

<https://doi.org/10.32921/2225-9929-2023-1-50-35-44>
UDC 614; 614.2; 614.33
IRSTI 76.75.75

Review article

Patient Medication Adherence Assessment Tools for Primary Healthcare Physicians in Research and Practice

[Aizhan Baigozhina](#)¹, [Ayagoz Umbetzhanova](#)², [Gulmira Derbissalina](#)³, [Zhanagul Bekbergenova](#)⁴

¹ Master's student in Medicine, Astana Medical University, Astana, Kazakhstan. E-mail: Aijana.med.ad-y@mail.ru

² Associate Professor of the Department of General Practice with a Course of Evidence-Based Medicine, Astana Medical University, Astana, Kazakhstan. E-mail: ayatemir@mail.ru

³ Head of the Department of General Practice with a Course of Evidence-Based Medicine, Astana Medical University, Astana, Kazakhstan. E-mail: derbissalina@gmail.com

⁴ Assistant of the Department of General Practice with a course of evidence-based medicine, Astana Medical University, Astana, Kazakhstan. E-mail: zhanna_bekbergen@mail.ru

Abstract

The current issues of patient adherence and how to diagnose adherence at the primary health care level are relevant. One of the simplest, easiest, and most cost-effective ways to assess adherence is to administer patient surveys using questionnaires. The identification of factors associated with adherence will justify the implementation of a number of interventions to improve the effectiveness of patient care, reduce cases of exacerbations, and rehospitalization rates, and reduce treatment costs.

The purpose of the study: is to analyze the advantages and disadvantages of different tools in the assessment of adherence to medication therapy.

Methodology: The study used evidence-based data mining methods. 210 publications were found using keywords and clinical outcomes according to PICO in the international databases PubMed / Medline, Cochrane Central Register of Controlled Trials, and Google Scholar. The application of PRISMA and inclusion/exclusion criteria made it possible to select the most relevant sources (20 publications).

Conclusions are drawn from the review: the Morisky scale (MMAS-8) is the most qualitative, simple, and widely used questionnaire. MMAS-8 has been used in more than 200 international studies in the last 9 years. The Self-Effectiveness Scale and the Short Drug Questionnaire are preferred for scientific research, as the interpretation of the results is not very convenient to use in outpatient settings due to the difficulty of scoring, given the limited time to the doctor and patient. The Medication Adherence Reporting Scale is recommended in preference to patients with psychiatric illness. The Medication Replenishment and Adherence Questionnaire has some limitations and isn't very reliable given the study in which it was used. The Hill-Bone score requires further testing. Unfortunately, there is no "gold standard" for assessing adherence to therapy, but the Morisky scale (MMAS-8) is closer to it.

Keywords: adherence assessment tools, scales, questionnaires, primary health care.

Corresponding author: Aizhan Baigozhina, 1st-year master's student in medicine, Astana Medical University, Astana, Kazakhstan.
Postal code: 010000
Address: Astana, Kazakhstan, Saryarka avenue 33
Phone: +7 747 825 9126
E-mail: Aijana.med.ad-y@mail.ru

J Health Dev 2023; 1 (50): 35-44
Received: 04-01-2023
Accepted: 28-02-2023



This work is licensed under a Creative Commons Attribution 4.0 International License

Introduction

The problem of adherence has been officially recognized by the World Health Organization (hereinafter referred to as WHO) since 2003 and has defined adherence as: "the degree of compliance of a person's behavior regarding taking medications, dieting and / or other lifestyle changes with the recommendations of a health professional" [1]. A low level of medications adherence reduces the effectiveness of pharmacotherapy and is considered an important obstacle to achieving better patient outcomes [2-4]. In a WHO report, low medications adherence was called "a worldwide problem of astonishing magnitude" [1]. In itself, the phenomenon of low adherence is a problem that should be considered as "diagnosable and treatable" [5]. This problem is of global importance, especially in wealthier countries where health care systems are already at a fairly high level, and further improvement in the effectiveness of pharmacotherapy may largely depend on increasing the level of patient adherence [6]. However, at present, various strategies for identifying low adherence and improving it are rarely used in the routine clinical practice.

