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Original Article

Effect of Health Literacy on Medication Adherence among Elderly People with Chronic Diseases in Damietta Governorate

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Abstract

Background: Health literacy is a key determinant of health outcomes, particularly among elderly patients with chronic diseases. Drug adherence is especially critical for managing multiple chronic conditions in older adults, as inadequate adherence can lead to adverse health outcomes. This study aimed to assess the relationship between health literacy and medication adherence among elderly patients with chronic diseases in Damietta governorate and to identify the key predictors of adherence.

Patients and methods: A cross-sectional study was conducted among 335 elderly patients [aged ≥60 years] with chronic diseases. Data were collected through structured interviews using validated Arabic versions of Comprehensive and Functional Health Literacy Scales [CHL and FHL], and the General Medication Adherence Scale [GMAS]. Descriptive statistics, correlation analysis, and stepwise linear regression were performed using SPSS version 27.

Results: The study revealed a high prevalence of limited medication adherence, with 42.7% of participants demonstrating poor adherence. More than half of participants had inadequate comprehensive [52.8%] and functional [62.4%] health literacy. A strong positive correlation was observed between health literacy and medication adherence [$r_s = 0.600$, $p < 0.001$]. Regression analysis identified medical insurance [$\beta = 0.276$, $p < 0.001$], CHL [$\beta = 0.180$, $p < 0.001$], and FHL [$\beta = 0.153$, $p = 0.003$] as significant positive predictors of adherence, while lower socioeconomic status [$\beta = -0.244$, $p < 0.001$] and a higher number of chronic diseases [$\beta = -0.199$, $p < 0.001$] were strong negative predictors.

Conclusion: Health literacy significantly influences medication adherence among elderly patients with chronic diseases. Poor adherence was associated with inadequate health literacy, lower socioeconomic status, and a higher burden of chronic diseases. Interventions aimed at improving health literacy and expanding healthcare access through medical insurance may enhance adherence in this population.

Keywords: Health Literacy; Medication Adherence; Elderly Patients; Chronic Diseases.

INTRODUCTION

The definition of "elderly" has evolved over time and can differ depending on the average life expectancy in a given region. In many developed countries, individuals are typically categorized as elderly when they reach the age of 65, while in less developed regions; this classification often starts at the age of 60 [1].

In recent decades, advances in science and medicine have led to a sustained increase in the number of people aged 60 years and older. Egypt is currently undergoing a demographic transition, with projections indicating that the percentage of individuals aged 60 and above will significantly rise from 9.2% in 2021 to 20.8% of the total population by 2050 [2,3].

The aging population worldwide tends to experience a higher prevalence of chronic illnesses. These persistent health conditions pose significant economic challenges for individuals, healthcare systems, and society as a whole. It is estimated that 23% of the global disease burden is associated with conditions affecting individuals aged 60 years and older. In Egypt, Non-communicable diseases account for more than 90% of years lived with disabilities among older adults [4,5]. The primary contributors to this disease burden among older individuals are cardiovascular diseases [accounting for 30.3% of the total burden in this age group], diabetes mellitus [17%], musculoskeletal disorders [7.5%], and neurological and mental health conditions [6.6%] [6,7].

Medication adherence refers to the extent to which patients adhere to the treatment plan prescribed by their healthcare provider. This aspect is particularly critical when it comes to managing chronic illnesses among older adults as inadequate adherence can result in unfavourable medical outcomes leading to reduced quality of life and increased hospital readmissions [8,9].

Adherence is influenced by various factors, including patients' comprehension of their condition and the suggested treatment, their beliefs regarding the benefits and effectiveness of the prescribed regimens, real or perceived obstacles like side effects and financial limitations [9].

Health literacy concept includes two primary aspects: functional health literacy, which focuses on a person's skill in reading health-related information, and comprehensive health literacy, which pertains to an individual's ability to access, understands, and utilizes health information to make informed decisions about their health and healthcare services [10].

In the context of elderly individuals with chronic diseases, they may face various challenges related to health literacy, such as difficulty in understanding medical instructions, managing multiple medications, and recognizing potential drug interactions. These challenges can impede their ability to adhere to the prescribed medications, leading to suboptimal health outcomes and an increased risk of complications. Current research suggests that improving patients' health literacy can be used as an effective education and prevention tool to improve disease management behaviours, including treatment adherence [9].

To the best of our knowledge, there is limited information about the association between health literacy and medication adherence among elderly individuals with chronic diseases in Egypt and understanding this association may provide a guide to develop a tailored interventions and healthcare strategies that can address health literacy among this large vulnerable population. Therefore, this study aims to assess the level of health literacy and medication adherence among elderly patients with chronic diseases, to identify the relationship between health literacy and medication adherence, and to identify the possible predictors of good medication adherence among them.

