychological	10.8±10.7	4.00	4.9±5.0	2.00	3.01	0.08
Worries	14.4±11.8	9.00	6.7±6.1	4.00	8.36	0.004*
Total	27.8±22.5	15.00	12.1±11.5	5.00	10.21	0.001*
2-Satisfaction						
	5.3±1.7	6.00	10.6±2.5	10.00	27.02	<0.001*

(*) Statistically significant at P<0.05, SD: Standard deviation; PAC-SYM: Patient assessment of constipation symptom questionnaire; PAC-QOL: Patient assessment of constipation quality of life questionnaire; QOL: Quality of life

independent positive predictors of score change of satisfaction (P < 0.001). The model explains 80% of the variations of satisfaction score, as indicated by the value of r-square [Table 3].

Age, education, and crowding index of the participants were statistically significant independent positive predictors of dissatisfaction score. Conversely, an intervention program was a statistically significant independent negative predictor of score change of dissatisfaction. The model explains 78% of the dissatisfaction score, as indicated by the value of r-square [Table 4].

DISCUSSION

The present study revealed a highly statistically significant increase of the elderly on regular three meals from 21.7 to 82.6% in pre-post intervention. This was consistent with the evidence on the association of constipation with fewer meals and caloric intake.^[5]

The present study showed a highly statistically significant increase of participants taking foods rich in fiber from 13 to 73.9% in response to the educational intervention. Based on the study by Donini *et al.*,^[22] which found that an intake of fiber was important particularly in the elderly to the point that all national dietary guidelines and food guide pyramid for elderly people underline the necessity to increase the intake of dietary fiber, such as fruits and vegetables. The present study was consistent with the study by Sturtzel and Elmadfa^[23] who used a controlled blind parallel intervention trial among 30 frail patients aged 57-100 years of a geriatric ward with the use of laxatives.

Table 2: Best fitting multiple linear regression model for PAC-SYM score change

	Unstandardized coefficients		Standardized coefficients	t test	P value
	Beta	Standard error			
Constant	-11,829	3,328		-3,555	0.001
Income: Reference insufficient	-2.100	0.484	-0.328	-4.339	<0.001
Intervention program	-4.913	0.461	-0.805	-10.656	<0.001

r-square=0.76, model ANOVA: F=66.19, P<0.001, variables entered and excluded: Age, sex, education, and crowding index, PAC-SYM: Patient assessment of constipation symptom questionnaire; ANOVA: Analysis of variance

Table 3: Best fitting multiple linear regression model for PAC-QOL satisfaction score change

	Unstandardized coefficients		Standardized coefficients	t test	P value
	Beta	Standard error			
Constant	-12.537	2.495		-5.026	<0.001
Sex: Reference male	1.312	0.557	0.178	2.354	0.023
Education	2.150	0.366	0.788	5.882	<0.001
Crowding index	3.703	0.924	0.519	4.009	<0.001
Intervention program	5.348	0.474	0.787	11.278	<0.001

r-square=0.80, model ANOVA: F=41.07, P<0.001, variables entered and excluded: age, score; PAC-QOL: Patient assessment of constipation quality of life questionnaire; ANOVA: Analysis of variance

In the trial an intervention group received oat bran (fiber) for 12 weeks mixed in their usual daily diet and in which

Table 4: Best fitting multiple linear regression model for PAC-QOL dissatisfaction score change

	Unstandardized coefficients		Standardized coefficients	t test	P value
	Beta	Standard error			
Constant	-78.053	16.309		-4.786	<0.001
Age	12.010	1.989	0.610	6.039	<0.001
Education	15.124	2.684	0.983	5.636	<0.001
Crowding index	49.353	5.907	1.228	8.355	<0.001
Intervention program	-15.739	2.811	-0.411	-5.599	<0.001

r-square=0.78, model ANOVA: $F=36.14$, $P<0.001$, variables entered and excluded: sex QOL: Quality of life; PAC-QOL: Patient assessment of constipation quality of life questionnaire; ANOVA: Analysis of variance

no extra fiber was given to the control group. This study found that fiber supplementation in the form of a cake allowed discontinuation of laxatives in 59% of the fiber group ($P < 0.001$). The increased fiber intake among the present sample together with other modifications could explain the decrease in the use of laxative and the success of the intervention.

However, a group of Canadian gastroenterologists conducted a systematic review of the literature and developed a set of consensus treatment recommendations for chronic constipation and Irritable Bowel Syndrome-Constipation (IBS-Constipation). This review mentioned that results from multiple observational studies about fiber were conflicting. Studies mentioned that extra fiber was more likely to be beneficial to people with fiber deficiency.^[12] This could be a contributing factor to the improvement in the present study.