Despite the availability of effective and safe medications dispensed in primary health care

Methodology

The study used evidence-based data mining methods. 210 publications were found using keywords and clinical outcomes according to PICO in the international databases PubMed / Medline, Cochrane

The Main part

WHO has classified the potential causes of inadequate medicines intake into 5 main groups

(PHC), in a certain part of patients, the disease is not adequately controlled. One of the main reasons is the lack of adherence of patients to treatment. The probability of control of the condition directly depends on the regularity of taking the medicines by the patient. Adherence to treatment or compliance is the degree to which a patient's behavior conforms to recommendations, it includes not only medication therapy received from a doctor [1]. Unfortunately, numerous studies in different countries of the world indicate that currently there is a serious problem, which is the lack of adherence of patients to treatment, due to reasons related to the patient, the doctor, the relationship between them, socio-economic factors, the characteristics of the disease. Non-adherence can have serious consequences for society, and many clinicians are not trained in screening for non-adherence. Since treatment adherence is a complex multifactorial behavior, it is important to provide an accurate and practical tool for assessing treatment adherence in routine medical practice.

The purpose of this review: to analyze the advantages and disadvantages of different tools in the assessment of adherence to medication therapy.

Central Register of Controlled Trials, and Google Scholar. The application of PRISMA and inclusion/exclusion criteria made it possible to select the most relevant sources (20 publications).

(Table 1) [1, 7].

Table 1 - Classification of factors of inadequate intake of medicines

Factors of Low Adherence	
Socio-economic factors	<ol style="list-style-type: none"> 1. low literacy; 2. high medications costs; 3. weak social support
Health system factors	<ol style="list-style-type: none"> 1. difficult access to health services; 2. insufficient communication between the health worker and the patient; 3. lack of continuity of care.
Factors associated with the nature of the disease	<ol style="list-style-type: none"> 1. asymptomatic chronic disease (no clinical manifestations); 2. mental health disorders (e.g. depression).
Therapy-related factor	<ol style="list-style-type: none"> 1. the complexity of the dosing regimen; 2. undesirable reactions.
Patient related factors	<ol style="list-style-type: none"> 1. physical impairments (such as problems with vision or coordination); 2. cognitive impairment; 3. mental disorders; 3. age.

The presence of chronic diseases that are asymptomatic and require long-term therapy does not motivate the patient to permanent treatment. The complexity of the medication dosing regimen and the development of adverse reactions also negatively affect adherence. It has been shown that an increase in the frequency of medicine dosing is inversely proportional to the adherence to the prescribed pharmacotherapy [8]. Among the factors of the patient, first of all, the following were identified: young age, cognitive

impairment, and mental disorders. Socioeconomic factors such as low social status, low educational attainment, and poor medical literacy among patients are also often associated with non-adherence. It has also been found that patients generally adhere more closely to the medication regimen for 5 days before and after visiting the doctor, compared to the period 30 days after the visit - this phenomenon is known as "white coat adherence" [9, 10].

Increasing adherence to therapy, according to WHO experts, is the most promising way to influence the health of the population, surpassing in its

Methods for assessing medication adherence

Methods for diagnosing adherence are divided into: 1) direct methods (directly observed therapy, measuring the concentration of a medication or its metabolite in the blood or urine, measuring the concentration of "biological markers" in the blood); and 2) indirect methods (include asking the patient about adherence to the prescribed therapy, assessing the clinical response (blood pressure level during antihypertensive therapy, cholesterol, and low-density

lipoprotein levels during lipid-lowering treatment, heart rate when taking beta-blockers, etc.), count pills, set the frequency of re-prescribing, conduct patient surveys, keep a diary of medication intake, and assess children's adherence to treatment by asking for help from a nurse, school nurse or teacher, electronic monitoring [12]. The classification is clearly shown in Fig.1.