PATIENTS AND METHODS

This study was cross-sectional study conducted on 335 elderly patients [≥ 60 yrs] with chronic diseases. It was implemented at outpatient clinics of Al-Azhar University hospital in Damietta from November 2023 till the end of October 2024.

The patients were included based on the following criteria; Elderly patients aged 60 years and above, patients who have been diagnosed with one or more chronic diseases [Hypertension, Diabetes mellitus, ischemic heart disease and Musculoskeletal disorders], and patients who are on at least one medication for the treatment of their chronic diseases for more than one year.

Patients with severe medical conditions or comorbidities that make them unsuitable for participation in the study and patients with a history of substance abuse or psychiatric disorders that may affect medication adherence were excluded from the study.

Sample size was determined using Epi info, Version 3, open-source calculator based on the following considerations: confidence level 95%, margin of error 5%, design effect 1, and prevalence of medication adherence among elderly population 30.6% [15]. So, the minimum required sample size was 327 cases which was approximated to 335 cases.

A convenient sampling technique was used to enroll the elderly patients. The sample was collected from three outpatient clinics; Internal medicine, Cardiology and Rheumatology clinics as these clinics receive most of the diseases in the inclusion criteria. Within each clinic all patients matching inclusion criteria were recruited until the total target sample size was reached. A structured interview questionnaire was used to collect data from patients who accept to participate in the study.

Data Collection;

A structured interview questionnaire was designed for the study. The questionnaire included:

Socio-demographic and medication related data:

This included characteristics such as [age, sex, marital status, residence, educational level, occupation, income, medical insurance, daily pills count, medication side effects]. Socioeconomic status was measured based on education, occupation, and monthly income of family [11].

Comprehensive and Functional Health Literacy scales: We used two scales to assess health literacy; one for the comprehensive and the other for the functional health literacy. Both scales have a validated Arabic version and were used with Egyptian population [10,12].

Comprehensive Health Literacy [CHL] scale: It consists of 16 items and the valid answer categories are 'very easy', 'fairly easy', 'fairly difficult', and 'very difficult' with the option to give an answer of 'do not know' that was analyzed in the same way as not answering the question. Both categories 'very easy' and 'fairly easy' got the value of 'one', while categories 'fairly difficult' and 'very difficult' got 'zero'. A

sum score was calculated only for valid questionnaires which had 14 or more valid answers. The respondent could score between 0 and 16 points, scores equal to or more than 13 denoted sufficient HL, scores from 9 to 12 denoted problematic HL, and scores less than or equal to 8 denoted inadequate HL [10].

Functional Health Literacy [FHL] scale: It consists of five items that assess FHL, each of them has five response options: 'never', 'seldom', 'sometimes', 'often', and 'always'. According to responses, the participants were divided into three categories of FHL: sufficient, problematic, and inadequate. Participants who responded by 'often' or 'always' at least once were categorized as having inadequate FHL, while participants who responded only by 'never' or 'seldom' to all questions were categorized as having sufficient FHL. Otherwise, participants were categorized as having problematic FHL, i.e., responded to at least one question by 'sometimes' and no responses with 'often' or 'always'. Questionnaires with at least one unanswered question were considered invalid [10].

General medication adherence scale [GMAS]: GMAS consists of 11 questions, each with four possible responses that contribute to an adherence score; Never [got value of 3], Sometimes [got value of 2], Mostly [got value of 1], and Always [got value of zero]. The maximum achievable score is 33. Adding up the scores from all the questions results in a final score that can be categorized into different levels of adherence: high [30–33], good [27–29], partial [17–26], low [11–16], and poor [≤10]. This scale has a validated Arabic version [13].

Ethical consideration:

The study design was approved at 8/10/2023 by the Local Ethics Committee of Cairo Faculty of Medicine/Al-Azhar University. Oral consents were obtained from each chosen patient before data collection. Aim and methodology of this study was explained to the selected subjects. All data obtained from the study was in private consideration and used for scientific purpose only.

Statistical analysis: We used SPSS version 27. to analyze the collected data. For presenting patient characteristics, descriptive statistics were displayed as counts with percentages and quantitative data were presented as mean ± standard deviation [SD]. We used Kolmogorov Smirnoff test to explore the normality of continuous data. We used Chi-Square test to compare the differences in medication adherence and health literacy levels according to patient characteristics. The Spearman correlation coefficient [r_s] was used to assess the correlation between medication adherence and health literacy. Stepwise linear regression analysis was used to investigate the predictors of medication adherence. The results were represented in tabular and diagrammatic forms then interpreted. All statistical tests were considered significant at p-value of ≤ 0.05.

