

Original articles

Evaluate medication adherence to medication in outpatients undergoing treatment for chronic diseases at Hue Family Medicine Clinic

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Abstract

Background: Chronic diseases are the leading cause of death worldwide. Medication adherence is a critical factor in improving treatment efficacy and reducing patient costs.

Objectives: (1) To survey the general characteristics of patients receiving treatment for chronic diseases at the Hue Family Medicine Clinic; (2) To assess home medication adherence among these patients using the GMAS scale.

Materials and methods: A cross-sectional descriptive study was conducted on 127 patients with chronic diseases (diabetes, hypertension, dyslipidemia, other cardiovascular diseases) at the Family Medicine Clinic from July 2024 to September 2024. Medication adherence was evaluated using the GMAS scale.

Results: The mean age of the patients was 63.5 ± 8.6 years. On average, patients had 2.2 ± 0.88 primary/comorbid conditions and were prescribed 2.8 ± 1.31 medications. The rate of high medication adherence was 92.1%. However, approximately 30 - 50% of patients “mostly and sometimes” forgot their medication due to being busy, traveling, attending social events, or having difficulty remembering. About 15% of patients “mostly and sometimes” discontinued medication on their own, and 28.3% self-adjusted their daily medication regimen.

Conclusion: Interventions are needed to minimize forgetfulness due to changes in routine and to address the self-adjustment of treatment regimens. Future patient counseling and education programs should focus on these two specific aspects.

Keywords: chronic disease; medication adherence; General Medication Adherence Scale.

1. BACKGROUND

Chronic diseases, also known as noncommunicable diseases, are medical conditions that last several months or more and require ongoing medical attention. According to the World Health Organization, chronic diseases are the leading cause of death worldwide. In 2021, it was estimated that 43 million deaths were related to chronic diseases, about 18 million people died before age 70 years [1]. In Vietnam, chronic diseases have increasingly become an urgent public health issue, with a rising trend in prevalence. During the period from 2015 to 2021, the prevalence of hypertension increased from 20% to over 25%; while that of diabetes increased from 4.2% to 7.1%. Chronic diseases account for up to 77% of all deaths each year in Viet Nam, mainly due to cardiovascular diseases, cancers, diabetes, and chronic obstructive pulmonary disease (COPD) [2]. Long-term medication-based interventions are deemed useful and practical for

maintaining effective disease control and preventing complications in patients with chronic conditions.

The home-based use of medication in patients is described through the concept of medication adherence. Previous studies have found that nonadherence to chronic medications was associated with increased frequency of hospitalization, adverse outcomes and healthcare utilization [3]. In the chronic coronary artery disease setting, nonadherence to cardioprotective medications was associated with a 50% to 85% relative increase in risk of all-cause mortality and a 50% to 70% relative increase in risk of cardiovascular mortality [4]. Simpson et al reported poor adherence to diabetes medications were significantly more likely to have an adverse outcome, including both microvascular and macrovascular complications with a 1.04-fold increase in risk compared with adherent patients [5]. In addition,

a study has found medication nonadherence was associated with \$679 - \$898 increased preventable spending in USA annually [3]. Until now, medication adherence remains a big challenge, particularly in developing countries such as Viet Nam, with limited research evidence. A cross-sectional study in some southern provinces in Vietnam that was conducted on reported 1444 outpatients and used General Medication Adherence Scale (GMAS), reported rates of 61.1% medication adherence. The group of patients with only cardiovascular disease and patients with only endocrine metabolic disease had relatively similar compliance with rates of 62.0% and 61.1%, respectively [6]. Another research reported only 41.3% of participants adhered to their prescribed medications for COPD and older patients exhibited a lower rate of medication adherence. Forgetfulness was a significant reason many older patients did not take their medications as prescribed [7]. However, to the best of our knowledge, the number of studies on medication adherence among patients with chronic diseases in Viet Nam, particularly in the central region, remains limited. Therefore, we conducted this cross-sectional study with two main objectives: (1) to describe the general characteristics of patients with chronic diseases at the Hue Family Medicine Clinic, and (2) to evaluate their medication adherence using the Vietnamese version of the GMAS.

