Effect of Cognitive Behavioral Intervention on Medication Adherence among Elderly at Elibrahemya Center, Sharkia Governorate, Egypt

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Abstract

Background: Medication non-adherence is a public health problem at every level of the population, especially in older adults. Therefore, it is important to improve medication adherence in patients with chronic diseases to minimize early deaths, economic and social burden. The **aim** of this study was to evaluate the effect of cognitive behavioral intervention on medication adherence among elderly at Elibrahemya center, Sharkia governorate, Egypt. **Design:** A quasi-experimental study design was carried out. **Setting**: the study was conducted at Sharkiat Mobasher Village, Elibrahemya center, Sharkia Governorate, Egypt. **Sample:** A multistage cluster sampling technique of 60 elderly. **Tools:** Four tools were used to collect the study data: **I)** A structured interview questionnaire. **II)** Elderly knowledge regarding their chronic disease & medication structured interview questionnaire. **III)**Beliefs about Medicines Questionnaire (BMQ). **IV)** The General Medication Adherence Scale (GMAS). **Results:** The study results revealed statistically significant improvement in medication adherence score, knowledge regarding chronic disease and medication score & beliefs about medicine score among the studied elderly throughout the study phases pre, post and follow the intervention ($P<0.001$). **Conclusion:** The cognitive behavioral intervention is effective in improving the elderly's medication adherence practice. **Recommendation**: Patient- centered interventions to overcome adherence barriers. It is also recommended that future studies with more focus on modifiable risk factors of medication non adherence.

Keywords: Effect, Cognitive Behavioral, Intervention, Medication Adherence, Elderly.

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Introduction:

Ageing in rural areas poses many of the challenges including, limited access to and availability of healthcare services, limited number of geriatric medical care staff, lack of preventive health and outpatient services, limited income, social care services accessibility challenges, geographic isolation, loneliness **(Cohen &Greaney,2019). Egypt**, along with other middle-income African countries is experiencing a great increase in the share of its population aged 65 and older. Population ageing is typically viewed as a minor concern in Egypt **(Angeli & Novelli, 2019)**. Additionally, the number of older people reached 6.5 million of (3.5 million for males, 3.0 million for females), representing 6.7% of the total population **(Central Agency for Public Mobilization and Statistics [CAPMAS], 2019).**

Adherence to long-term therapy can be defined by the extent to which a person's behavior taking medication, following a diet and/or executing lifestyle changes corresponds with agreed recommendations from a healthcare provider **(Lavielle et al., 2018).** Poor adherence is a public health problem at every level of the population, especially in older adults **(Costa et al., 2015)**. Many older adults suffer from multiple chronic diseases and are treated with numerous medications. They are, therefore, at a high risk of poor adherence, e.g. missing doses, discontinuation, alteration of schedules and doses or overuse. Non-adherence can result in worsening clinical outcomes, including re-hospitalization, exacerbation of chronic medical conditions and greater healthcare costs. Up to 10% of hospital readmissions have been attributed to non-adherence **(Verloo et al., 2017).**

The WHO report on medication adherence goes on to describe five categories of factors that affect medication adherence: patient-related factors, socioeconomic factors, health care provider and health care system factors, medication -related factors, and condition-related factors **(Levy et al., 2018)**. To effectively increase adherence among older adults strategies should be formed to properly identify barriers to medication adherence **(Saqlain et al., 2019).**

Lavielle et al., (2018) mentioned that, there are several modalities of interventions can be proposed to enhance medication adherence and can be classified in 4 categories: educational, behavioral, cognitive behavioral and multicomponent interventions. Medication adherence strategies may aid an older adult to achieve proper adherence, and these strategies may be combined for further effectiveness **(Blocker et al., 2017).**

Cognitive behavioral interventions enhance adherence by altering thinking patterns that contribute to non-adherence while also establishing behavioral patterns that support adherence using behavioral strategies (example: problem-solving skills training) **(Depont et al., 2015)**. In the same context, **Evans, (2019)** added that, cognitive behavior interventions are ideally suited to the individual in the later stages of the recovery or as maintenance when they are well. The underlying assumption behind the Cognitive behavior interventions is that individuals can positively influence their symptoms by changing their behavior and thinking.

