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Medication adherence, medication beliefs and social support among illiterate and low-literate community-dwelling older adults with polypharmacy

NAFISEH GHASSAB-ABDOLLAHI[1, A–C, E, F], HAIDAR NADRIAN[2, A–D], ELNAZ SHASEB[3, C–E],
ORCID ID: 0000-0002-9926-4588 ORCID ID: 0000-0003-3129-2475 ORCID ID: 0000-0001-7931-4632

MINA HASHEMIPARAST[4, 5, A, E], HAMID ALLAHVERDIPOUR[6, C, E], PARVANEH GHAHREMANINASAB[1, B, E]
ORCID ID: 0000-0002-0633-3813 ORCID ID: 0000-0003-3700-6185 ORCID ID: 0000-0002-2644-3526

[1] Department of Geriatric Health, Faculty of Health Science, Tabriz University of Medical Sciences, Tabriz, Iran
[2] Department of Health Education and Promotion, School of Health, Tabriz University of Medical Sciences, Tabriz, Iran
[3] Drug Applied Research Centre, Tabriz University of Medical Science, Tabriz, Iran
[4] Social Determinants of Health Research Centre, Zanjan University of Medical Sciences, Zanjan, Iran
[5] Department of Health Education and Promotion, School of Public Health, Zanjan University of Medical Sciences, Zanjan, Iran
[6] Research Centre of Psychiatry and Behavioural Sciences, Department of Health Education and Promotion, Tabriz University of Medical Sciences, Tabriz, Iran

A – Study Design, **B** – Data Collection, **C** – Statistical Analysis, **D** – Data Interpretation, **E** – Manuscript Preparation, **F** – Literature Search, **G** – Funds Collection

Summary **Background.** Polypharmacy can be an area of concern for the older population. A set of internal and external factors determine the degree of adherence to treatment in older adults.

Objectives. We aimed to investigate whether medication belief and social support, taking into account the role of socio-demographic and clinical factors, are predictors of medication adherence among illiterate, low-literate community-dwelling older adults with polypharmacy.

Material and methods. A cross-sectional study was conducted in the health centres of Tabriz-Iran in 2022. The data was collected using the socio-demographic and clinical questionnaires, Morisky, Green and Levine's adherence scale, Belief about Medicines Questionnaire (BMQ) and the Multidimensional Scale of Perceived Social Support (MSPSS). Hierarchical Multiple Linear Regression analysis was used to identify medication adherence predictors based on a conceptual framework.

Results. The final sample size was 318 people. The results showed that age, education years, medication satisfaction, side effects of medications, doctor checkups, medication belief and social support were significant predictors of medication adherence. The necessity part of medication belief had a negative significant relationship, and the concern part had a positive significant relationship with medication adherence.

Conclusions. A strong belief along with sufficient social support could be a good predictor of medication adherence. The results showed that elementary education has a positive relationship with people's medication adherence, even among low-literacy populations. The development of literacy movement programmes within communities to promote primary education among illiterate older adults is recommended. Our findings also highlight the importance of improving patient-physician communication skills and clear communication in the formation of patients' behaviour.

Key words: medication adherence, polypharmacy, frail elderly, educational status, health belief model, social support.

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Background

Age-related changes are associated with increasing multimorbidity among older adults. Thus, they are at a higher risk for taking a large number of medications than other age groups. Polypharmacy can be an area of concern for the older population due to various reasons [1]. With an increasing number of drugs, adherence to medications becomes more challenging for older patients [2]. According to the definition by the World Health Organization (WHO), medication adherence refers to the degree a patient's behaviour corresponds with the prescribed medication regime [3].

Some fundamental reasons lead to different degrees of adherence among patients. Medication non-adherence is considered a multifactorial problem. Individual factors, medication therapy, patient's medical history and even social factors can affect a person's behaviours in terms of medication adherence [4–6].

Among the internal individual factors, a person's beliefs about medications play a decisive role in the behaviour of taking medication. A person's awareness of the reason for prescribed medications and their necessity affects the patient's behaviours [7]. On the other hand, the patient's concern about short- and long-term medication-related side effects can also affect their behaviours [8].

Previous studies [9, 10] have shown that social support, as an external resource, plays an important role in the individual's behaviours regarding taking medication. The assistance that patients receive from their family, friends and other people improves their optimism and self-esteem. Thus, the patient's health behaviour is improved, and as a result, medication adherence also improves [10, 11].

Predictors of medication non-adherence in older people have been investigated in numerous studies [3, 12, 13]. However, the majority of these examined a specific disease, and few studies have investigated the predisposing factors of medication adherence among poly-medicated patients [3, 14]. Moreover, age seems to be highly correlated to literacy. Illiteracy is more prevalent among the older population compared to other age groups. Therefore, illiterate older people are exposed to poor health outcomes [15]. For example, people with low literacy have difficulty reading and understanding written information on drug brochures. Thus, low-literate older adults are more prone to poor medication adherence [16]. However, there is a lack of evidence that is specifically focused on the predictors of medication adherence in this vulnerable group.