RESULTS

This study included 335 elderly patients. The patients' mean age was 68.6 years [±6.5]. The majority [66.3%] were aged ≤70 years, and 53.1% were female. Most participants were married [60.6%], with no single individuals. Rural residency was predominant [56.4%]. Education levels varied, with 41.8% having a high school or post-high school diploma, while 12.8% were illiterate. Socioeconomic status was predominantly lower-middle and upper-lower class [74.6%] [Table 1].

Regarding daily activities and medications data; more than half of the participants [54.3%] reported difficulties in performing daily activities, [55.8%] required assistance in taking medications, [36.4%] took more than five pills daily, and 52.2% experienced medication side effects. Medical insurance coverage was low, with only [29.6%] having medical insurance [Table 2].

Hypertension was the most prevalent chronic condition [79.7%], followed by diabetes mellitus [46.8%], coronary heart disease [38.2%], and musculoskeletal disorders [26.3%] [Figure 1].

Adherence levels varied, with high adherence seen in 9.6% of participants and good adherence in 8.1%. while the majority of participants had limited adherence levels [24.8% partial, 14.9% low and 42.7% poor] [Figure 2].

Regarding the levels of comprehensive and functional health literacy, the majority of participants had inadequate comprehensive [52.8%] and functional [62.4%] health literacy, with only 30.4% and 13.4% having sufficient levels, respectively [Figures 3,4].

Regarding the correlation between comprehensive/ functional health literacy and medication adherence, a strong positive correlation [$r_s = 0.600$, $p < 0.001$] was observed between comprehensive health literacy and adherence. Participants with sufficient health literacy demonstrated the highest levels of adherence. Functional health literacy was also strongly correlated with adherence [$r_s = 0.615$, $p < 0.001$]. [62.2%] of participants with sufficient functional literacy exhibited good-to-high adherence [Tables 3,4].

In order to test the prediction, a stepwise forward multiple linear regression was conducted on adherence score, with three blocks of variables. The analysis included three steps:

1. **Step 1:** Incorporated baseline demographic and clinical predictors [age, sex, marital status, residence, education, medical insurance, difficulty in performing daily activities, daily pill count, assistance in taking medication, medication side effects, socioeconomic class, and the number of chronic conditions]. Significant predictors included medical insurance [$\beta = 0.276$, $p < 0.001$], socioeconomic class [$\beta = -0.244$, $p < 0.001$], number of chronic conditions [$\beta = -0.199$, $p < 0.001$], assistance in taking medication [$\beta = -0.161$ $p = 0.004$], and difficulty in performing daily activities [$\beta = -0.117$, $p < 0.031$].

2. **Step 2:** Added comprehensive health literacy [CHL] as a predictor, which was positively associated with adherence [$\beta = 0.180$, $p < 0.001$].

3. **Step 3:** Included functional health literacy [FHL], which also showed a positive impact [$\beta = 0.153$, $p = 0.003$].

These findings highlight that, higher levels of health literacy [both CHL and FHL] and access to medical insurance enhance adherence, while factors such as lower socioeconomic status, managing multiple chronic conditions, and difficulty in performing daily activities negatively affect adherence [Table 5].

Table [1]: Sociodemographic characteristics of study participants

		Values
Age	Mean±SD	**[68.6 ± 6.5]**
	≤70 years old	222 **[66.3%]**
	>70 years old	113 [33.7%]
Sex	Male	157 [46.9%]
	Female	178 **[53.1%]**
Marital status	Married	203 **[60.6%]**
	Divorced	23 [6.9%]
	Widow	109 [32.5%]
	Single	0 [0.0%]
Residence	Rural	189 **[56.4%]**
	Urban	146 [43.6%]
Education	Illiterate	43 **[12.8%]**
	Primary/ Middle school	80 [23.9%]
	High school/ Intermediate or post high school diploma	140 [41.8]
	Professional, Graduate or Postgraduate degree	72 [21.5]
Socioeconomic class	Upper	1 [0.3%]
	Upper Middle	41 [12.2%]
	Lower Middle	122 **[36.4%]**
	Upper Lower	128 **[38.2%]**
	Lower	43 [12.8%]
Total		335 [100%]