The interventions aim to: involve patients in treatment; simplify therapeutic regimens; facilitate compliance with proposed treatments; incorporate

adaptation mechanisms into daily practice; and provide supporting documentation and reward for improved adherence **(Midão et al., 2018).** Interventions are characterized by cognitive–behavioral techniques focused on dysfunctional emotions, behaviors and cognitions with the aim to promote healthy lifestyles, and positive changes toward symptoms and treatment **(Costa et al., 2015)**.

Nurses can play an important role in improving the patient's treatment adherence through continuous training and follow ups, motivating patients, facilitating the care processes, and providing feedbacks. Providing these services requires constant nurse-patient communication which is possible in specialized community-based nursing clinics or through home nursing programs **(Zahmatkeshan et al., 2021)**.

Aim of the study:

The aim of the current was to evaluate the effect of cognitive behavioral intervention on medication adherence among elderly at Elibrahemya center, Sharkia governorate, Egypt.

This aim was fulfilled through the following objectives to:

1. Assess the elderly's knowledge regarding their disease &medication regimen pre and postintervention.
2. Assess the elderly's beliefs regarding their medication pre and post intervention.
3. Assess the elderly's practices regarding medication adherence pre and post intervention.
4. Develop and implement cognitive behavioral intervention to improve the elderly's medicationadherence.
5. Evaluate the effect of cognitive behavioral intervention on the elderly's medicationadherence.

Research Hypothesis:

The elderly's medication adherence was improved after implementation of the cognitivebehavioral intervention.

Subjects and Methods:

A quasi-experimental study was carried out. The study was used multistage random sampling technique to select Sharkiat Mobasher Village from Elibrahemya District, Sharkia governorate, Egypt, starting from the beginning of April 2020 up to the end of December 2020 with taking into account the preventive and precautionary measures to prevent COVID-19.

A multistage cluster sample composed of 60 elderly who fulfilled *the following inclusion criteria:* above the age of 60 years of both the sexes, Elderly is taking at least one medication by doctor's prescription for more than 6 months for chronic diseases, Ability to self-administer medications or take with minimal assistance, Free from communication problems, and Willing to participate in the study.

The sample size was calculated using EPI Info software program version 6.04 with study power 80% and at confidence level 95%. It was based on the assuming percentage of good medication adherence (63.0%) after application of teaching program **(Ahmed, & Abd El-Aziz, 2017)**. The total number of elderly population in Sharkiat Mobasher Village was elderly (540). Accordingly, the estimated sample size was 60 participants.

Tools of data collection:

Tool I-A structured interview questionnaire was developed by the researcher which is consisted of three parts:

Part 1: Personal characteristics of the studied elderly.

Part 2: Medical & medication history of the studied elderly.

Part 3: Factors affecting medication adherence of the studied elderly.

Tool II- Elderly's knowledge regarding their chronic disease & medication structured interview questionnaire to assess the study subject's knowledge regarding their disease & medication regimen used to treat their chronic disease. It composed of two parts:

A. Elderly knowledge regarding their chronic disease
B. Elderly knowledge regarding their medication

Scoring system: The total number of disease knowledge questions is four, medication knowledge includes ten questions; all items were scored 2 for "completely correct answer", 1 for "in completely correct answer", and zero for "wrong answer or I don't know ".

The total grade of disease and medication knowledge questions was considered satisfactory if the percent score was 60% or more and unsatisfactory if less than 60%.

Tool III- Beliefs about Medicines Questionnaire (BMQ): This tool was developed by **Horne, et al., (1999)** to assess the cognitive representations of medications. BMQ consists of two sections, general and specific. The specific section composed of specific-necessity and specific-concerns scales. The general section composed of the general-overuse and the general-harm scales. Higher scores indicate stronger beliefs in the concepts of the scale.