Since medication adherence can be influenced by multiple factors [6], examining a set of these factors together can provide a better view of the predictors of medication adherence. Most previous studies have addressed the role of health literacy on medication adherence, and no study highlights general illiteracy. Since illiteracy is still one of the common problems among older adults in developing countries, paying more attention to illiterate and low-literate older adults in studies might be helpful in health literacy policymaking. On the other hand, using more advanced statistical methods, such as Hierarchical Multiple Linear Regression (HMLR), that examine the amount of variance explained in a dependent variable by more than one predictor may lead to more reliable results. This study hypothesises that patients with a strong belief in the usefulness of their medications, along with receiving sufficient support from their surrounding peers, perform better in taking their prescribed medications. In fact, the conceptual framework of this study seeks to understand whether an internal incentive along with external support can shape a person's behaviour concerning medication adherence.

Objectives

This study aimed to investigate whether medication belief and social support, taking into account the role of socio-demographic and clinical factors, are significant predictors of medication adherence among illiterate and low-literate community-dwelling older adults with polypharmacy (Figure 1).

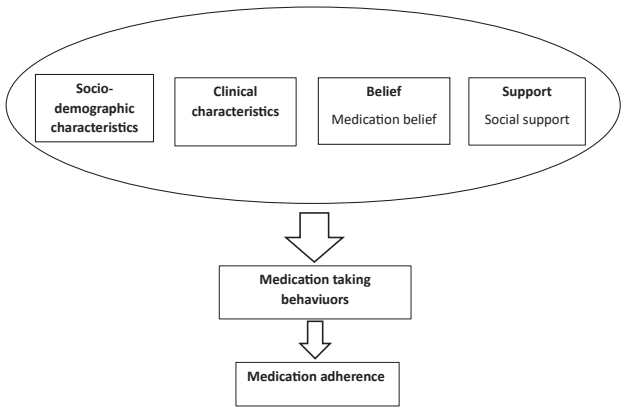

Figure 1. A schematic presentation of the concept of the study

Material and methods

Study design and population

This cross-sectional descriptive-analytical study was conducted among illiterate and low-literate (five years of elementary education or less) community-dwelling older adults aged 60 years and above who were taking five or more medications in the city of Tabriz-Iran. People who had been diagnosed with dementia or those with an Abbreviated Mental Test score (AMTs) less than eight were excluded from the study. Older adults who lived in nursing homes and other care centres and were hospitalised, physically dependent, immobile, or homebound were also excluded from the study.

G*Power (version 3.1.2) software (Franz Faul, Universitat Kiel, Germany) was used to determine the sample size. Based on a previous report [17], the minimum sample size was estimated to be 318 people, for two-tailed tests, $\alpha = 0.05$, 95% confidence level, a possibility of 10% loss and an expected frequency of patient errors of 71%**.**

Sampling

Tabriz-Iran health centres from March to Agust 2022. The city of Tabriz has 87 health centres, and the information of all older adult residents is available through the Integrated Health System (SIB). A list of all people aged 60 and above along with their telephone numbers was obtained from SIB. The SIB system allows users to limit the population to illiterate and low-literate persons by data filtering. After limiting the population to illiterate and low-educated people, they were randomly selected by a simple random method using online software (www.random.org). The researcher then contacted the selected people and assessed the inclusion and exclusion criteria. Eligible people were invited to attend the health centre. In a face-to-face meeting, the researcher explained the aims of the study and assured the participants that their information is confidential and that they could stop participating at any time. Detailed information on the recruitment of study participants is provided in Figure 2. After the enrolment, the questionnaires were completed by the researcher.

Ethical considerations

The present study was approved by the Research Ethics Committee of Tabriz University of Medical Sciences (code: IR.TBZMED.REC.1400.974).

Before obtaining informed consent from the participants, due to their poor reading abilities, the researcher read the contents of this form in plain language and asked the participant to explain the received meaning from the statements. The participants were assured about the confidentiality of their information and voluntary participation in the study.

Measurements

The data was collected using the socio-demographic and clinical questionaries, Morisky, Green and Levine's (MGL) adherence scale, Belief about Medicines Questionnaire (BMQ) and the Multidimensional Scale of Perceived Social Support (MSPSS).

The socio-demographic questionnaire was used to obtain information on age, gender, years of education (up to five years), marital status, employment status and family income.

The clinical information questionnaire consisted of questions about the number of chronic diseases, medication satisfaction, hearing and vision status. Moreover, this questionnaire gathered information on the number of medications, months on treatment with five or more drugs, medication refills, regular doctor checkups and side effects of medications.

The validity of questionnaires was determined using face and qualitative content validity. The questionnaires were sent to 10 expert faculty members of the Department of Health Sciences, and they were asked to submit their comments about the content of the items, grammar, wording and overall format of the questionnaires. The necessary changes were made based on their comments.

Morisky, Green and Levine's Adherence Scale consists of four questions with yes/no answers. Yes is scored 1 and no 0. The total score ranges from 0 to 4 (more than 2 = low level, 1–2

= medium, 0 = high level of medication adherence) [18, 19]. The validity and reliability of the Persian version of this scale were approved in a previous study [20].

