Effect of Health Literacy Intervention on Medication Adherence among Older Adults with Chronic Diseases

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Abstract

Background: Medication adherence is essential for controlling chronic conditions, treating temporary conditions, and overall health and well-being. **Aim**: Examine the effect of health literacy intervention on medication adherence among older adults with chronic diseases. **Design:** A quasi-experimental (study and control design). **Settings:** Family health unit in Dragel village, Menoufia Governorate, Egypt. **Sample:** a purposive sample of 140 older adults. **Tools:**1) Interviewing questionnaire that includes; the socio-demographic data, medical history, medication knowledge, factor affecting medication adherence and physiological measurement 2) The Medication Adherence Scale. 3) Self-Efficacy for appropriate medication use scale. **Results:** There was remarkable improved medication adherence and self-efficacy in medication use in the study group compared to pre-intervention and the control group. Also, there was improved knowledge and practice regarding medication use. Also, there was significant control in random blood glucose level and blood pressure in the study group compared to pre-intervention and the control group. **Conclusion:** The health literacy intervention was effective in enhancing medication adherence, successful in improving self-efficacy in medication use, and significantly controlling random blood glucose and blood pressure among older adults. **Recommendation:** Health care providers especially nurses should provide regular follow up for older adults with chronic diseases regarding medication adherence.

Keywords: *Chronic diseases- Health literacy - Medication adherence - Older Adults*

Introduction

Chronic diseases are long-lasting in their effects and require ongoing medical attention or limit activities of daily living[1]. Chronic diseases require long-term treatment and an increase in the demand for long-term healthcare services; that lead to decrease elderly people's quality of life[2]. Aging is often accompanied by a larger burden of comorbid conditions and the seriousness of illness[3].

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Pharmacologic therapy is an essential component in chronic disease management. Most elderly people with chronic diseases do not adhere to prescribed medication which usually leads to poor clinical outcomes [4]. Therefore, it is essential to enhance medication adherence in patients with chronic diseases to decrease premature deaths and social burden[5]. Patient adherence to medication is the degree to which patients follow treatment recommendations recommended as prescribed by their clinician[6].

Health literacy is a patients' ability to obtain, process, communicate and understand basic health information and services needed to make effective health-related decisions. So that, the patients should adequately be informed and understand the health-related instructions[6]. In maintaining medication

adherence for their patients by establishing therapeutic communication with patients before they receive their medication regimen; to be able to determine the common adherence barriers before adherence becomes a problem for the patient[6-7]. The nurses provide information or guide the patient to engage in the teach-back method that helps patients understand their instructions[8-9].

Aim of the Study

Examine the effect of health literacy intervention on medication adherence among older adults with chronic diseases (diabetes and hypertension).

Research Hypothesis

1. Older adults who will receive health literacy intervention will have improved medication adherence than older adults who will not receive health literacy intervention.

2. Older adults who will receive health literacy intervention will have controlled random blood glucose levels and blood pressure than older adults who will not receive health literacy intervention.

3. Older adults who will receive health literacy intervention will have improved self-efficacy than older adults who will not receive health literacy intervention.

Methods

Design: A quasi-experimental (study and control design) was utilized

Settings: Family health unit in Dragel village, Menoufia Governorate, Egypt that was selected using multi-stage random selection.

Sample: A purposive sample of 140 older adults was divided randomly into two equal-matched groups (study and control group) by using simple random selection.

Inclusion criteria:-

· Older adults 60years old and older.

· Older adults with chronic diseases (diabetes mellitus and/ or hypertension).

Sample Size and Power of The study:-

The sample size was calculated based on power analysis performed by Kelsey, Fleiss, and Fleiss, (2010)

which indicated that 140 older adults would yield sufficient power of 80% to detect the effect of health literacy intervention on older adults with chronic diseases, based on the following assumptions effect size= 0.5, and alpha=0.05, the power of 80 %, and the ratio of exposed to risk factors to those who were not exposed =1:1.

Instruments:

I: <u>Interviewing questionnaire</u> that includes:

Part 1: Socio-demographic data including name, age, sex, marital status, etc.

Part 2: Medical history including the type of chronic disease and medication information.

Part 3: Medication knowledge.