2. RESEARCH SUBJECTS AND METHODS

2.1. Research subjects and study design:

2.1.1. Research subjects: Patients undergoing treatment for one of the chronic diseases (diabetes mellitus, hypertension, dyslipidemia, other cardiovascular diseases) at the Family Medicine Clinic, University of Medicine and Pharmacy, Hue University, from July 2024 to September 2024, who satisfy the inclusion and exclusion criteria. Patient eligibility was confirmed based on the official diagnoses documented on their medical prescriptions.

- Inclusion Criteria: (1) Patients aged 18 years or older, (2) have been treated with medication at home for at least 1 month.

- Exclusion Criteria: (1) Patients with a mental illness, (2) patients who are pregnant or breastfeeding women, (3) patients unable to communicate and converse directly, (4) patients who do not agree to participate in the study.

2.1.2. Study design: Cross-sectional descriptive study.

2.1.3. Sampling method:

A convenience sampling method was employed, enrolling all eligible patients who visited the Family Medicine Clinic during the study period. Given the relatively limited patient volume at this clinical setting, a continuous enrollment approach was utilized instead of a formal sample size calculation to maximize the sample size. Notably, the response rate was exceptionally high, with almost all approached patients consenting to participate.

2.2. Data collection

Patients returning for follow-up and receiving prescribed medication at the Family Medicine Clinic had information collected through a direct interview using a questionnaire which includes the following sections:

- Administrative Section: Includes demographic information (gender, age, education level, living area, occupation, level of patient's health insurance benefits, family history,...) and characteristics related to medication use (information on medication use at home including the number of prescribed medicines, purchasing additional medicines for treatment, sources of drug information, never/ever experiencing adverse drug reactions (ADR), and whether/not checking the expiry date of the medication, having a medicine cabinet at home.).

- Medication Adherence Section: The General Medication Adherence Scale (GMAS) consists of 11 questions. We used a previously validated and accepted Vietnamese translation [8,9]. The questionnaire uses a 4-level Likert scale including: always, mostly, sometimes, and never, with corresponding scores of 0, 1, 2, and 3 points. The total score for the 11 questions ranges from 0 - 33 points. Patients are assessed as "adherent to medication use" when the total score is 27 and above (≥ 27) and "non-adherent" when the total score is 26 or lower (≤ 26). Higher total scores indicate better medication adherence.

2.4. Statistics and data processing

Data entry and processing were performed using IBM SPSS 20.0 software. Results are presented as mean and standard deviation for continuous quantitative variables following a normal distribution; if not normally distributed, they are presented as median and interquartile range (25th percentile, 75th percentile); qualitative variables are presented as frequency and percentage.

2.5. Research Ethics

This study was approved by the Scientific Council and the Ethics Committee in Biomedical Research of Hue University of Medicine and Pharmacy, under

record number H2024/577. The objectives and procedures of the study were explained to all participants, and the patients' consent was obtained before their participation in the study.

3. RESEARCH RESULTS

3.1. General characteristics of patients

Table 1. General characteristics of study patients (N = 127)

	Characteristic	Number (n)	Percentage (%)
Gender	Male	46	36.2
	Female	81	63.8
Age	18 - 59	37	29.1
	60 - 79	89	70.1
	≥ 80	1	0.8
	Min-max	37 - 80	
	Mean ± SD	63.5 ± 8.65	
Living area	Urban area	93	73.2
	Rural area	34	26.8
Occupation	Work (Intellectual or labor)	45	35.4
	At home, retired	82	64.6
Education Level	Illiterate	10	7.9
	High school or below	87	68.5
	Above high school	30	23.6
Level of patient's health insurance benefits	80%	85	66.9
	95%	29	22.8
	100%	13	10.2
Additional payment when paying for health insurance	Yes	2	1.6
	No	125	98.4
Number of current illnesses (main illness, comorbidities)	1	29	22.8
	2	48	37.8
	3	43	33.9
	4	6	4.7
	5	1	0.8
	Min-max	1 - 5	
	Mean ± SD	2.2 ± 0.88	
Specific chronic diseases in patients	Diabetes	89	70.1
	Hypertension	101	79.5
	Dyslipidemia	55	43.3
	Other heart diseases	8	6.3
	Kidney disease	2	1.6
	Eye disease	4	3.1
	Musculoskeletal disease	2	1.6
	Respiratory disease	3	2.4
	Neurological disease	1	0.8
	Vascular disease	2	1.6
	Other diseases	16	12.6