The Belief about Medicines Questionnaire (*BMQ*) contains two five-item scales: necessity and concerns. The necessity part assesses patients' beliefs about their personal need for the prescribed medicine, while the concerns part assesses concerns about the medications. Each question is scored on a 5-point Likert scale (1 = completely disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = completely agree). The total scores for the necessity and concerns parts are between 5 and 25. A necessity–concerns differential is calculated, with a possible range of -20 to +20. Higher scores demonstrate stronger beliefs. The higher scores indicate the patients' belief about the usefulness of their medication. The reliability of the BMQ was confirmed in the study by Minaian et al. [21].

The Multidimensional Scale of Perceived Social Support (MSPSS) is a short instrument with 12 items to measure an individual's perceived level of social support with family, friends and significant others. The total scores range from 12 to 84. The higher the score, the greater the amount of social support [22]. A score between 12–35 is considered as low perceived social support, 36–59 as moderate, and 60–84 is considered as high perceived social support [23]. The validity and reliability of the Persian version of MSPSS were approved by Bagherian-Sararoudi et al. [24].

Statistical analysis

SPSS software (version 24) was used for data analysis. Descriptive statistics, including frequency, percentage, mean and standard deviation (SD), were used to describe the variables. The Kolmogorov-Smirnov test was used to test the normality of distribution. Pearson correlation test, independent *t*-Test and one-way analysis of variance were used to determine the relationship of medication adherence with study variables. We performed a Hierarchical Multiple Linear Regression (HMLR) analysis with the Enter method to identify factors that affect medication adherence based on our conceptual framework. The medication adherence score was considered a dependent variable. HMLR was used in four models. The predictors were categorised into four blocks: socio-demographic characteristics (block 1), clinical information (block 2), medication belief (block 3) and social support (block 4). In all statistical analyses, $p < 0.05$ was considered significant.

Results

In this study, the final sample size was 318 people. 30 persons declined participation (Figure 2). The mean age of the participants was 69.56 ± 6.2 years. In this study, 56.6% were women, and 43.4% were men. More than half of the participants were housewives (53.5%), 30.5% were retired, and 11.3% were employed. About 37% of people were illiterate, and 62% were low-literate. Most of the participants (82.1%) were married, and their income status was average (37.7% of participants). More than 39% and 33% of the participants had three and more than four chronic diseases, respectively. The mean months on treatment with five or more drugs was 94.93 ± 77.6. Mild visual impairment was reported in 63.5% of patients. Most of the participants (78.9%) had normal auditory status. The average number of medications received by participants was 7.44 ± 2.2. Over half of the participants (63.8%) reported regular doctor checkups, and their medication satisfaction was excellent (61.6%). More than two-thirds of the participants (73.3%) refilled their prescriptions after the last physician visit. Nearly 90% of the participants did not report medication-related side effects (Table 1).

Medication adherence was high in 62.9% of the participants and moderate in about one-third of the participants (32.7%). Poor adherence was reported in 4.4% of participants. The results showed that the mean necessity score was 18.92 ± 5.8, and the mean concerns score was 10.27 ± 4.8. The average total score of BMQ was calculated at 8.64 ± 7.3. More than two-thirds of the participants (73%) perceived high social support. The results of the Pearson's correlation coefficient showed that there are significant relationships between the necessity ($r = -0.254$, $p < 0.001$),

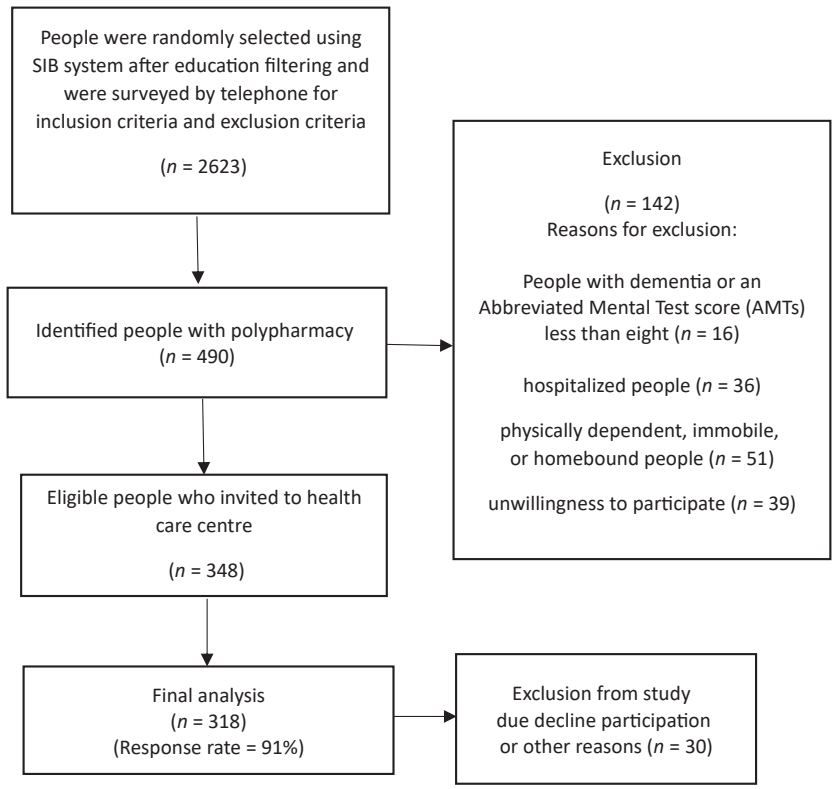

Figure 2. Flow chart for study subject selection

Table 1. Socio-demographic and clinical characteristics of participants and thier relationship with medication adherence (*n* = 318)