Table [2]: Daily activities and medications data of study participants

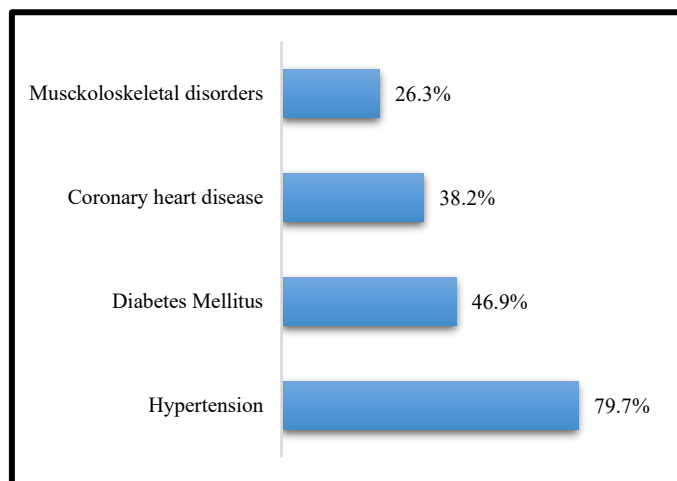|		Values
Difficulty in performing daily activities	Yes	182 **[54.3%]**
	No	153 [45.7%]
Daily pills count	<3	112 [33.4%]
	3_5	101 [30.1%]
	>5	122 **[36.4%]**
Assistance in taking medications	Yes	187 **[55.8%]**
	No	148 [44.2%]
Medication side effects	Yes	175 **[52.2%]**
	No	160 [47.8%]
Medical insurance	Yes	99 **[29.6%]**
	No	236 [70.4%]
Total		335 [100%]

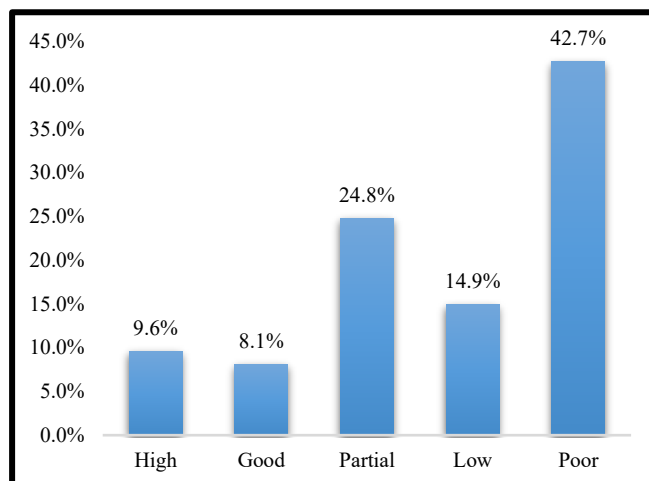**Figure [1]:** Chronic diseases' distribution among study participants

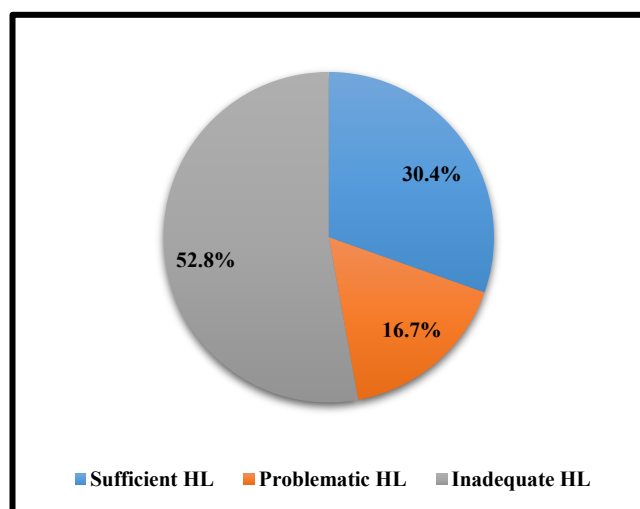**Figure [2]:** Adherence levels of study participants

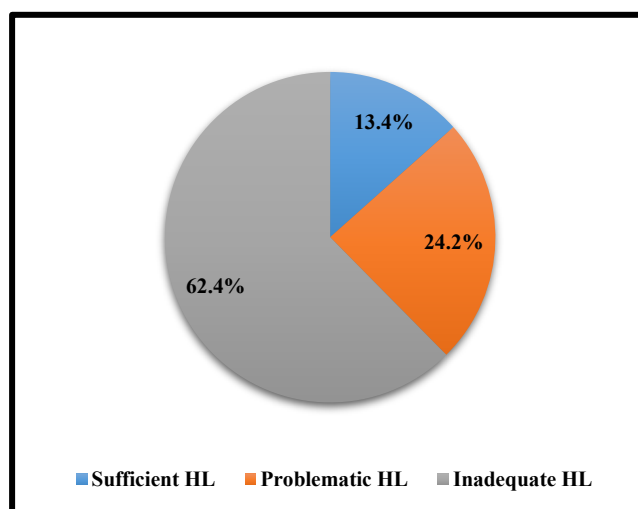**Figure [3]:** Comprehensive Health Literacy levels among study participants

Figure [4]: Functional Health Literacy levels among study participants

Table [3]: Correlation between Comprehensive Health Literacy and medication adherence