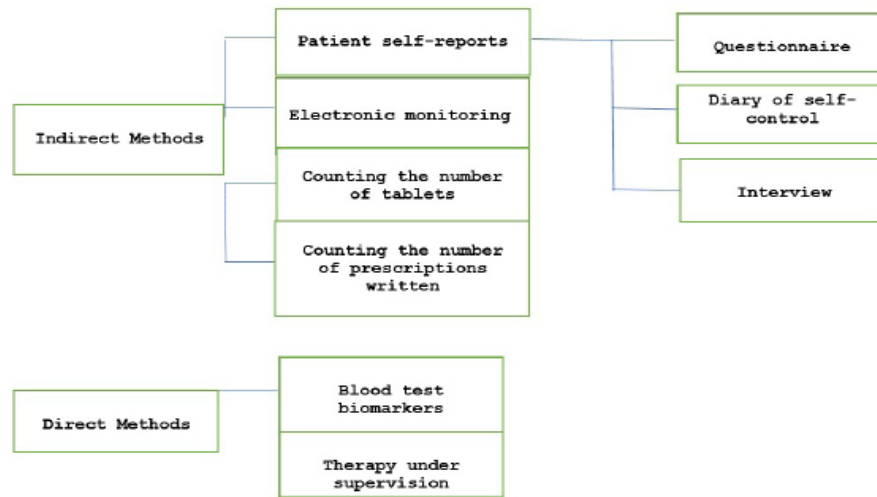


Figure 1 - Classification of adherence assessment methods

Direct methods for diagnosing adherence are more accurate than indirect methods, but unlike indirect methods for assessing road adherence, they are burdensome, time-consuming, rather inconvenient, and not suitable for use in PHC. In addition, due to a number of ethical and legal issues, direct methods are applicable, mainly, only within the framework of clinical trials, in which the consent of the patient is obtained for the collection of biological material from him and other procedures. From this, we can conclude that in the context of PHC, indirect methods for diagnosing adherence are much more promising and convenient. Indirect methods are relatively easy to use, but raise questions, can be subject to patient bias, and tend to result in clinicians overestimating patient adherence.

Indirect methods for diagnosing adherence in a doctor's practice:

One of the most convenient, frequently used methods for assessing adherence in PHC is the questioning of patients using various questionnaires. According to a systematic review of scales for diagnosing adherence, there are about 43 questionnaires translated into English to assess patient adherence to treatment [13]. The authors divided these questionnaires into 5 groups:

- 1) determining only behavioral reactions in relation to taking medications;
- 2) evaluating behavioral responses and barriers to high adherence;
- 3) identifying barriers to adherence;

4) diagnostic factors that increase adherence to medication therapy (patient's beliefs);

5) factors that increase adherence and barriers that violate adherence to medical recommendations [13].

Table 2 lists the main representatives of each group, as well as the types of patient populations in which large validation studies of the relevant scales were conducted [13].

When choosing a questionnaire for diagnosing adherence to treatment, preference should be given to questionnaires with a small number of questions, indicators of internal consistency, reliability, sensitivity, and specificity, taking into account patients with which diseases the test was validated, whether the test diagnoses self-efficacy, whether factors (barriers) determine non-adherence whether the level of literacy of the test persons are taken into account. There is no unambiguous "gold standard" when choosing a scale for measuring adherence. However, the closest to the "gold standard" is the Morisky-Green Medication Adherence Scale (MMAS) [14].

Table 2 - Classification of medication adherence scales

Group	Scale name	IHD	CHF	HTN	Diabetes	Dyslipidemia	BA
1. Medication behavior	Adherence Self-Report Questionnaire			+	+	+	
	Gehi et al. Adherence Question	+					
	Medication Adherence Rating Scale-5			+			+
	Stages of Change for Adherence Measure			+			
2. Medication-related behaviors and barriers	Adherence to Refills and Medications Scale		+				
	Adherence Starts with Knowledge-12		+		+		+
	Adherence Starts with Knowledge-20		+		+		+
	Brief Medication Questionnaire			+			
	Choo et al. Questionnaire			+			
	Fodor et al. Adherence Questionnaire			+			
	Hill-Bone Compliance Scale-10			+			
	Hill-Bone Compliance Scale-14			+			
	Morisky Medication Adherence Scale	+	+	+	+	+	
	Reported Adherence to Medication Scale	+	+	+	+	+	+
	Brooks Medication Adherence Scale						+
The Patterns of Asthma Medication Use Questionnaire						+	
3. Barriers to adherence	Medication Adherence Reasons Scale					+	
	Medication Adherence Questionnaire		+	+	+	+	
	Medication Adherence Self-Efficacy Scale			+			
	Medication Adherence Self-Efficacy Scale-Revised			+			
	Self-Efficacy for Appropriate Medication Use Scale	+		+	+	+	
4. Factors that increase adherence	Beliefs about Medicines Questionnaire	+	+	+	+		+
5. Factors that increase adherence and barriers	Maastricht Utrecht Adherence in Hypertension						+