Variables		*n* (%)	Medication Adherence Mean (SD)	*p*
Age/mean (SD)		69.56 (6.2)		0.003*
Gender	male	138 (43.4%)	0.50 (0.8)	0.337†
	female	180 (56.6%)	0.59 (0.8)	
Job	housewife	170 (53.5%)	0.58 (0.8)	0.149‡
	employed	36 (11.3%)	0.66 (0.8)	
	retired	97 (30.5%)	0.41 (0.8)	
	retired and employed	15 (4.7%)	0.86 (1.1)	
Education years	illiterate	118 (37.1%)	0.82 (1.0)	0.001‡
	1 year	20 (6.3%)	0.35 (0.5)	
	2 years	25 (7.9%)	0.28 (0.4)	
	3 years	17 (5.3%)	0.52 (1.0)	
	4 years	29 (9.1%)	0.51 (1.0)	
	5 years	109 (34.3%)	0.37 (0.6)	
Marital status	married	261 (82.1%)	0.53 (0.8)	0.359†
	widow/divorced/single	57 (17.9%)	0.64 (0.9)	
Income status	sufficient	103 (32.6%)	0.47 (0.7)	0.425‡
	somehow sufficient	119 (37.7%)	0.55 (0.8)	
	insufficient	94 (29.7%)	0.63 (0.9)	
Number of chronic diseases	1	17 (5.3%)	0.64 (0.9)	0.640‡
	2	71 (22.3%)	0.64 (0.8)	
	3	125 (39.3%)	0.54 (0.9)	
	≥ 4	105 (33%)	0.48 (0.7)	
Visual status	normal	107 (33.6%)	0.57 (0.9)	0.886‡
	mild impairment	202 (63.5%)	0.53 (0.8)	
	severe impairment	9 (2.8%)	0.66 (1.0)	
Auditory status	normal	251 (78.9%)	0.53 (0.8)	0.572‡
	mild impairment	44 (13.8%)	0.68 (1.1)	
	severe impairment	23 (7.2%)	0.52 (0.7)	
Number of medications/mean (SD)		7.44 (2.2%)		0.564*
Regular doctor checkup	yes	203 (63.8%)	0.44 (0.7)	0.002†
	no	110 (34.6%)	0.76 (1.01)	
Medication satisfaction	weak/moderate	34 (10.7%)	1.11 (1.2)	< 0.001‡
	good	88 (27.7%)	0.57 (0.7)	
	excellent	196 (61.6%)	0.44 (0.8)	
Side effects of medications	yes	33 (10.4%)	1.12 (1.1)	< 0.001†
	no	285 (89.6%)	0.48 (0.8)	
Medication refill	yes	233 (73.3%)	0.61 (0.9)	0.028†
	no	85 (26.7%)	0.37 (0.7)	
Duration of taking medication (Month)/mean (SD)		94.93 (77.6)		0.215*

*Pearson's correlation coefficient; †Independent *t*-Test; ‡Oneway ANOVA Fisher's exact test. ANOVA – analysis of variance; SD – standard deviation.

concerns ($r = 0.365$, $p < 0.001$) and necessity–concerns differential ($r = -0.423$, $p < 0.001$) scores of BMQ with medication adherence. A significant correlation was also observed between social support and medication adherence ($r = -0.234$, $p < 0.001$) (Table 2).

Table 3 presents the summary of HMLR. The first model with an *R*-square of 0.074 suggests that socio-demographic factors account for 7.4% of the variance in medication adherence. The second model accounted for 16% of the variance in terms of medication adherence after including the clinical factors. The third model accounted for 30% of the variance when medication belief was entered. The final model explained 31% of the variance after entering social support. The ANOVA results showed that all the selected models were significant.

Based on the HMLR, among socio-demographic factors (model 1), age ($\beta = -0.027$, $p = 0.002$) and education years ($\beta = -0.087$, $p < 0.001$) were statistically significantly associated to medication adherence. In the second model, age ($\beta = -0.026$, $p = 0.003$), education years ($\beta = -0.071$, $p = 0.003$), medication satisfaction ($\beta = -0.185$, $p = 0.011$) and side effects of medications ($\beta = 0.496$, $p = 0.002$) were detected as statistically significant predictors of medication adherence. By including medication belief in the third model, the analysis showed that age ($\beta = -0.023$, $p = 0.004$), education years ($\beta = -0.074$, $p = 0.001$), doctor checkup ($\beta = -0.204$, $p = 0.049$), side effects of medications ($\beta = 0.348$, $p = 0.015$) and medication belief ($\beta = -0.048$, $p < 0.001$) were the significant predictors of medication adherence.