Longest illness duration (years)	< 5	58	45.7
	5 - 10	48	37.8
	> 10	21	16.5
	Min-max	0.2 - 31	
	Median (25% - 75%)	5 (2 - 10)	
Family history of related diseases	Yes	40	31.5
	No	87	68.5
Living Situation	Living alone	10	7.9
	Living with relatives	117	92.1

The study population was predominantly elderly (70.1% aged ≥ 60) and retired (64.6%), with a high prevalence of multimorbidity (average 2.2 ± 0.88 conditions), mainly hypertension (79.5%) and diabetes (70.1%). Notably, all participants were fully covered by health insurance without out-of-pocket expenses. Patients usually lived with their family (92.1%).

Table 2. Characteristics of drug use of study patients (N = 127)

Characteristic		Number (n)	Percentage (%)
Number of prescribed medicines	1	24	18.9
	2	38	29.9
	3	22	17.3
	4	30	23.6
	≥ 5	13	10.2
	Min-max	1 - 6	
	Mean $\pm$ SD	2.77 ± 1.31	
Purchasing additional medicines for treatment	By prescription	5	3.9
	Self-purchased	8	6.3
	No	114	89.8
Monthly follow-up appointments		113	89.0
		13	10.2
Have encountered adverse drug reactions		35	27.6
Check the expiry date of the medicines		45	35.4
Having a medicine cabinet at home		22	17.3

On average, patients were prescribed 2.8 ± 1.304 medicines in their prescriptions. Most patients had regular follow-up appointments (89.0%). There were 27.6% of patients who had previously experienced adverse drug reactions (ADs). Approximately one-third of patients checked the expiry date of the medication before use and 17.3% of patients had a home medicine cabinet.

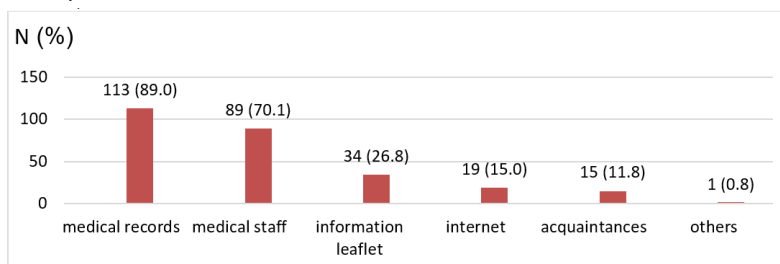


Figure 1. Patients' drug information sources (N = 127)

Note: A patient could select more than one source

Most patients received drug information advice from medical records (89%) and medical staff (70.1%). In addition, patients often consulted information from other sources such as the information leaflet, the internet and acquaintances with the rates of 26.8%; 15% and 11.8%, respectively.

3.2. Assessment of patient adherence to medication

The results of the assessment of adherence to medication in the study group based on the GMAS scale are as follows:

Table 3. Results of medication adherence assessment (N = 127)

Assessment	Number (n)	Rate (%)
Non-adherent (26 and below)	10	7.9
Adherent (27 and above)	117	92.1
Min - max	21 - 33	
Median (25%, 75%)	31 (30 - 33)	

The rate of patients compliance with medication use was high at 92.1%. Median compliance score was 31 (30 - 33).

Table 4. Results of medication adherence assessment (N = 127)