IHD - Ischemic heart disease, CHF - Chronic heart failure, HTN - hypertension, BA - bronchial asthma

Morisky Medication Adherence Scale

A widely used test for diagnosing patient adherence to treatment due to simplicity and versatility is the 4-item Morisky-Green Medication Adherence Scale - MMAS-4 (4-item Morisky Medication Adherence Scale), which includes 4 questions to which answers are provided “yes” or “no”, and is aimed primarily at identifying non-adherence associated with inattention, forgetfulness, the manifestation of side effects of medicines, or vice versa, their pronounced effectiveness [15]. It is known that this scale was originally developed and was validated for patients with arterial hypertension, and later it was validated in other populations, primarily in chronic heart failure (CHF), type 2 diabetes, depression, dyslipidemia, etc. However, sensitivity and specificity, as well as the internal consistency indicator of the test - Cronbach's alpha, — are small and, according to the data indicated by the authors, are 44% and 47%, respectively, and Cronbach's alpha is 0.61 [16]. In 2008, an 8-question version of the scale, MMAS-8 (8-item Morisky Medication Adherence Scale), was developed and improved. The MMAS-8 scale showed higher validation rates: reliability $\alpha = 0.83$, patient response rate 98%, sensitivity 0.93, specificity 0.53, and also retained a

high correlation with the validation criteria [17]. The interpretation of the results of this test was carried out as follows. 1 point was awarded for each negative answer, with the exception of the question about taking all medicines the day before. For a positive answer to this question, 1 point was awarded. In the question of difficulty remembering the need to take all prescribed medications daily, with ranked answers, only 1 point is awarded for the answer “never”. Patients who scored 8 points were considered highly adherent, patients who scored 6–7 points (at risk) were considered moderately adherent, and those who scored 5 or fewer points were considered poorly adherent. The MMAS-8 scale has been translated into other languages (according to the authors, into 80 languages of the world) and validated in patients with nosology not only like hypertension, but these are: osteoporosis, gouty arthritis, type 2 diabetes, bronchial asthma, CHF, mental illness, etc. [17, 18].

From 2009 to 2017 MMAS-8 has been used in more than 200 studies [19]. In particular, MMAS-8 was used in 12 randomized clinical trials on acute coronary syndrome [20, 21], diabetes [22–26], hypertension [27, 28], chronic heart failure [29, 30], and malignancy [31].

One systematic review and meta-analysis selected 912 articles using the MMAS-8 questionnaire on adherence to antihypertensive therapy from 3 scientific databases (PubMed = 380, Scopus = 312, and Google Scholar = 220) [32]. After checking abstracts and titles, 28 articles were selected and included in a systematic review [33-60], and 25 of them were included in a meta-analysis [33, 35-49, 51-55, 57-60].

SEAMS scale (The Self-Efficacy for Appropriate Medication Use Scale)