Tool IV: The General Medication Adherence Scale (GMAS): this tool was developed by **Naqvi et al., (2018)** to assess adherence to medication in patients with chronic conditions. Arabic version was obtained & approved to use by the questionnaire developers through e-mail communications. The GMAS consisted of 11 questions to measure adherence. All items had 4 possible outcomes, i.e., always, mostly, sometimes and never, that awarded scores 0, 1, 2, and 3, respectively.

Scoring system: Grading for cumulative medication adherence: high adherence (30–33), good adherence (27–29), partial adherence (17–26), low adherence (11–16) and Poor adherence (0–10). Administrative and ethical consideration were taken into consideration especially informed consent from the studied persons.

Results:

Table (1) shows that, the studied elderly's age ranged between 60 - 88 years, 58.3% of them were illiterate. Concerning their income, 56.7% of the studied elderly had sufficient income, and the highest percentage 75 % of the studied elderly weren't having health insurance.

Table (2) clarifies, variation in the studied elderly's beliefs about medicine pre, post and follow intervention (P= 0.000). At the post-intervention phase, there were highly statistically significant improvements in all domains of beliefs about medicine (p= 0.000). The follow-up phase showed some declines in all domains, but it remained significantly higher compared with the pre-intervention levels.

Figure (1) demonstrates, statistically significant difference in the total mean score of knowledge among the studied elderly pre and post the intervention (P= 0.000). Before the intervention, total mean score of knowledge was 7.63±3.9 which increased to 18.6±2.3 at the post intervention phase, and slightly decline to

17.0±1.8 at the follow-up phase. These improvements were statistically significant.

Figure (2) portrays, statistically significant difference in the total mean score of medication adherence among the studied elderly pre and post the intervention (P= 0.000). Before the intervention, total mean score of medication adherence was 17.35±4.2 which increased to 24.81±4.6 at the post intervention phase, and slightly declined to 23.9±3.8 at the follow-up phase. These improvements were statistically significant**.**

Table (3) points to high statistically significant positive correlation between medication adherence, specific necessity, knowledge, education and income. Conversely, there was a statistically significant negative correlation between medication adherence, age, health insurance, number of diseases, number of medications**,** specific concern, general-overuse and general-harm.

Discussion:

Once poor adherence is detected, efforts should focus on implementing interventions to improve and maintain long-term adherence. This can be achieved by using several different approaches, which concern not only patients but also physicians, health care systems and the medical therapy itself as already. Understanding the categories of factors contributing to non- adherence is useful in managing non-adherence **(Burnier & Egan, 2019)**.

Regarding personal characteristics of the studied elderly, according to table (1), the present study revealed that, approximately three- quarters of the studied elderly were in the age group 60 to less than 70 years old; this might be due to that presence of larger number of individuals of this age group in our country. Additionally, more than half of them were illiterate; this finding might be attributed to that living in rural areas associated with lack of interest in education and depend mainly on agriculture, thus the education is still low in many rural areas. In the same context, **Hamza et al., (2019)** in Egypt, who found that most of the studied subjects belonged to 60-69 years age group and illiterate. Similarly, **Xu et al., (2020)** in China, reported that more than half of the participants werein the age group 60 -69 years old and approximately three-quarters of them were illiterate.

According to the present study finding, more than half of the studied elderly had sufficient income. This finding might be due to strong family ties and social integration among the inhabitants of the village and majority of them depend on agriculture as a source of their income. The present finding was in agreement with the result of the study carried by **Cho et al., (2018)** in Korea, who found that the majority of the participants had middle &high income.

As regards to health insurance, the present results indicated that, three quarters of the studied elderly weren't having health insurance. Because the majority of rural residents are unemployed and therefore do not have government health insurance. This finding in accordance with the result of the study carried by **Ajibola & Timothy, (2018)** in Nigeria, who found that the majority of the participants (61.8%) were uninsured. On the contrary, a study was conducted in Korea by **Kim et al.,(2019)** showed that, 94.0% of the subjects were beneficiaries of the national health insurance.