		Adherence level			r_s	p-value*
		Good to High	Partial	Poor to Low		
CHL grade	Sufficient [N=102]	42 [41.2%]	42 [41.2%]	18 [17.6%]	0.600	<0.001
	Problematic [N=56]	9 [16.1%]	20 [35.7%]	27 [48.2%]		
	Inadequate [N=177]	8 [4.5%]	21 [11.9%]	148 [83.6%]		

* Spearman's Correlation

Table [4]: Correlation between Functional Health Literacy and medication adherence

		Adherence level			r_s	p-value*
		Good to High	Partial	Poor to Low		
FHL grade	Sufficient [N=45]	28 [62.2%]	12 [26.7%]	5 [11.1%]	0.615	<0.001
	Problematic [N=81]	24 [29.6%]	34 [42.0%]	23 [28.4%]		
	Inadequate [N=209]	7 [3.3%]	37 [17.7%]	165 [79.0%]		

* Spearman's Correlation

Table [5]: Regression analysis for predictors of medication adherence

Steps	Predictors	Standardized β [95% Confidence]	t [p]	F [p]	Adjusted R^2	ΔR^2
1	Age	-0.042 [-0.222_0.08]	-0.926 [0.355]	43.586 [<0.001]	0.605	0.039
	Sex	0.101 [0.517_3.772]	2.592 [0.01]			
	Marital state	0.046 [-0.46_1.513]	1.05 [0.295]			
	Residence	0.024 [-1.149_2.159]	0.601 [0.548]			
	Education	0.024 9 [-0.583_0.848]	0.364 [0.716]			
	Socioeconomic class	-0.244 [-4.296_-1.605]	-4.314 [<0.001]			
	Chronic diseases mean	-0.199 [-3.309_-1.043]	-3.778 [<0.001]			
	Difficulty in performing daily activities	-0.117 [-4.753_-0.233]	-2.17 [0.031]			
	Daily pills count	-0.002 [-1.486_1.433]	-0.035 [0.972]			
	Assistance in taking medication	-0.161 [-5.782_-1.086]	-2.877 [0.004]			
	Medication side effects	-0.074 [-3.847_0.722]	-1.346 [0.179]			
	Medical insurance	0.276 [4.313_8.529]	5.993[<0.001]			
2	CHL grade	0.180 [1.022_3.287]	3.742 [<0.001]	45.583 [<0.001]	0.634	
3	FHL grade	0.153 [0.799_3.72]	3.044 [0.003]	44.079 [<0.001]	0.644	

* The regression equation for predicting adherence score is: Adherence Score= 47.542 + [0.276×Medical Insurance] - [0.244×Socioeconomic Class] - [0.199×Chronic Diseases Mean] + [0.180×CHL Grade] - [0.161×Assistance in Taking Medication] + [0.153×FHL Grade] - [0.117×Difficulty in Daily Activities] + [0.101×Sex]

DISCUSSION

The key to controlling and preventing long-term consequences in patients with multimorbidity is medication adherence, which is defined as individuals taking their medications as prescribed. Higher medication adherence has also been shown to significantly reduce complications and mortality in multimorbidity patients and improve their quality of life. The basis of long-term drug adherence are sufficient medication literacy and a positive attitude toward disease management [14].

The results of this study provide additional evidence of the vital role of health literacy in influencing elderly patients' adherence to medicines for chronic diseases. It has been found that both functional and comprehensive health literacy are important predictors of drug adherence, highlighting the significance of literacy in healthcare settings.

The results of the present study showed that the mean age of participants was 68.6 ± 6.5 years, with ages ranging from 60 to 90 years. 53.1% of the participants were female, while 46.9% were male.

This is similar to the results of **Lee *et al.*** [15] whose results showed that 57.4% of the participants were 65-74 years old, and about half were female [53.6%]. This is also consistent with the results of **Selvakumar *et al.*** [16] which revealed that the mean age of the participants was 67.1 years, ranging from 60 to 89 years old and the majority of them were female [52.3%].

While these results slightly different from the results of **Wang *et al.*** [14] which demonstrated that the mean age of the participants was 74.90±7.37 years, with a slightly higher proportion of males [55.8%] than females [44.2%]. Also, **Tsai *et al.*** [17] showed slightly different results with the mean age of their patients was 76.2 years, and 53% were male.

This difference in the mean age may be explained by the greater life expectancy in the population of China and Taiwan where **Wang *et al.*** [14] and **Tsai *et al.*** [17] did their studies. Although the national male-to-female ratio is 1.065, the higher proportion of females in our sample may be explained by the higher life expectancy of females which makes them mor liable to chronic multimorbidity and by the health seeking behavior of females [18,19].