Translation of "self-efficacy" from English "self-efficacy", is defined as confidence in one's ability to perform a given task, such as taking medication, which is an important factor in determining adherence to treatment. To this end, a self-efficacy scale was developed to determine adherence to medical treatment in the treatment of chronic diseases. SEAMS was developed in 2007 by a multidisciplinary team experienced in medication compliance and health literacy. Its psychometric properties were first evaluated in a randomized clinical trial (RCT) among 436 patients with ischemic heart disease and comorbidities such as arterial hypertension, and diabetes, who took an average of about 9 prescription medicines. Reliability was assessed by measuring internal consistency and retest reliability. Further, the questionnaire was used in patients with various chronic diseases (hypertension, type 2 diabetes, osteoporosis, dyslipidemia, etc.). Table 2 belongs to the 3rd group, which allows for determining the adherence barriers, especially those related to the patient himself. There are 2 versions of the questionnaire: 1. the full version, consisting of 21 questions, and 2. the short version, including 13 questions [61]. For the 13-item version, Cronbach's alpha internal consistency coefficient (high reliability) was 0.89; sensitivity and specificity for the SEAMS scale are not given [61, 62]. Included are questions about taking several different medications every day, also more than once a day; about side effects

This study is the largest meta-analysis involving more than 13,000 participants, in addition, it used the only validated and widely used MMAS-8 questionnaire [32]. In the study group of patients, an extremely high proportion (42.5%) of patients were found who were not adherent to antihypertensive therapy, and 83.7% of patients had uncontrolled arterial hypertension.

or when the patient feels unwell; taking a new dose of medication that looks different than usual; also about the fact that no one reminds you of the need to take medicine, etc. The answer to each of the questions is presented in the form of a Likert scale: absolutely sure (definitely yes) - 3 points, somewhat confident (doubtful) - 2 points, not at all sure (definitely not) - 1 point. Thus, this questionnaire makes it possible to quantify (in the range from 13 to 39 points) the patient's self-efficacy in relation to medication adherence. The founders of SEAMS developed a scale to assess self-efficacy among patients with various chronic diseases and with different levels of literacy. The psychometric analysis determined that the overall scale is reliable and valid, having a strong correlation with self-reported adherence to treatment. Factor analysis of the results revealed two aspects of medicine self-efficacy. The first was self-efficacy when taking medications in difficult circumstances, such as when patients are busy, away from home, or need to take multiple medications. The second was self-efficacy when taking medications in uncertain or changing circumstances, for example, when the patient is not sure how to take the medications or the regimen is changed [61]. Despite the advantages of the questionnaire, the interpretation of the results is not very convenient for use in an outpatient appointment due to the length and relative complexity of scoring. In this regard, the test is more suitable for scientific research than for outpatient service.

BMQ (Brief Medication Questionnaire)

BMQ is a short medicines questionnaire that allows you to determine not only adherence to taking specific medicines but also possible reasons for non-adherence [63]. This questionnaire allows you to assess not only the omissions in taking medications but also the excessive use of medicines, which is also considered unsatisfactory. The BMQ was originally developed and used in patients with hypertension, then validated for patients with type 2 diabetes, depression, and other chronic diseases [64]. The questionnaire is divided into two scales, each of which is divided into two subscales. The first scale concerns patients' opinions about the medicines they have been prescribed, while the second scale asks patients about their opinion in general about the medicines and their use. The first 5 questions are about medicine compliance, including both missed and "extra" medications; then 2 questions that determine the opinion of patients about the effectiveness of

medicines and the inconvenience associated with their use; the next 2 questions, recognizing problems related to the regularity of taking medicines; and additional 2 questions about the difficulties that the patient has in getting prescriptions and buying medicines on time. The degree of agreement for each item is indicated using the 5-point Likert scale, where "1" indicates disagreement and "5" indicates strong agreement. According to the authors, the questionnaire has a high sensitivity for diagnosing recurring episodes of non-adherence, ranging from 80-100%. These data were confirmed by the results of measuring adherence using pillboxes with built-in electronic chips [65]. The disadvantage of this questionnaire is the difficulty in scoring during outpatient appointments, where time is limited. Therefore, the BMQ questionnaire is not convenient in an outpatient setting, but rather possible within the framework of scientific research.