Table 2. General descriptive outcomes of medication adherence, medication belief and social support among participants and the association with medication adherence (*n* = 318)

Medication adherence		Medication belief				Social support			
	n (%)		Mean (SD)	*r*	*p*		*n* (%)	*r*	*p*
Poor	14 (4.4%)	necessity (5 to 25)	18.92 (5.8)	-0.254	< 0.001*	poor	20 (6.3%)	-0.234	< 0.001*
Moderate	104 (32.7%)	concerns (5 to 25)	10.27 (4.8)	0.365	< 0.001*	moderate	66 (20.8%)		
High	200 (62.9%)	total (-20 to +20)	8.64 (7.3)	-0.423	< 0.001*	high	232 (73 %)		

*Pearson's correlation coefficient; SD – standard deviation. Total score of medication adherence ranges from 0 to 4 (more than 2 = low level, 1–2 = medium, and 0 = high level of medication adherence). Necessity: the necessity part assesses patients' beliefs about their personal need for the prescribed medicine, Concerns: the concerns part assesses concerns about the medications, Total: A necessity–concerns differential is calculated as the difference between the necessity and the concerns parts, with a possible range of -20 to +20. The total scores of social support range from 12 to 84. A score between 12–35 is considered as low perceived social support, 36–59 as moderate, and 60–84 is considered as high perceived social support.

Table 3. Summary of hierarchical regression analysis for variables predicting medication adherence

	Beta	*p*	ANOVA	R^2
Model 1				
Age	**-0.027**	**0.002**	*F* = 4.012 *p* = 0.001	0.074
Gender	-0.068	0.766		
Job	0.056	0.599		
Education years	**-0.087**	**< 0.001**		
Marital status	0.127	0.356		
Income	-0.009	0.897		
Model 2				
Age	**-0.026**	**0.003**	*F* = 3.818 *p* < 0.001	0.163
Gender	-0.020	0.928		
Job	0.073	0.481		
Education years	**-0.071**	**0.003**		
Marital status	0.069	0.610		
Income	-0.038	0.569		
Number of chronic diseases	-0.041	0.466		
Visual status	0.015	0.876		
Auditory status	0.089	0.287		
Regular doctor checkup	-0.158	0.165		
Number of medications	0.006	0.815		
Duration of taking medication	0.000	0.566		
Medication satisfaction	**-0.185**	**0.011**		
Medication refill	0.163	0.164		
Side effects of medications (no = 0, yes = 1)	**0.496**	**0.002**		
Model 3				
Age	**-0.023**	**0.004**	*F* = 8.110 *p* < 0.001	0.307
Gender	-0.199	0.328		
Job	-0.038	0.690		
Education years	**-0.074**	**0.001**		
Marital status	-0.023	0.849		
Income	-0.017	0.799		
Number of chronic diseases	-0.025	0.632		
Visual status	-0.047	0.596		
Auditory status	0.118	0.121		
Regular doctor checkup (no = 0, yes = 1)	**-0.204**	**0.049**		
Number of medications	0.011	0.616		
Duration of taking medication	-7.478E-5	0.897		
Medication satisfaction	-0.077	0.257		
Medication refill	0.142	0.183		
Side effects of medications (no = 0, yes = 1)	**0.348**	**0.015**		
Medication belief	**-0.048**	**< 0.001**		

Table 3. Summary of hierarchical regression analysis for variables predicting medication adherence				
	Beta	*p*	ANOVA	R^2
Model 4				
Age	**-0.021**	**0.009**	$F = 8.061$ $p < 0.001$	0.319
Gender	-0.209	0.301		
Job	-0.058	0.545		
Education year	**-0.067**	**0.002**		
Marital status	-0.028	0.823		
Income	-0.033	0.582		
Number of chronic diseases	-0.033	0.524		
Visual status	-0.026	0.767		
Auditory status	0.119	0.116		
Regular doctor checkup	-0.162	0.121		
Number of medications	0.009	0.683		
Duration of taking medication	2.671E-6	0.996		
Medication satisfaction	-0.072	0.289		
Medication refill	0.156	0.143		
Side effects of medications (no = 0, yes = 1)	**0.314**	**0.028**		
Medication belief	**-0.047**	**< 0.001**		
Social support	**-0.007**	**0.021**		

Dependent variable: Medication Adherence; *F* is the calculated value of the Analysis of Variance (ANOVA).

In the final model, age (β = -0.021, p = 0.009), education years (β = -0.067, p = 0.002), side effects of medications (β = 0.314, p = 0.028), medication belief (β = -0.047, p < 0.001) and social support (β = -0.007, p = 0.021) were significant (Table 3).