In terms of education this study's findings revealed that 25.4% of participants had an intermediate or post-high school diploma, while 21.5% had a postgraduate or professional degree. The percentage of illiterates was lower [12.8%]. This is similar to the results of **Lee *et al.*** [15] which demonstrated that 26.8% of participants had above middle education and also the results of Tsai et al showed 50% of participants had >9 years of education. But this is slightly different from the results of **Selvakumar *et al.*** [16] and **Wang *et al.*** [14] whose results showed that only 4.3% had university education in Selvakumar study and 3% in Wang study. However, the present study results are consistent with the national percentages of population entered higher education [29.2%] [20].

Regarding socioeconomic status. The present study showed that the majority of participants belonged to the upper lower [38.2%] or lower middle [36.4%] socioeconomic classes. This is consistent with the national percentages of middle class in Egypt [53%] [21].

The present study showed that only 29.6 of participants had medical insurance coverage. This percentage is lower than the total national percentage [52.25%] which can be explained by the age group of the study sample as people aged ≥ 60 years old could have only public health insurance after retirement from a governmental job. It is reported that only 16% of women aged 60 - 64 have any type of health insurance, and there is no available data on health coverage among women aged ≥ 65 or older men [22,23].

The results of this study showed that 54.3% of participants reported they had difficulties in performing everyday activities, 55.8% of them needed help taking their medications, 36.4% used more than five medicines each day, and 52.2% reported experiencing adverse effects from medications. This is similar to the results of **Lee *et al*.** [15] which revealed that 41.9% of participants had passive daily activities, 62.2% required assistance to take medications. However, **Lee *et al*.** [15] reported that 13.75 of participants took ≥ 4 pills daily and only 7.6% had medication side effects.

This can be explained by the higher prevalence of chronic diseases in Egypt which leads higher number of medications administrated simultaneously leading to increased risk of adverse effects [24].

This study findings showed that the most prevalent chronic conditions were hypertension and diabetes mellitus; 79.7% of patients were hypertensive, 46.9% were diabetic, 38.2% suffered from coronary heart disease, and 26.3% had musculoskeletal disorders. This is similar to the results of other studies which investigated the prevalence of non-communicable diseases among elderly patients whose findings revealed that the prevalence of hypertension ranged from [60 to 75%] in women and men older than 60 years, the prevalence of diabetes [37.5 to 53.5%], the prevalence of cardiovascular diseases [30.7-37.5%], and the prevalence of musculoskeletal disorders [23.5-32.9%] [25,26].

The present study findings demonstrated variations in the participants' levels of adherence with only 9.6% and 8.1% of them had high and good levels of adherence respectively while the majority had partial [24.8%], low [14.9%] and poor [42.7%] adherence levels.

This is similar to the results of **Wang *et al*.** [14] which showed that 7.6% of participants demonstrated high adherence, 16.5% had moderate adherence, and 75.9% exhibited low adherence. Also, the results of **Tsai *et al*.** [17] demonstrated that 66% of patients had a poor adherence and the results of **Gomes *et al*.** [27] which showed that 47.7% of the sample had an adherence value below the median and were categorized as nonadherent.

While the results of **Lee *et al*.** [15] showed that 30.6% of patients was highly adherent to medications and in **Selvakumar *et al*.** [16] study the findings revealed that 83.2% of participants were non-adherent to their medications. These differences from the present study results can be explained by the variations in the used scales.

Regarding the health literacy levels, this study results showed that the mean of the comprehensive health literacy score among participants was 7.56±6 with the majority of participants 69.5% had limited comprehensive HL [52.80% inadequate and 13,70% problematic] and 86.6% had limited functional HL [62.40% inadequate and 24.2%

problematic] while only 30.4% and 13.4% had sufficient levels of them respectively. This is similar to the results of **Selvakumar *et al*.** [16] which revealed that about three fourth of participants reported limited health literacy.

This is slightly different from the results of **Almaleh *et al*.** [10] which showed that 81% of the participants had limited comprehensive health literacy [34.3% inadequate and 46.7% problematic] and 84% had limited FHL [50.6% inadequate and 33.4% problematic] while only 18.9% and 16.1% had sufficient levels of them. This may be attributed to the variations in the participants' socioeconomic and cultural backgrounds, age, and health condition as the sample of Almaleh et al. study included about 50% of companions and 50% patients from different age groups.

Regarding the relation between health literacy and medication adherence, this study results showed that the comprehensive health literacy [CHL] and functional health literacy [FHL] were significantly associated with medication adherence. This is comparable to the findings of **Selvakumar *et al*.** [16] which reported a significant positive association between health literacy and medication adherence. Also, the results of **Lee *et al*.** [15] and **Wang *et al*.** [14] revealed that health literacy was positively associated with medication adherence [14-16].