Based on the present study finding

there was a statistically significant positive correlation between disease / medication knowledge and adherence. The foregoing present study finding was in agreement with previous studies, which demonstrated that there was a statistically significant association between disease knowledge and adherence with treatment. Participants who had adequate knowledge of their chronic disease were more adherent than those who had inadequate knowledge **Akoko et al., (2017)** in Cameroon and **Jankowska-Polańska etal., (2016)** in Poland. Likewise, **Mekonnen& Gelayee, (2020)** in Ethiopia, who found that good medication knowledge scores were significantly associated with medication adherence. Additionally, **Salama et al., (2017)** in Egypt, reported that a significant association between adherence and medication knowledge.

As revealed in the present study findings, there was a statistically significant positive correlation between medication adherence and the specific necessity beliefs. Hence, as the necessity beliefs increases, adherence also increases. On the same line, a study in Romania by **Sipos et al., (2020).**

Demonstrated that higher adherence was significantly correlated with higher necessity. Additionally, **Shahin et al., (2020)** in Australia supported these results. The present results in an agreement with **Jamous et al., (2014)** in Palestine who reported that the medication necessity beliefs were positive predictor for adherence**.**

Collectively, the present study findings revealed that a statistically significant negative correlation between adherence and negative beliefs about medications as a whole (specific concerns, general-harm scale and general over use beliefs). In addition, these beliefs may be associated with poor patients' experiences with the use of medicines in general, worse experiences acquired from surrounding patients with prior use of medicines, poor patients' knowledge regarding the purpose of medication in a disease treatment and patients' beliefs that their actions like eating healthy food and practicing exercise can control the disease without need for medicines.

On the same line with the aforementioned study results, **Lemay et al., (2018)** in Kuwait, indicated that negative beliefs toward medications have a significant negative impact on adherence tothe treatment regimen. These results are consistent with **Alhewiti, (2014),** who conducted a study in Saudi Arabia, and stated that there was a significant negative association between adherence score and BMQ specific concerns, general overuse, and harm.

The results of the current study after implementation of the cognitive behavioral intervention showed that there were statistically significant improvements in elderly's knowledge, beliefs and medication adherence. This indicates the effectiveness of the intervention in effecting a positive change. This improvement may be attributed to the content and process of the intervention, which was individualized according to patient's needs and focused on the identification of gaps in people's knowledge which can aid in the development of messages to enhance that knowledge. Furthermore, the booklet provided to the participant during the intervention based on applying knowledge in simple, straightforward, understandable language, with illustrations and aimed to address their concerns and reduce their fears may also contributed.

The present study finding in accordance with the study conducted by **Shehab et al., (2016)** in UAE which found that, significant improvement in adherence and medication's negative beliefs, when compared pre and post interventions. In congruence with this, a study in Egypt**,** reported that the implementation of the nursing guideline intervention was associated with significant improvements in all aspects of hypertensive patients' knowledge at the post and follow-up tests ($p < .001$) **(Ali & Taha, 2015)**. With this regard the present study finding matched with similar study in Egypt by **Mohammed et al., (2020)** who mentioned that highly significant improvement in diabetic knowledge and medication adherence in 1st and 2nd follow up after application of nursing teaching program than pre application.

Similarly, **Kulsick et al., (2020)** in Amherst, USA showed that, a statistically significant improvement in adherence rates from pre-seminar to post-seminar educational program for diabetic and hypertensive elderly patients. Furthermore, **Park & Kim, (2016)** in korea, reported statistically significant improvement in elderly's hypertension knowledge and treatment adherence after application of a nurse-led home visiting intervention. On the same line, **Torres-Robles et al., (2021)** in Spain found that a statistically significant improvement in medication adherence and disease-specific clinical outcomes in patients with hypertension, asthma and COPD after 3 months of follow- up based on behavior change frameworks interventions.

On the same line with foregoing study results, **Ahmed & El-Aziz, (2017)** in Egypt who stated that there was significant improvement in patient's knowledge and adherence after application of medical and nursing teaching program. There was a statistically significant difference between patient's knowledge and adherence score pretest and post-test. In the same stream, a study was conducted in Nigeria showed that the health education intervention had positive effect on increase the elderly's knowledge and medication adherence, immediately after implementation of the intervention (4^{th} month) and during follow up (5^{th} month) compared to the baseline **(Ozoemena et al., 2019)**.