Discussion

This study examined whether medication beliefs as internal factors and social support as external factors, taking into account the role of socio-demographic and clinical factors, could predict medication adherence in illiterate and low-literate community-dwelling older adults with polypharmacy. We found that when patients' beliefs in the usefulness of their medications increases, medication adherence behaviour also improves. By increasing social support as an external stimulus, treatment adherence is also improved. All these points were examined in the context of socio-demographic and clinical factors.

The results of our study showed that with increasing age, medication adherence increases among participants. These results are not consistent with previous studies [25, 26]. A systematic review reported that older age is negatively associated with adherence, although this association was weak [27]. The average age of the participants of the present study was 69 years. The improvement in medication adherence with increasing age may be attributable to the low average age of our participants.

In the HMLR analyses, older patients were found to be more likely to adhere to their medications if they were educated. Low education has always been one of the important predictors of medication adherence in this population [4, 28]. In the present study, which was specifically conducted on a low-educated and illiterate population, the essential role of education in medication compliance was also recognised. Even having primary education is effective in medication adherence compared to complete illiteracy. Poor adherence in the low-literate group may be due to the fact that it is difficult for them to understand written or spoken drug information [16]. Therefore, pharmacists must pay special attention to provide specific patient-related information according to the educational background of older patients [29]. After the 1979 Iranian revolution, the Literacy Movement Organisation was established to eliminate illiteracy in Iran. The implementation of the literacy mobilisation plan played a significant role in promoting primary education among adults [30]. However, illiteracy is a somewhat common problem among community older adults. Thus, improving education in illiterate older people by encouraging them to participate in literacy movement programmes can also have a positive effect on health indicators such as medication adherence.

In terms of clinical factors, the results showed that patients who were more satisfied with their treatment had fewer side effects and had regular doctor checkups reported higher medication adherence. These results are in accordance with the findings of previous studies. Adherent people usually report greater satisfaction with their treatment regime [31]. Satisfaction with treatment leads to the adoption, and subsequently, better medication compliance [32]. Morisky et al. claimed that the exact mechanism regarding the association between treatment satisfaction and medication adherence is unknown [18]. However, treatment satisfaction may be associated with the convenience and effectiveness of medications [31]. Part of the relationship between medication adherence and treatment satisfaction can also be attributed to the side effects of the medications. Medicines with fewer side effects build more satisfaction with the treatment [33]. In the present study, nearly 90% of the participants did not report any medication-related side effects. Therefore, more satisfaction with the treatment and then higher medication adherence is not far beyond expectation. As the results of the present study showed, side effects of drugs lead to less drug compliance, which is in accordance with those reported by previous studies. When patients experience side effects of their medications, they are more prone to stop taking their medications or try to adjust them [28, 34]. Prevention, exploration and effective management of medication-related side effects are essential to maximising medication adherence [16]. The results showed that patients with regular doctor checkups have better medication adherence. Few studies have examined the relationship between regular doctor visits and medication adherence. However, regular doctor checkup can be attributed to health-promoting behaviours [35], which may affect medication adherence.

The results of our study demonstrated that people's beliefs about medication could predict their adherence. Medication beliefs in older adults are formed by a set of positive and negative attitudes. Older people with strong beliefs in the necessity of taking medication to maintain their health are more adherent compared to people with higher levels of concern [7]. If older adults are convinced that their medication serves their special

needs, they will be more likely to be adherent [3]. Medical beliefs also originate from patients' expectations. Most patients expect their medications to relieve their symptoms in the short term, but this does not always happen. When patients do not perceive any immediate tangible benefits from taking their medications, they will become uncertain about taking medications [7]. The clinician–patient relationship is a key factor in the building of adequate knowledge and eliminating concerns and uncertainty in patients [36]. This is more important for illiterate and low-literate patients, because many of them have problems understanding the doctor's instructions. Thus, improving patient–physician communication skills and clear communication, such as speaking slowly and using simple words, can be helpful to reduce the gap between physicians and patients [37].

Just as in previous studies, social support demonstrated a positive effect on medication adherence [9, 10]. Family members regulate each other's behaviours. They provide support to their patients by positively encouraging them, sharing information and helping in moments of crisis [38]. By educating and supporting the patients' behaviours and reminding them to take medications, adequate social support can improve medication adherence. Adequate social support becomes more important for the older population who are more dependent on their families regarding health issues [9]. To maximise the benefits of medical treatment, healthcare providers should assess the type and sources of a patient's social support to change the patient's behaviour [9, 39].

The medication adherence rate among our participants was generally high at 62%. Most of the previous studies conducted among older adults reported poor medication adherence rates in this age group [3, 17]. However, many other studies have shown high medication adherence [40, 41]. In a study conducted on older patients with multiple illnesses who took about four medicines on average, the results showed that most of the participants had perfect adherence [40]. The high level of medication adherence in this study can be well explained by the high-level social support reported by 73% of participants and the strong medication belief (Mean: 18.9).

Limitations of the study

Medication adherence in this study was assessed using a self-reporting tool. This method of measurement can be affected by recall bias or social desirability bias. Since no single method has been recognised as a standard tool for measuring medication adherence, using several measurement tools together can provide a more accurate estimate. The type of cross-sectional study is another potential limitation of the present study.