Question	Always (0 score)	Mostly (1 score)	Sometimes (2 scores)	Never (3 scores)
Non-adherence due to patient behavior (un-intentional and intentional)				
D1. Do you have difficulty in remembering to take your medications?	0 (0%)	4 (3.1%)	40 (31.5%)	83 (65.4%)
D2. Do you forget to take your medication due to your busy schedule, travelling, meeting, events at home, party, marriage, religious celebrations, etc.?	0 (0%)	3 (2.4%)	60 (47.2%)	64 (50.4%)
D3. Do you discontinue your medication when you feel well?	0 (0%)	11 (8.7%)	8 (6.3%)	108 (85.0%)
D4. Do you stop taking medications when you feel adverse effects such as gastric discomfort, etc.?	0 (0%)	2 (1.6%)	9 (7.1%)	116 (91.3%)
D5. Do you stop taking medications without informing the doctor?	1 (0.8%)	12 (9.4%)	13 (10.3%)	101 (79.5%)
Non-adherence due to additional disease and pill burden				
D6. Do you discontinue your medicines due to other medicines that you have to take for your additional disease?	0 (0%)	1 (0.8%)	2 (1.6%)	124 (97.6%)
D7. Do you find it is a hassle to remember your medications due to medication regime complexity?	0 (0%)	0 (0%)	14 (11.0%)	113 (89.0%)
D8. During the last month, had there been any occasion when you missed your medicines due to progression of disease and addition of new medicines?	0 (0%)	2 (1.6%)	0 (0%)	125 (98.4%)
D9. Do you alter medication regimen, dose and frequency by yourself?	4 (3.1%)	14 (11.0%)	18 (14.2%)	91 (71.7%)
Non-adherence due to financial constraints				
D10. Do you discontinue these medications because they are not worth the money you spent on them?	0 (0%)	0 (0%)	0 (0%)	127 (100%)
D11. Do you find it difficult to buy your medicines because they are expensive?	0 (0%)	0 (0%)	2 (1.6%)	125 (98.4%)

Regarding patient behavior (Questions D1 - D5): 47.2% of individuals “sometimes” and 2.4% “mostly” forgot take their medication because they were busy schedule, travelling, meeting, ect (D2). And 31.5% of “sometimes” and 3.1% of “mostly” have difficulty in remembering to take medication (D1). About 9.4% of “mostly” patients and 10.3% of “sometimes” patients stop taking medication without informing the doctor (D5).

Regarding comorbidities and medication burden (Questions D6 - D9): 97.6% never stopped their chronic medication when they had to take medication for an acute illness (D6) and 89.0% did not feel hassle to remember your medications due to medication regime complexity (D7). However, 28,3% of patients change their medication regimen on their own (D9).

4. DISCUSSION

4.1. Study population characteristics

The study population was predominantly elderly, with 70.9% aged 60 years or older (mean age was 63.5 ± 8.7 years). This proportion is consistent with many studies on noncommunicable diseases such as diabetes, hypertension, and cardiovascular diseases, which increase in prevalence with age [10]. This older population often faces challenges in treatment management, including reduced hepatic and renal function, cognitive decline, and risks associated with multimorbidity and polypharmacy [11,12].

Socioeconomically, most participants lived in urban areas (73.2%) and were retired (64,6%), rates higher than those reported by Ho Anh Hien *et al.* (2025) in Central Vietnam (47.6% urban)[13]. Patients’ education levels were diverse; however, a large proportion (68.5%) had completed primary, secondary, or high school. This distribution is noteworthy, as existing literature frequently discusses educational attainment as a potential facilitating factor in processing medical information and supporting treatment adherence [14]. Nevertheless, a small proportion of patients were illiterate (7.9%), representing a vulnerable group that requires particular attention from healthcare workers, including the use of visual and easily understandable counseling methods.

All patients in the study were covered by health insurance, and most incurred no additional out-of-pocket expenses. This suggests that financial constraints rarely impeded access to pharmacotherapy or clinical services, a key factor in sustaining chronic care.

Multimorbidity was common among patients, with a mean of 2.23 ± 0.88 diseases. Only 22.8% presented with a single condition. This clinical complexity, typical among older adults, often necessitates polypharmacy (average of 2.8 ± 1.3 prescribed items), increasing the risk of drug interactions, adverse effects, and medication-related errors [15]. A median illness duration was five years, indicating a population with long-term chronic conditions requiring continuous management.

The proportion of patients attending monthly follow-up appointments reached 89,0%, indicating that most patients maintained regular contact with the healthcare system for treatment monitoring. This rate was higher than that reported by Fernandez-Lazaro *et al.* (2019) in Spain, where only about 50,8% of patients had monthly or more frequent visits [16].

Although the rate of regular follow-up among outpatients was relatively high, several limitations in medication-use behavior were still observed. The study found that 27,6% of patients had experienced adverse drug reactions, while only 35,4% checked the expiry date of their medicines before use, indicating that awareness of medication safety remains limited. In addition, only 17,3% of patients had a home medicine cabinet, reflecting a lack of preparedness for home healthcare. These results emphasize the importance of health education and the pharmacist’s role in ensuring safe and rational medication use.