Part 4: a physiological measurement that includes:

· Random blood glucose

· Blood pressure

II: The Medication Adherence Scale: The scale was developed by[10]. The total score of the scale was ranged from 0-8 and categorized into: >2 = low adherence, 1 or 2 = medium adherence, 0 = high adherence

III: Self-Efficacy for Appropriate Medication Use Scale: This scale was developed by[11]. The total score of the scale was ranged from 16 to 48 and categorized into: 1-16 low self-efficacies, 17- 32 moderate self-efficacy, 33- 48 high self-efficacy.

Validity of the instruments:

The study instruments were tested for validity by a jury of five experts in the field of Community Health Nursing and Geriatric Nursing, to ascertain the relevance, completeness, and simplicity of each component in the instruments.

Reliability: The Cronbach alpha coefficient of the Medication Adherence Scale was 0.81 which indicates that the scale is reliable. Whereas the Cronbach alpha coefficient for self-efficacy for medication use scale was 0.85 which indicates that the scale is reliable.

Pilot Study: was carried out to assess the clarity, feasibility, applicability of the study tools, and the time needed to fill each tool. The pilot study was not included in the study sample.

Ethical Consideration:

· An official letter was obtained from the Dean Faculty of Nursing, Menoufia University to the director of the family health unit at Dragel to collect data and gain their help during the study period.

· Verbal informed consent from each participant was taken after explaining the purpose and duration of the study as well as they assured that their data will be used for research purpose only.

Procedure for Data Collection:

· Data were collected during the period from the beginning of January 2020 to the end of October 2020.

· The researcher interviewed the participants in the waiting room at the family health unit at Dragel two or three times every week.

· Pretest data of the study was filled by the researcher after introducing herself to participants and explaining the aim of the study to gain their cooperation.

· The filling of the instruments took about 20- 30 minutes for each participant then the measurements of blood glucose and blood pressure were taken.

· The sample of the study was categorized into two groups (study and control group) using simple random selection. The Control group was received routine care and the study group was received health literacy intervention.

· The health literacy intervention was developed by the researcher and carried out in three sessions. Each session was taken 20- 30 minutes. The intervention was given in a small group each group contains from 2- 5 participants.

ü The first session included information about diabetes mellitus and hypertension disease.

ü The second session related to diet and exercise regimen for diabetes mellitus and hypertension.

ü The third session related to medication adherence and factor affecting it.

· By the end of each session the researcher provides a summary of essential points as well as at the end of the sessions then, the participants of the study group received an educational intervention booklet.

· Posttest was administered for the study and control group at 3 months post-intervention.

· Physiological measures (random blood glucose and blood pressure) were taken once monthly for three months for the study group and control group.

· Participants of the control group have received a copy of the booklet at the end of the study.

Statistical analysis:

The collected data were coded and entered into the computer and statistically analyzed using SPSS version 22 for categorical variable the number and percent were calculated. The relations between the studied variables were tested. The level of significance was adopted at $p<0.05$.

Results

Population characteristics: The total sample size of 140 older adults were included in the study. 72.9% of the study group was in the age group 60-70 years, 64.3% were females, 58.6% were married, 37.1% do not read or write, 75.7% were not working and 57.1% with not enough income. While 67.1% of the control group was in the age group 60-70 years, 55.9% were females, 62.8% were married, 37.1% do not read or write, 64.3% were not working and 61.4% with not enough income;

there were no significant differences between the study and control group regarding all sociodemographic characteristics.

Table (1): Reveals that, post-intervention knowledge of the study group was significantly improved compared to their pre-intervention knowledge and knowledge of the control group.

Fig. (1): Shows that, in post-intervention, the high medication adherence degree among the study group increased to 45.8% than the control group 10% also medium medication adherence degree among the study group increased to 47.1% than the control group 24.3% while low medication adherence degree among the control group increased to 65.7% than the study group 7.1%.

Table (2): Shows that, mean random blood glucose showed consequently decreased on three occasions post-intervention in the study group compared to the mean random blood glucose pre-intervention and control group. Also, mean systolic BP showed consequently decreased on three occasions post intervention in the study group compared to mean systolic BP pre-intervention and control group. Also, mean diastolic BP showed consequently decreased on three occasions post-intervention in the study group compared to the mean diastolic BP pre-intervention and control group.