Conclusions

Our results diagnosed several predictors of medication adherence using HMLR analysis, such as age, education, medication satisfaction, side effects, medication beliefs and social support. The results highlighted that primary education has a positive effect on people's medication adherence, even among low-literacy populations. To promote public education, the Ministry of Education should pay more attention to the promotion of primary education among the illiterate older population. This goal can be achieved by encouraging older adults to participate in literacy movement programmes. The findings of the present study showed that in illiterate and low-literate older adults taking multiple medications, a strong belief along with sufficient social support could be a good predictor of medication adherence in this vulnerable population. Creating medication satisfaction by properly managing drug-related side effects and informing the patient about the effects and necessity of regular use of medications by clinicians can also help to promote medication adherence. Our findings highlight the importance of improving patient–physician communication skills and clear communication in the formation of patients' behaviour. These findings can help healthcare professionals to recognise older people who are at a greater risk of medication non-adherence.

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References

1. Pazan F, Wehling M. Polypharmacy in older adults: a narrative review of definitions, epidemiology and consequences. *Eur Geriatr Med* 2021; 12(3): 443–452.
2. Vatcharavongvan P, Puttawanchai V. Polypharmacy, medication adherence and medication management at home in elderly patients with multiple non-communicable diseases in Thai primary care. *Fam Med Prim Care Rev* 2017; 19(4): 412–416.
3. Chew SM, Lee JH, Lim SF, et al. Prevalence and predictors of medication non-adherence among older community-dwelling people with chronic disease in Singapore. *J Adv Nurs* 2021; 77(10): 4069–4080.
4. Mathes T, Jaschinski T, Pieper D. Adherence influencing factors – a systematic review of systematic reviews. *Arch Public Health* 2014; 72(37): 1–9.
5. Lin J, Sklar GE, Oh VM Sen, et al. Factors affecting therapeutic compliance: a review from the patient's perspective. *Ther Clin Risk Manag* 2008; 4(1): 269–286.
6. MacLaughlin EJ, Raehl CL, Treadway AK, et al. Assessing medication adherence in the elderly: which tools to use in clinical practice? *Drugs Aging* 2005; 22(3): 231–255.
7. Clyne B, Cooper JA, Boland F, et al. Beliefs about prescribed medication among older patients with polypharmacy: A mixed methods study in primary care. *Br J Gen Pract* 2017; 67(660): e507–e518.
8. Park HY, Seo SA, Yoo H, et al. Medication adherence and beliefs about medication in elderly patients living alone with chronic diseases. *Patient Prefer Adherence* 2018; 12: 175–181.
9. Shahin W, Kennedy GA, Stupans I. The association between social support and medication adherence in patients with hypertension: a systematic review. *Pharm Pract* 2021; 19(2): 2300, doi: 10.18549/PharmPract.2021.2.2300.
10. Gu L, Wu S, Zhao S, et al. Association of social support and medication adherence in Chinese patients with type 2 diabetes mellitus. *IJERPH* 2017; 14(12): 1–10.
11. Sarpooshi DR, Mahdizadeh M, Jaferi A, et al. The relationship between social support and self-care behavior in patients with diabetes mellitus. *Fam Med Prim Care Rev* 2021; 23(2): 227–231.
12. Rodgers JE, Thudium EM, Beyhaghi H, et al. Predictors of Medication Adherence in the Elderly: The Role of Mental Health. *MCRR* 2018; 75(6): 746–761, doi: 10.1177/1077558717696992.
13. Neter E, Glass-Marmor L, Wolkowitz A, et al. Beliefs about medication as predictors of medication adherence in a prospective cohort study among persons with multiple sclerosis. *BMC Neurol* 2021; 21(136): 1–9.