MARS (Medication Adherence Report Scale)

MARS - Medication Adherence Reporting Scale. Originally developed to diagnose adherence in people with mental illness. There are 2 versions: 10- and 5-question (MARS-10 and MARS-5). MARS-10 is a 10-item scale that assesses intentional ("I avoid using this when I can") and unintentional ("I forget to use this") medicines cessation. MARS-5 is a modified

shortened version of MARS-10 that offers more detail and differentiability between patients. For the first time, Cronbach's alpha for this scale in patients with schizophrenia was = 0.75, but in a subsequent validation study in patients with other mental illnesses, the value of the internal consistency index decreased to 0.6 [66, 67]. The sensitivity and specificity of the test

are not given. Also, adherence to the MARS-5 scale was assessed in patients with bronchial asthma, arterial hypertension, and diabetes mellitus [68, 69]. MARS-5 showed good internal consistency across all patient groups, with Cronbach's α at AH=0.68, BA=0.84, and

DM=0.89 [68]. The conciseness of the test ensured its popularity and translation into many languages. Currently, the scale is recommended and widely used mainly in psychiatry.

ARMS Questionnaire (Adherence to Refills and Medications Scale)

The ARMS was developed to assess medication adherence and replenishment in chronically ill patients. The ARMS score has a number of strengths as a measure of adherence in patients with chronic conditions. It has been developed and tested among patients with ischemic heart disease and other chronic diseases, including arterial hypertension, dyslipidemia, and diabetes. Cronbach's alpha of the test is 0.814 [70]. It also includes two separate subscales for factor analysis. The 8-item Medication Subscale assesses the patient's ability to self-administer prescribed medications. The 4-item prescription refill subscale assesses a patient's ability to refill medications on schedule. Conceptually, they represent different types of medicine use problems. However, it is recommended that these issues be recorded separately so that the researcher can address them accordingly. It correlates well with the MMAS-8 scale, which is probably the most commonly used for self-assessment of treatment adherence. In addition, ARMS has a stronger correlation with medicine refill adherence than MMAS-8, so the study authors believe that ARMS may be better in some respects.

The main advantage of ARMS is its suitability for use among semi-literate patients who appear to

Hill-Bone scale

The Hill-Bone tool was based on the MMAS scale, but it is specific for assessing adherence to antihypertensive therapy, developed on the African continent for hypertensive patients, and therefore has the highest validity in assessing adherence in black hypertensive patients. This scale consists of 14 questions, divided into 3 subscales, and evaluates three behavioral characteristics that are critical for the Hill-Bone scale: 1) reducing sodium (salt) intake; 2) visiting a doctor; and 3) medication. The responses are based on the Linkert rating scale, with a four-point response format: (4) always, (3) sometimes, (2) rarely, and (1) never. When summarized, the total score ranges from 14 (minimum) to 56 (maximum). It is possible to use only 8 questions of the first subscale of the test

Conclusions

Low adherence to treatment is common and contributes to significant worsening of the course of the disease, readmissions, death, and increased healthcare costs. Practitioners should always pay attention to poor adherence and try to increase adherence by emphasizing the value of the patient's treatment regimen, simplifying and adapting treatment regimens to the patient's individual condition, and lifestyle. A collaborative approach to treatment increases adherence. Patients who have difficulty maintaining adequate adherence need more intensive strategies than patients who have fewer adherence problems.

We can draw the following conclusions by analyzing the above data: 1. currently, there is a variety of questionnaires on adherence to treatment; 2. not all questionnaires meet all the requirements, some questionnaires overestimate the adherence of patients to treatment or do not fully diagnose non-adherence

have lower levels of adherence to therapy. In addition, Lexile's analysis showed that the scale had difficulty readings below the eighth-grade level of both the Hill-Bone scale and the Morisky compliance measure. Experience with ARMS assessments also indicates that patients of all literacy levels are able to complete an assessment when it is presented orally. It is important to note that the reliability analyzes showed a high consistency of responses across literacy levels. However, a limitation of this scale is that the tests were conducted at a single city hospital that caters predominantly to African Americans. Second, patients in the study took an average of six medicines, which may give misleading results in the group of patients with fewer medicines. The third limitation was the 3-month gap between the initial and subsequent assessment of the scale. The authors of the study note that the reliability of repeat tests would be higher if the tests were conducted at a shorter time interval, such as 2 weeks. However, a large time gap was needed to fit the overall study design. Fourth, data were collected at a scheduled clinic visit. Fifth, the distribution of ARMS scores was asymmetric, with the majority of patients indicating adherence to therapy.