Table (3): demonstrates that the third post-intervention mean random blood glucose was significantly controlled in older adults with high and moderate medication adherence among the study group compared to their pre-intervention and the control groups

Table (4): Demonstrates that, post-intervention degree and mean total score of self-efficacy in medication use among the study group was significantly improved compared to their pre-intervention and control group.

Answering research hypothesis number 1

Table 1: Degree of knowledge about medication among the study and control groups pre and post-intervention

Degree of knowledge about medication	Pre-intervention				Pre	Post-intervention				Post
	Study group		Control Group			Study group		Control Group		
	No	%	No	%		No	%	No	%	
Poor knowledge (3-5)	51	72.9	45	64.3	LR=1.2, P=0.27	15	21.4	44	62.9	$\chi2$=24.6, P<0.0001
Good knowledge (6-7)	19	27.1	25	35.7		55	78.6	26	37.1	
Mean total score of medication knowledge	5.2± 1.4		4.8± 1.2		t=1.2, P=0.22	6.2± 1.1		4.7± 1.1		t=9.3, P<0.0001

*LR = The likelihood-ratio

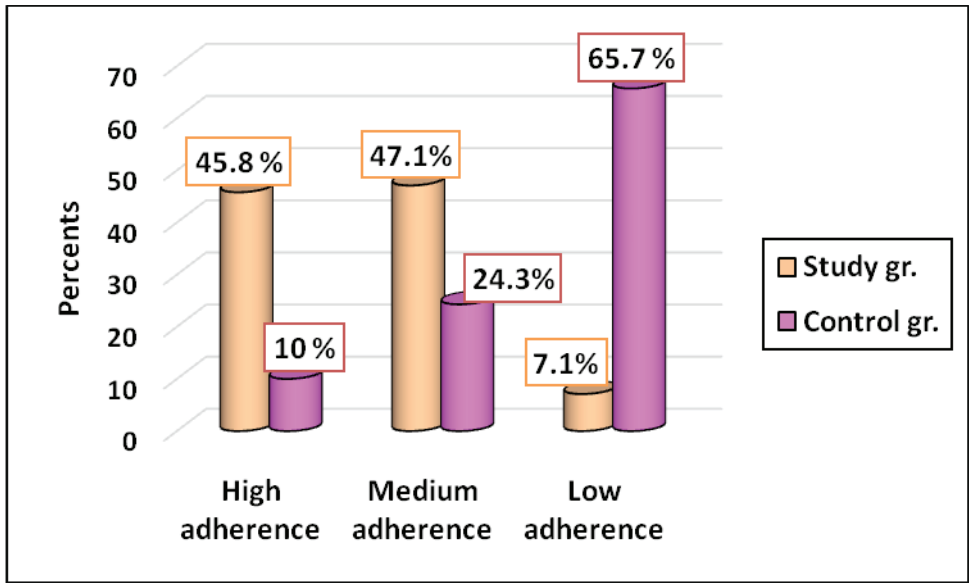

Fig.1:Post intervention medication adherence degree among the study and the control groups.

Answering research hypothesis number 2

Table 2: Comparison of post-intervention physiological measurements follow up among study and control groups, pre, post1, post2, and post3 intervention

	Pre-intervention		Post 1 one month post-intervention		Post 2 two months post-intervention		Post 3 three months post-intervention	
	Study *gr.	Control gr.	Study gr.	Control gr.	Study gr.	Control gr.	Study gr.	Control gr
Mean random blood glucose	174.7 ±43.9	169.5± 54.3	168.3 ± 33.6	161.7 ±32.7	158.5±32.8	172.8±24.2	146.7±27.3	183.1 ±29
Test of significant	t=0.62, P=0.53 NS		t=1.2, P=0.2 NS		t= - 2.94, P=0.004		t=-7.61, P<0.0001	
Mean systolic BP	136.1±17.1	124.6±17.1	129.9±10.9	125.1±10.9	122.7±16.4	128.9±10.7	118.9±15.7	134±12.3
Test of significant	t=3.9, P=0.001		t=2.5, P=0.01		t= - 2.6, P=0.01		t= - 6.3, P<0.0001	
Mean diastolic BP	87.4±9.7	81.7±10.5	84.9±7.1	81.6±7.5	80.7±6.8	84.3±6.4	78.3±6.1	87.4±8.6
Test of significant	t=3.3, P <0.001		t=2.6, P<0.009		t=- 302, P=0.002		t= - 7.22, P<0.0001	

*gr = group

Table (3): Relation between medication adherence degree and mean blood glucose in third post-intervention among the study and control groups.