Additionally, a study in Iran by **Zolfaghari et al., (2017)** clarified that cognitive behavioral intervention was found to be effective in reducing treatment adherence barriers leading to improve the score of adherence to medication regimen among study participants. In accordance with this finding, a study conducted in Brazil by **Cani et al., (2015)** who emphasized statistically significant improvement in the diabetes knowledge score, medication knowledge score and medication adherence after implementation of pharmacotherapeutic care plan and diabetes education program. Similarly, **Safren et al., (2014)** in Boston, reported a significant effect of cognitive behavioral therapy for improving medication adherence at post treatment and during the follow-up period.

The present findings show the mean scores of adherence, knowledge; beliefs were significantly higher at the end of the intervention and the follow-up when compared with the baseline. However, there was a significant decline in the mean score at the follow-up when compared with the post- intervention. This phenomenon is probably due to the effect of time lapse, where it is a normalhuman tendency to take things on a lighter note when there are no imminent

threats to one's wellbeing. Moreover, sustainability of adherence to medications over time is dependent upon multicomponent interventions including educational, attitudinal and technical aspects to modify and enhance patient medication-taking behavior.

This finding is supported by **Raj & Mathews (2020)** in India who reported that, the mean adherence and knowledge score in the intervention group was significantly higher when compared with the control group at the end of the third and the sixth month of behavioral interventions. However, there was a significant fall in the mean score at the sixth month when compared with the third month.

Conclusion:

Based upon the findings of the present study and answer of hypothesis, it was concluded that the cognitive behavioral intervention is effective in improving the medication adherence among elderly with chronic disease. The implementation of cognitive behavioral intervention is also effective in improving elderly knowledge, beliefs regarding their medication.

Recommendations:

- ✓ A better understanding of the motivational and behavioral factors that influence medication adherence will assist the development of effective strategies to improve medication adherence.
- ✓ Patient-centered interventions to overcome barriers and educating them about the importance of adherence. It is also recommended that future studies with more focus on modifiable risk factors of medication non adherence.
- ✓ New cooperation protocols between physicians should be designed to organize the treatment regimens of patients with multiple chronic diseases to avoid drug-to-drug interactions, decrease systemic side effects, and minimize non-adherence opportunities.

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Table 1: Frequency distribution of sociodemographic characteristics of the studiedelderly:

items	(n=60)	
	Frequency	**Percent**
Age group: /year		
60-	43	71.7
70-	13	21.7
≥80	4	6.6
Mean ± SD	**66.7 ± 6.3**	
(range)	**(60 – 88)**	
Education:		
illiterate	35	58.3
Read & write	12	20.0
Basic	4	6.7
Preparatory	2	3.3
Intermediate (secondary)	4	6.7
University/ post	3	5.0
Income:		
Insufficient	24	40.0
Sufficient	34	56.7
Sufficient and saving	2	3.3
Health insurance :		
Governmental	15	25.0
No insurance	45	75.0

Figure 1: Total mean score of knowledge among studied elderly throughout study phases:

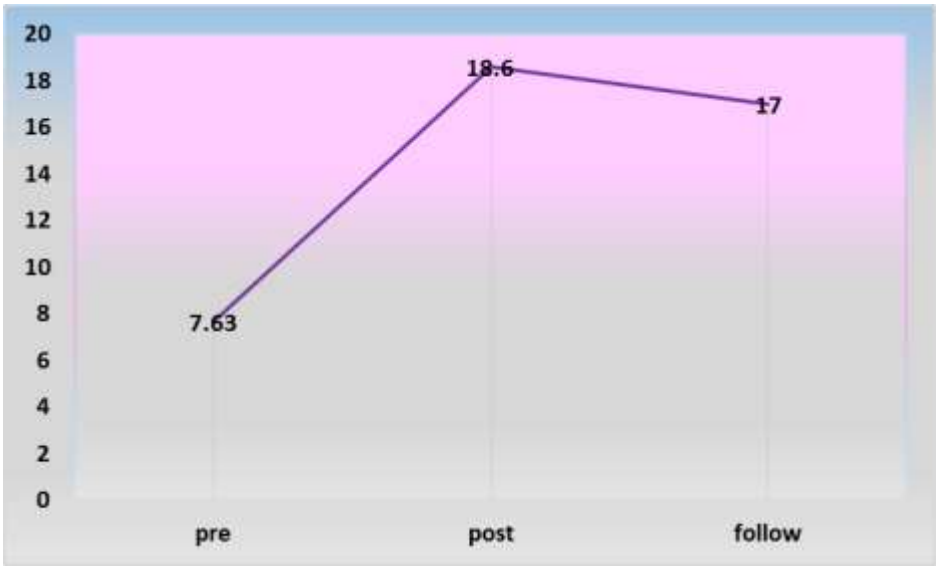

Table 2: Total mean score of Beliefs about Medicine Questionnaire [BMQ] among thestudied elderly throughout the study phases:

Subscale	Pre (n=60)	Post (n=60)	Follow up (n=60)	Paired t-test	(p-value)
	Mean ± SD Rang	Mean ± SD Rang	Mean ± SD Rang		
Specific-necessity	10.74±2.1 9-18	17.30±2.02 11-25	16.10±1.6 12-23	38.32	**.000****
Specific-concern	12.71±2.43 10-17	7.20±2.20 7-12	8.22±1.8 8-13	44.01	**.000****
General -overuse	16.39±1.42 12-20	10.62±1.6 7-13	10.88±1.43 8-13	88.67	**.000****
General -harm	14.01±1.8 9-18	9.13±1.35 6-13	9.33±1.12 7-13	90.03	**.000****

Figure 2: Total mean score of medication adherence among studied elderly throughoutstudy phases:

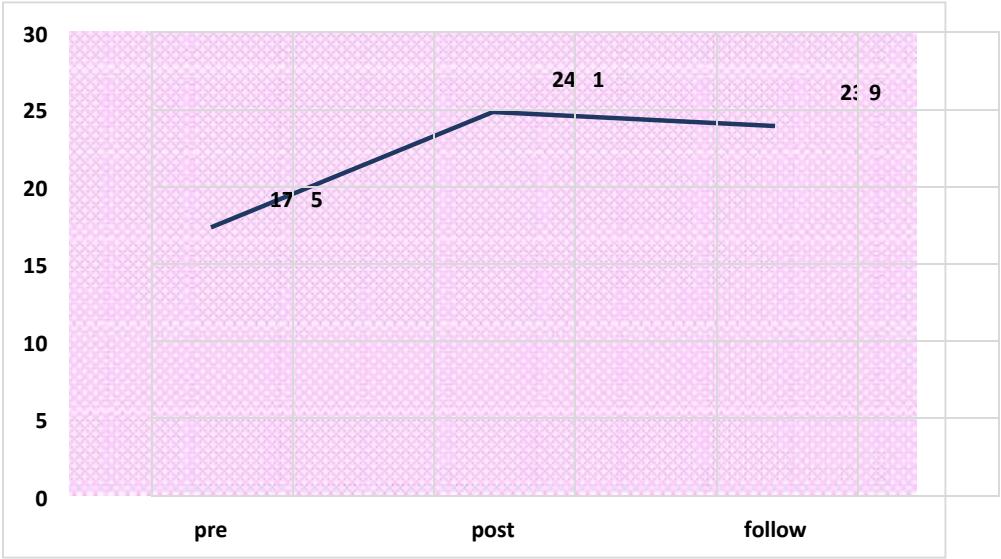

Table 3: Correlation matrix of elderly's knowledge, beliefs, and medication adherence scores:

Scores	Spearman's rank correlation coefficient					
	Knowledge	**Adherence**	**BMQ [Specific necessity]**	**BMQ [Specific concern]**	**BMQ [general-overuse]**	**BMQ [general-harm]**
Knowledge						
Adherence	**.564****					
BMQ[Specific necessity]	**.392****	**.426****				
BMQ[Specific concern]	.232	**-.455****	**-.340****			
BMQ[general-overuse]	-.218	**-.471****	.059	**.281***		
BMQ[general-overuse]	**-.389****	**-.316***	**-.304***	-.168	.082	