The present study findings revealed several highly significant predictors of medication adherence. Medical insurance emerged as one of the strongest positive predictors [β = 0.276], socioeconomic class was another significant predictor [β = -0.244], CHL and FHL showed a significant positive influence on adherence. Higher CHL scores [β = 0.180] and FHL scores [β = 0.153] were associated with improved adherence. Additionally, the presence of multiple chronic conditions negatively influenced adherence [β = -0.199]. This is comparable to the results of **Lee *et al*.** [15] which showed that health literacy was a strong predictor of medication adherence [β = 0.190]. Also, the perceived health status [β = 0.132], and assistance with medication administration [β = 0.120] were also significant predictors of medication adherence.

Our findings are generally consistent with those of previous researches that have demonstrated a strong correlation between health literacy and medication adherence. Studies by **Lee *et al*.** [15], **Selvakumar *et al*.** [16] and **Wang *et al*.** [14] have similarly showed that elderly patients with limited health literacy often face difficulties in adhering to medications and managing chronic conditions.

Conclusion: This study findings highlight that poor medication adherence is highly prevalent among elderly patients with chronic diseases, with more than half demonstrating inadequate comprehensive and functional health literacy. Health literacy was found to be a significant predictor of adherence, alongside sociodemographic factors such as older age, lower education, rural residency, and low socioeconomic status. Additionally, multiple comorbidities and lack of medical insurance were major barriers to adherence.

To address these challenges, we recommend developing accessible health information tools, engaging caregivers in health literacy training, and implementing support systems such as medication management applications for elderly patients. Strengthening community-based awareness programs, expanding healthcare accessibility through improved insurance coverage, and increasing rural healthcare resources. Future research should further explore demographic-specific barriers to health literacy and examine the long-term effects of health literacy on medication adherence to develop more effective interventions.

Limitations: The Study limitations included the convenience sampling technique which was used due to lack of geriatric clinic in the governorate where we conducted the research, the causal relation between health literacy and medication adherence can't be established because of the cross-sectional design, and the self-reported adherence questionnaire may be liable to bias, as patients may overestimate/underestimate their adherence levels.

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REFERENCES

1. United Nations. [2019]. Retrieved December 2, 2023, from https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/unpd_egm_201902_s1_sergeischerbov.pdf

2. Sweed HS, Maemon MM [2014]. Egypt-ageing population. EJGG.2014;1[1]:1-9. Available at: /https://ejgg.journals.ekb.eg/article_5330_91475a5e3de06bf97c85610b30019a96.pdf

3. WHO. [2023]. Retrieved December 12, 2023, from https://www.who.int/news-room/fact-sheets/detail/ageing-and-health

4. Maresova P, Javanmardi E, Barakovic S, Barakovic Husic J, Tomsone S, Krejcar O, Kuca K. Consequences of chronic diseases and other limitations associated with old age - a scoping review. BMC Public Health. 2019 Nov 1;19 [1]:1431. doi: 10.1186/s12889-019-7762-5.

5. United Nations Population Fund. [2021]. Retrieved January 20, 2024, from https://arabstates.unfpa.org/sites/default/files/pub-pdf/country_profile_-_egypt_27-10-2021_0.pdf

6. Prince MJ, Wu F, Guo Y, Gutierrez Robledo LM, O'Donnell M, Sullivan R, Yusuf S. The burden of disease in older people and implications for health policy and practice. Lancet. 2015 Feb 7;385[9967]:549-62. doi: 10.1016/S0140-6736[14]61347-7.

7. WHO. [2023]. Retrieved December 5, 2023, from https://www.emro.who.int/egy/programmes/noncommunicable-diseases.html

8. Yap AF, Thirumoorthy T, Kwan YH. Systematic review of the barriers affecting medication adherence in older adults. Geriatr Gerontol Int. 2016 Oct;16[10]:1093-1101. doi: 10.1111/ggi.12616.

9. Miller TA. Health literacy and adherence to medical treatment in chronic and acute illness: A meta-analysis. Patient Educ Couns. 2016 Jul;99[7]:1079-1086. doi: 10.1016/j.pec.2016.01.020.

10. Almaleh R, Helmy Y, Farhat E, Hasan H, Abdelhafez A. Assessment of health literacy among outpatient clinics attendees at Ain Shams University Hospitals, Egypt: a cross-sectional study. Public Health. 2017 Oct; 151:137-145. doi: 10.1016/j.puhe.2017.06.024.

11. Wani RT. Socioeconomic status scales-modified Kuppuswamy and Udai Pareekh's scale updated for 2019. J Family Med Prim Care. 2019 Jun;8[6]:1846-1849. doi: 10.4103/jfmpc.jfmpc_288_19.