3rd random blood glucose					P-value
Post-intervention medication adherence degree	Study		Control		
	N	Mean± SD	N	Mean± SD	
High adherence (0)	32	145.6±20.8	7	190.9±14.8	t=16.5 p<0.0001
Moderate adherence (1 or 2)	33	141.7±24.4	17	185.9±36.3	t=12.2 p<0.0001
Low adherence (> 2)	5	187.2±50.2	46	180.8±27.9	t=6.1 p<0.004

Answering research hypothesis number 3

Table (4): Degree of self -efficacy among the study and control groups pre and post-intervention

Self-efficacy degree	Pre-intervention				Pre	Post-intervention				Post
	Study group		Control group			Study group		Control		
	No	%	No	%		No	%	No	%	
Low self-efficacy (1-16)	1	1.4	1	1.4	LR=1.4, P=0.50	0	0	0	0	$\chi2$=103.2, P<0.0001
Moderate self -efficacy (17-32)	64	91.5	67	95.7		3	4.3	63	90	
High self-efficacy (33-48)	5	7.1	2	2.9		67	95.7	7	10	
Mean total score of self –efficacy	25.9± 4.9		27.1± 4.2		t=1.5, P=0.12	19.6± 3.4		9.3± 3.9		t=16.3, P<0.0001

*LR = The likelihood-ratio

Discussion

The consequences of medication non-adherence to long-term therapies are poor health outcomes, increased health care costs, and frequent hospitalization of older adults[12-13]. The purpose of the present study aimed to examine the effect of health literacy intervention on medication adherence among older adults with chronic diseases (diabetes and hypertension).

The first hypothesis suggested that older adults who will receive health literacy intervention will have improved medication adherence than older adults who will not receive health literacy intervention. Support for this hypothesis was found in the present study that revealed a highly significant improvement in the different levels of medication adherence among the study group than the control. This finding was supported by[14]; who reported that a health literacy intervention may be a

viable mechanism for improving cardiovascular-related medication adherence and outcomes. Besides, the present study result came on the same line with[15] who showed that a greater percentage of intervention patients were adherent to medication compared with usual care patients and there was a statistically significant greater percentage of intervention patients were classified as an adherent for medication.

The second hypothesis suggested that older adults who will receive health literacy intervention will have controlled blood pressure and blood glucose level than older adults who will not receive health literacy intervention. Support for this hypothesis was found in the present study that revealed a significant difference was observed between study and control groups regarding the control of random blood glucose. There was a significant difference was observed between the study and control groups regarding the control of blood pressure. A similar finding was recorded by[16] they showed that a significant improvement in pre and post-intervention was detected in the intervention group's HbA1c levels and the intervention helped improve HbA1c levels. Also, a similar finding was reported by[14]; they found that at six months post health literacy intervention average systolic blood pressure was decreased 0.5 mmHg and diastolic blood pressure was decreased 1.5 mmHg compared to pre-intervention among American patients' at primary care clinics.

The third hypothesis suggested that older adults who will receive health literacy intervention will have improved self-efficacy than older adults who will not receive health literacy intervention. Support for this hypothesis was found in the present study that revealed a significant improvement in the different levels of self-efficacy among the study group than the control in post-intervention. The level of high self-efficacy increased among the study group, compared to the control group post-intervention. These findings came in agreement with[17]they reported that older adults in the program intervention group showed significantly higher levels of self-efficacy at follow-up among Korean older adults with chronic disease. Participants with low health literacy had greater benefits from the intervention than those with high health literacy. Also, the present study results were in accordance with the study carried out by[18] who reported that the intervention group had significantly better self-efficacy and diabetes knowledge than the control group.

Conclusion

The health literacy intervention was effective in enhancing medication adherence, successful in improving self-efficacy in medication use, and significantly controlling random blood glucose and blood pressure among older adults.

Recommendation:

Health care providers especially nurses should provide regular follow up for older adults with chronic diseases regarding medication adherence.

Conflict of Interest: The researchers declare that they have no conflict of interest within this research and publication

Source of Funding: Self-funding

Ethical Clearance: Taken from the Ethical Research Committee of the Faculty of Nursing, Menoufia University.

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