This study indicated a highly statistically significant increase in participants with regular physical activity from 17.4 to 69.6% in pre-post intervention. Based on the effect of exercise on constipation as one of the components of the intervention, previously small randomized control trials (RCTs) showed opposite results while two cohorts showed benefits with the conclusion that exercise was more likely to be beneficial to people who lacked exercise.^[12] The present study was consistent with the study by Daley *et al.*,^[24] on patients with a clinically confirmed diagnosis of irritable bowel syndrome according to Rome II criteria. The participants were randomized to either an exercise consultation intervention or usual care for 12 weeks. The exercise group reported significantly improved symptoms of constipation compared with usual care at follow-up, but there were no differences in the quality life scores between the groups at 12-weeks follow-up. The present results were not consistent with a 6-month study by Chin *et al.*,^[25] on moderate intensity exercise training, which revealed

that this neither improved habitual physical activity nor affected complaints of constipation in the elderly living in long-term care facilities.

The present study revealed a statistically significant increase of the daily fluid intake of the elderly of more than 1.5 liters from 39.1% to 87% in pre-post-intervention. These results were to some extent in agreement with one observational study, whereas another controlled trial showed the benefits of increased fluids only in the presence of sufficient fiber intake.^[12]

The current study showed a statistically significant decrease in the participants who used laxatives from 82.6% to 34.8% users in pre-post intervention. These findings were consistent with the findings by Sturtzel and Elmadfa^[23] that revealed reduced laxative intake in response to regular fiber intake. On the other hand, Park *et al.*,^[26] found that although exercise and dietary fiber could be helpful in some patients with constipation, laxatives have been found to be more effective than a placebo at relieving symptoms of constipation in others.

The classic triad of increasing dietary fiber, exercise, and fluids will benefit patients with actual deficiencies.^[27] These deficiencies found in the participating elders were corrected and significantly improved in response to education on lifestyle modification.

The present study showed highly statistically significant improvement in post-educational intervention on lifestyle modification, of the severity of symptoms of constipation according to PAC-SYM, including total score and subscores. This was to a large extent consistent with the study by Ostaszkievicz *et al.*,^[19] which included 27 community-dwelling adults aged 35-83 years who presented with lower urinary tract symptoms and constipation and received individualized conservative treatment for constipation. They showed significantly reduced overall severity of constipation symptoms measured by the PAC-SYM ($P < 0.01$). Also Ginsberg *et al.*,^[28] previously reported that primary constipation is amenable to dietary adjustments, education and behavioral training, and laxatives when necessary.

The present study showed statistically significant improvement of the QOL of patients in post-intervention according to PAC-QOL in satisfaction scores and total dissatisfaction scores with its subscores except in the psychological domain. This was different from the study by Ostaszkievicz *et al.*,^[19] in which the participants reported statistically significant improvements in their overall QOL as measured by the PAC-QOL ($P < 0.01$). There were significant improvements in relation to psychosocial

discomfort, worry and anxiety, and satisfaction as measured by the PAC-QOL. This could be related to the difference either in the approach or cultural differences between the studied samples. Also a study of the effect of lifestyle intervention previously done on 89 participants with IBS who joined the Nursing Academy of the Armed Forces in 2010 revealed a significant improvement of all subscale structures of the QOL ($P < 0.05$).^[29]

Unfortunately, no previous studies have analyzed the predicting factors of improvement related to education on lifestyle modification of a similar group. However, this type of intervention would be feasible in developing countries and in nursing homes.

The present study showed that income and intervention programs were statistically significant independent negative predictors of changes in PAC-SYM scores. The model explains 76% of the variations of PAC-SYM score, as indicated by the value of r-square. This means that a rise in income and delivery of the lifestyle modification education were associated with lower PAC-SYM scores indicating an improvement of the symptoms of constipation.

Female gender, education, crowding index, and intervention programs were statistically significant independent positive predictors of changes in satisfaction score. The model explains 80% of the variations of satisfaction score, as indicated by the value of r-square. This means that the better scores of satisfaction subscale of QOL were associated with females, with higher education, and education on lifestyle modification. Also better satisfaction scores were unfortunately associated with high crowding index.

Age, education, and crowding index were statistically significant independent positive predictors of changes in dissatisfaction score. Conversely, the intervention program was a statistically significant independent negative predictor of dissatisfaction score. The model explains 78% of the dissatisfaction score, as indicated by the value of r-square. This means that the higher dissatisfaction scores were associated with advanced age, higher education, and raised crowding index, whereas the education on lifestyle modification reduced the dissatisfaction scores among the studied sample.

CONCLUSION

Education on lifestyle modification leads to a significant improvement in the severity of symptoms as measured by PAC-SYM scores, and the QOL as measured by PAC-QOL scores among the elderly in nursing homes suffering from constipation. Lifestyle modification is of global concern

and is recommended for the prevention and management of several diseases. This was done successfully among the elderly in nursing homes.

Limitation of the study

The study was conducted on a special group of the elderly in nursing homes so the results cannot be generalized to cover all older people in the community. The detection of constipation depends on history taking. Other factors that could affect the results such as media were not investigated.

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