14. Leung DYP, Bai X, Leung AY, et al. Prevalence of medication adherence and its associated factors among community-dwelling Chinese older adults in Hong Kong. *Geriatr Gerontol Int* 2015; 15(6): 789–796.
15. Roman SP. Illiteracy and older adults: Individual and societal implications. *Educ Gerontol* 2004; 30(2): 79–93.
16. Beusekom MM, van, Grootens-Wiegers P, Bos MJW, et al. Low literacy and written drug information: information-seeking, leaflet evaluation and preferences, and roles for images. *Int J Clin Pharm* 2016; 38: 1372–1379.
17. Taheri Kharameh Z, Khoshravesh S, Noori R, et al. Determinants of Medication Adherence Among Iranian Elderly Patients with Chronic Diseases. *Jundishapur J Chronic Dis Care* 2018; 7(3): e68310, doi: 10.5812/jjcdc.68310.
18. Morisky DE, Ang A, Krousel-Wood M, et al. Predictive validity of a medication adherence measure in an outpatient setting. *J Clin Hypertens* 2008; 10(5): 348–354.
19. Beyhaghi H, Reeve BB, Rodgers JE, et al. Psychometric Properties of the Four-Item Morisky Green Levine Medication Adherence Scale among Atherosclerosis Risk in Communities (ARIC) Study Participants. *Value Health* 2016; 19(8): 996–1001.
20. Heizomi H, Iraji Z, Vaezi R, et al. Gender differences in the associations between health literacy and medication adherence in hypertension: a population-based survey in Heris County, Iran. *Vasc Health Risk Manag* 2020; 16: 157–166.
21. Minaiyan M, Taheri M, Mirmoghtadaee P, et al. Comparative role of demographic factors and patient's belief about prescribed medicine on adherence to drug treatment in chronic diseases. *J Isfahan Med Sch* 2011; 29(156): 9.
22. Dambi JM, Corten L, Chiwaridzo M, et al. A systematic review of the psychometric properties of the cross-cultural translations and adaptations of the Multidimensional Perceived Social Support Scale (MSPSS). *HRQOL* 2018; 16: 80, doi: 10.1186/s12955-018-0912-0.
23. Tajdini Z, Banijamali SS. The relationship between perceived social support and women experiences in menopause. *Adv Nurs Midwifery* 2016; 25: 55–64.
24. Bagherian-Sararoudi R, Hajian A, Bahrami Ehsan H, et al. Psychometric properties of the Persian version of the multidimensional scale of perceived social support in Iran. *Int J Prev Med* 2013; 4(11): 1177–1181.
25. Bourcier E, Mille F, Brunie V, et al. Quality of prescribing in community-dwelling elderly patients in France: an observational study in community pharmacies. *Int J Clin Pharm* 2017; 39(6): 1220–1227.
26. Ulfvarson J, Bardage C, Wredling RAM, et al. Adherence to drug treatment in association with how the patient perceives care and information on drugs. *J Clin Nurs* 2007; 16(1): 141–148.
27. Smaje A, Weston-Clark M, Raj R, et al. Factors associated with medication adherence in older patients: a systematic review. *Aging Medicine* 2018; 1(3): 254–266.
28. Hall AE, Paul C, Bryant J, et al. To adhere or not to adhere: rates and reasons of medication adherence in hematological cancer patients. *Crit Rev Oncol Hematol* 2016; 97: 247–262.
29. Jin HK, Kim YH, Rhie SJ. Factors affecting medication adherence in elderly people. *Patient Prefer Adherence* 2016; 10: 2117–2125.
30. Bakhtiari F. Literacy movement: achievements and plans. 2021 [cited 21.03.2023]. Available from URL: https://www.tehrantimes.com/news/468502/Literacy-movement-achievements-and-plans.
31. Alhazzani A, Alqahtani M, Alamri N, et al. Treatment satisfaction and adherence to medications among multiple sclerosis patients in Saudi Arabia. *ESNPN* 2019; 55: 1–7.
32. Ajayi DT, Adedokun BO, Owoeye DO, et al. Treatment Satisfaction and Medication Adherence Among Hypertensive Patients Seeking Care in Selected Hospitals in Ibadan, Nigeria. *ABAM* 2018; 6(1): 67–72.
33. Shikiar R, Rentz AM. Satisfaction with Medication: An Overview of Conceptual, Methodologic, and Regulatory Issues. *Value Health* 2004; 7(2): 204–215.
34. DiBonaventura M, Gabriel S, Dupclay L, et al. A patient perspective of the impact of medication side effects on adherence: Results of a cross-sectional nationwide survey of patients with schizophrenia. *BMC Psychiatry* 2012; 12(20): 1–7.
35. Williams L, O'Connor RC, Grubb N, et al. Type d personality predicts poor medication adherence in myocardial infarction patients. *Psychol Health* 2011; 26(6): 703–712.
36. Ridd M, Shaw A, Lewis G, et al. The patient-doctor relationship: A synthesis of the qualitative literature on patients' perspectives. *Br J Gen Pract* 2009; 59(561): 268–275.
37. Safeer RS, Keenan J. Health Literacy: The Gap Between Physicians and Patients. *AFP* 2005; 72(3): 463–468.
38. Thomas PA, Liu H, Umberson D. Family Relationships and Well-Being. *Innov Aging* 2017; 1(3): igx025, doi: 10.1093/geroni/igx025.
39. DiMatteo MR. Social Support and Patient Adherence to Medical Treatment: A Meta-Analysis. *Health Psychol* 2004; 23(2): 207–218.
40. Schüz B, Marx C, Wurm S, et al. Medication beliefs predict medication adherence in older adults with multiple illnesses. *J Psychosom Res* 2011; 70(2): 179–187.
41. Epakchipoor F, Bastani F, Pashaei Sabet F. Self-management and Medication Adherence in Older Adults with Type II Diabetes Referring to the Endocrinology Clinics of the Teaching Hospital Affiliated to Iran University of Medical Sciences (2019). *Iran J Nurs Res* 2021; 34(129): 1–14.

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Address for correspondence:
Haidar Nadrian, PhD, Assoc. Prof.
Department of Health Education and Promotion
School of Health, Tabriz University of Medical Sciences
Attar-e-Neyshabouri st.
Postal Code: 5165665931
Tabriz
Iran
Tel: +98 9181734596
E-mail: haidarnadrian@gmail.com