(subscale of medication intake), containing questions about adherence to medication. Cronbach's alpha for the reduced scale was 0.68. Given the specificity of the Hill-Bone scale, this test is recommended for use mainly in patients with hypertension. The main limitation of this analysis is due to the characteristics of the study itself (survey) and the study subjects since the survey was conducted with a limited number of patients in two clinics in African Americans. The sensitivity and specificity of the scale as a diagnostic tool have not been established because the scale does not meet all the requirements and further testing in different populations are needed to cross-check the results of this study [71].

to therapy, often determine only a particular type of adherence; 3. in time-constrained practice settings, preference should be given to short and easy-to-understand scales validated against known reliability criteria in well-executed clinical trials with a large sample of patients.

Conflict of interest. The authors deny the existence of a conflict of interest.

Contribution of the authors. All authors contributed to the study conception and design. General management - G.D., A.U.; methodology - Zh.B.; writing and literature review - A.B., proofreading and editing - A.U. All authors read and approved the final manuscript.

References

1. Adherence to Long-Term Therapies: Evidence for Action. WHO Library Cataloguing-in-Publication Data, Geneva, WHO 2003 — 211 p. World Health Organization (WHO). [Cited 21 Dec 2022]. Available from: https://www.who.int/ch/knowledge/publications/adherence_report/en/
2. Osterberg L, Blaschke T. Adherence to medication. *N Engl J Med*. 2005; 353: 487-497. [[CrossRef](#)]
3. Bosworth H.B., Granger B.B., Mendys P., et al. Medication adherence: a call for action. *Am Heart J*. 2011;162:412-424. [[CrossRef](#)]
4. Cutler DM, Everett W. Thinking outside the pillbox-medication adherence as a priority for health care reform. *N Engl J Med*. 2010;362:1553-1555. [[CrossRef](#)]
5. Marcum ZA, Sevick MA, Handler SM. Medication nonadherence: a diagnosable and treatable medical condition. *JAMA*. 2013;309:2105-2106. [[CrossRef](#)]
6. Ascertaining Barriers for Compliance: Policies for Safe, Effective and Cost-effective Use of Medicines in Europe. ABC Project newsletter [Internet]. 2009. Available from: http://abcproject.eu/img/ABC_newsletter_06_03_2009.pdf
7. Naem Arshad C., Adherence to Long-term Therapies Evidence for Action. *Ann Saudi Med*. 2004; 24(3): 221-222. [[CrossRef](#)]
8. Santo K., Kirkendall S., Laba T-L., et al. Interventions to improve medication adherence in coronary disease patients: A systematic review and meta-analysis of randomised controlled trials. *European Journal of Preventive Cardiology* 2016;23(10):1065-1076. [[CrossRef](#)]
9. Feinstein A.R. On white-coat effects and the electronic monitoring of compliance. *Arch Intern Med*. 1990;150:1377-8. [[CrossRef](#)]
10. Cramer J.A., Scheyer R.D., Mattson R.H. Compliance declines between clinic visits. *Arch Intern Med*. 1990;150:1509-10. [[CrossRef](#)]
11. World Health Organization. Adherence to long-term therapies: evidence for action. WHO Library Cataloguing-in-Publication Data, Geneva, WHO 2003 — 211 p. [Cited 21 Dec 2022]. Available from: https://www.who.int/chp/knowledge/publications/adherence_report/en/
12. Osterberg L., Blaschke T. Adherence to Medication. *New England Journal of Medicine*, 2005; 353(5): 487-497. [[CrossRef](#)]