Pharmacotherapy information is an important factor influencing adherence. Clear, unbiased guidance enables individuals to fully comprehend their regimens, weigh therapeutic risks against benefits, and ultimately optimize treatment outcomes [17]. Although most patients in this study reported receiving medication information from healthcare professionals (70,1%) and through their medical records (89,0%), a considerable proportion also referred to other sources such as drug information leaflets (26,8%), the internet (15,0%), and acquaintances (11,8%). This is a common trend in the modern context, where patients have easy access to health information from multiple channels, though it also carries the risk of misinformation or misinterpretation.

According to Friis *et al.*, chronically ill populations often experience difficulties in understanding the medical information provided by healthcare professionals [18]. Similarly, Fredericksen *et al.*, in a study conducted at primary care clinics in the United States, found that many patients with chronic

diseases had limited or incorrect understanding of the purpose of their prescribed medications [19].

4.2. Assessment of patient adherence to medication

The study results showed a high patient adherence rate (92.1%) according to the GMAS scale, with a median adherence score of 31 (out of 33), confirming that the majority of patients in the study sample had good adherence awareness and behavior. Despite this positive overall result, an analysis of individual domains reveals that specific non-adherent behaviors persist. This discrepancy can be explained by the GMAS scoring mechanism: since the threshold for adherence is ≥ 27 points, patients answering “sometimes” (2 points) to several questions may still be classified as adherent. Among the persistent issues, forgetting medication due to a busy schedule was the primary reason, with 47.2% “sometimes” and 2.4% “mostly” forgetting to take medication due to traveling, meetings, or parties. Additionally, difficulty in remembering to take medication in general also affected about one-third of patients (31.5%). This pattern of behavior aligns with what existing literature often categorizes as unintentional non-adherence, where patients miss doses due to external circumstances rather than deliberate choices. These observed patterns highlight potential target areas for future analytical studies and the development of interventions. Based on similar findings in the literature, exploring practical solutions such as using pill organizers, setting reminder alarms, and preparing medication for travel could be beneficial for this population [20].

Although accounting for a lower proportion, intentional non-adherence behaviors still exist and pose potential risks, such as arbitrarily altering the medication regimen (dose and frequency), with about one-quarter of patients (28.3% at “always” and “sometimes” and “mostly” levels) admitting to this behavior. Stopping medication without informing the doctor was also recorded in a significant portion of patients (about 20% at “always” and “sometimes” and “mostly” levels). While the current descriptive design did not measure the quality of patient-provider interactions, existing literature hypothesizes that such self-directed alterations may be associated with underlying gaps in clinical communication or patient health literacy [17]. Patients may self-adjust medication based on subjective perceptions of their symptoms without fully understanding the risks [21].

The study results indicate that pill burden and financial constraints were not major barriers for the

surveyed patient group. Nearly all patients did not discontinue their chronic medicines due to other medicines for additional diseases, did not find the medication regime complexity to be a hassle, and notably, cost had no impact on their decision to take medication. This is a very valuable finding, suggesting that when economic barriers are removed, treatment adherence rates can be significantly improved.

5. CONCLUSION

In conclusion, this study observed a high overall medication adherence rate (92.1%) among patients with chronic diseases at the Hue Family Medicine Clinic, a population fully covered by health insurance. Despite this positive overall score, specific non-adherent behaviors remained prevalent. The most frequently reported barrier was forgetting to take medication due to routine disruptions or busy schedules. Additionally, a considerable proportion of patients reported self-adjusting their treatment regimens. These descriptive findings highlight specific, persistent barriers in medication-taking behavior, emphasizing the ongoing need for targeted patient counseling and continuous monitoring in chronic disease management.

STUDY LIMITATIONS

Several limitations should be acknowledged when interpreting these results. First, the cross-sectional design precludes causal inferences. Second, self-reported GMAS data introduces recall and social desirability biases. Third, the GMAS threshold ($\geq 27/33$ points) may classify patients as globally ‘adherent’ despite occasional non-adherent behaviors, potentially masking specific barriers. Finally, convenience sampling at a single clinical setting with a relatively small sample size limits the generalizability of our findings and the statistical power for subgroup analyses.

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