12. Wangdahl JM, Dahlberg K, Jaensson M, Nilsson U. Psychometric validation of Swedish and Arabic versions of two health literacy questionnaires, eHEALS and HLS-EU-Q16, for use in a Swedish context: a study protocol. BMJ Open. 2019 Sep 17;9[9]: e029668. doi: 10.1136/bmjopen-2019-029668.

13. Naqvi AA, Mahmoud MA, AlShayban DM, Alharbi FA, Alolayan SO, Althagfan S, et al. Translation and validation of the Arabic version of the General Medication Adherence Scale [GMAS] in Saudi patients with chronic illnesses. Saudi Pharm J. 2020 Sep;28[9]:1055-1061. doi: 10.1016/j.jsps.2020.07.005.

14. Wang W, Luan W, Zhang Z, Mei Y. Association between medication literacy and medication adherence and the mediating effect of self-efficacy in older people with multimorbidity. BMC Geriatr. 2023 Jun 19;23[1]:378. doi: 10.1186/s12877-023-04072-0.

15. Lee YM, Yu HY, You MA, Son YJ. Impact of health literacy on medication adherence in older people with chronic diseases. Collegian. 2017; 24 [1]:11-8. doi: 10.1016/j.colegn.2015.08.003.

17. Selvakumar D, Sivanandy P, Ingle PV, Theivasigamani K. Relationship between Treatment Burden, Health Literacy, and Medication Adherence in Older Adults Coping with Multiple Chronic Conditions. Medicina [Kaunas]. 2023 Jul 31;59[8]:1401. doi: 10.3390/medicina 59081401.

18. Tsai KT, Chen JH, Wen CJ, Kuo HK, Lu IS, Chiu LS, Wu SC, Chan DC. Medication adherence among geriatric outpatients prescribed multiple medications. Am J Geriatr Pharmacother. 2012 Feb;10[1]:61-8. doi: 10.1016/j.amjopharm.2011.11.005.

19. CAPMAS [2022]. Retrieved December 13, 2023, from https://www.capmas.gov.eg/Admin/News/PressRelease/2022929134228_333.pdf

20. Prabhakar T, Goel MK, Acharya AS. Health-Seeking Behavior and its Determinants for Different Noncommunicable Diseases in Elderly. Indian J Community Med. 2023 Jan-Feb;48[1]:161-166. doi: 10.4103/ijcm.ijcm_106_22.

Langsten R. Effectively maintained inequality: Access to higher education in Egypt. In: Advances in Education in Diverse Communities: Research, Policy and Praxis Mitigating Inequality: Higher Education Research, Policy, and Practice in an Era of Massification and Stratification, Emerald Group Publishing Limited Volume 11, 2015; https://doi.org/10.1108/S1479-358X20150000011004

Middle class in Arab countries | Enhanced Reader. [2023]. Retrieved February 21, 2024, from: https://www.unescwa.org/sites/default/files/inline-files/middle-class-arab-countries-working-paper-2.pdf

CAPMAS [2019]. Retrieved October 15, 2024, from https://www.capmas.gov.eg/Pages/Publications.aspx?page_id=7195&Year=23448

The rights and wellbeing of older persons in Egypt. [2021]. Retrieved February 12, 2024, from https://arabstates.unfpa.org/en/topics/demographic-dividend-6

El-Saadani S, Saleh M, Ibrahim SA. Quantifying non-communicable diseases' burden in Egypt using State-Space model. PLoS One. 2021 Aug 10;16[8]:e0245642. doi: 10.1371/journal.pone.0245642. PMID: 34375334; PMCID: PMC8354445.

Burnier M, Polychronopoulou E, Wuerzner G. Hypertension and Drug Adherence in the Elderly. Front Cardiovasc Med. 2020 Apr 7; 7:49. doi: 10.3389/fcvm.2020.00049.

Moustafa SA, Deif R, Gaballah N, Salama M. Cognitive Impairment and Non-Communicable Diseases in Egypt's Aging Population: Insights and Implications from the 2021-2022 Pilot of "A Longitudinal Study of Egyptian Healthy Aging" "AL-SEHA". Int J Environ Res Public Health. 2024 Jan 29;21[2]:151. doi: 10.3390/ijerph21020151.

Gomes D, Placido AI, Mó R, Simões JL, Amaral O, Fernandes I, Lima F, Morgado M, Figueiras A, Herdeiro MT, Roque F. Daily Medication Management and Adherence in the Polymedicated Elderly: A Cross-Sectional Study in Portugal. Int J Environ Res Public Health. 2019 Dec 27;17[1]:200. doi: 10.3390/ijerph17010200.

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