13. Nguyen T.-M.-U., Caze A. L., Cottrell N. What are validated self-report adherence scales really measuring?: a systematic review. *British Journal of Clinical Pharmacology*, 2014; 77(3): 427-445. [[CrossRef](#)]
14. Culig J., Leppee, M. From Morisky to Hill-Bone; self-reports scales for measuring adherence to medication. *Collegium antropologicum*. 2014; 38: 55-62. [[Google Scholar](#)]
15. Лукина Ю. В., Марцевич С. Ю., Кутишенко Н. П. Шкала Мориски-Грина: плюсы и минусы универсального теста, работа над ошибками // Рациональная фармакотерапия в кардиологии. – 2016. – Т. 12. – №. 1. – С. 63-65. [[CrossRef](#)]
- Lukina Y.V., Martsevich S.Yu., Kutishenko N.P. Shkala Moriski-Grina: pljusy i minusy universal'nogo testa, rabota nad oshibkami (The Morisky-Green scale: the pros and cons of universal test, correction of mistakes) [in Russian]. *Racional'naja farmakoterapija v kardiologii*. 2016; 12(1): 63-5. [[CrossRef](#)]
16. Morisky D.E., Green L.W., Levine D.M. Concurrent and predictive validity of self-reported measure of medical adherence. *MedCare*. 1986;24:67-73. [[CrossRef](#)]
17. Morisky D.E., Ang A., Krousel-Wood M., Ward H.J. Predictive validity of a medication adherence measure in an outpatient setting. *J Clin Hypertens (Greenwich)*. 2008; 10(5): 348-54. [[CrossRef](#)]
18. Cuevas C.I., Penate W. Psychometric properties of the eight-item Morisky Medication Adherence Scale (MMAS-8) in a psychiatric outpatient setting. *Int J Clin Health Psychol*. 2015;15:121-9. [[CrossRef](#)]
19. Moon S. J., Lee W.-Y., Hwang J. S., Hong Y. P., Morisky D. E. Accuracy of a screening tool for medication adherence: A systematic review and meta-analysis of the Morisky Medication Adherence Scale-8. *PLOS ONE*, 2017; 12(11): e0187139. [[CrossRef](#)]
20. Kassab Y., Hassan Y., Abd Aziz N., Ismail O., AbdulRazzaq H. Patients' adherence to secondary prevention pharmacotherapy after acute coronary syndromes. *Int J Clin Pharm*. 2013; 35(2): 275-80. [[CrossRef](#)]
21. Park L.G., Howie-Esquivel J., Chung M.L., Dracup K. A text messaging intervention to promote medication adherence for patients with coronary heart disease: a randomized controlled trial. *Patient Educ Couns*. 2014; 94(2):261-8. [[CrossRef](#)]
22. Arora S., Peters A.L., Burner E., Lam C.N., Menchine M. Trial to examine text message-based mHealth in emergency department patients with diabetes (TEXT-MED): a randomized controlled trial. *Ann Emerg Med*. 2014; 63(6):745-54. [[CrossRef](#)]
23. Cummings D.M., Lutes L., Littlewood K., DiNatale E., et al. Regimen-Related Distress, Medication Adherence, and Glycemic Control in Rural African American Women With Type 2 Diabetes Mellitus. *Ann Pharmacother*. 2014; 48(8): 970-7. [[CrossRef](#)]
24. Guo X.H., Ji L.N., Lu J.M., et al. Efficacy of structured education in patients with type 2 diabetes mellitus receiving insulin treatment. *J Diabetes*. 2014; 6(4):290-7. [[CrossRef](#)]
25. Khosravizade Tabasi H., Madarshahian F., Khoshniat Nikoo M., Hassanabadi M., Mahmoudirad G. Impact of family support improvement behaviors on anti diabetic medication adherence and cognition in type 2 diabetic patients. *J Diabetes Metab Disord*. 2014; 13(1):113. [[CrossRef](#)]
26. Katalenich .B, Lizheng S., Shuqian L., Hui S., et al. Evaluation of a Remote Monitoring System for Diabetes Control. *Clinical Therapeutics*. 2015; 37(6):1216-25 [[CrossRef](#)]
27. Bramlage P., Ketelhut R., Fronk E.M., Wolf W.P., et al. Clinical impact of patient adherence to a fixed-dose combination of olmesartan, amlodipine and hydrochlorothiazide. *Clin Drug Investig*. 2014; 34(6):403-11. [[CrossRef](#)]
28. Chan H.K., Hassali M.A. Modified labels for long-term medications: influences on adherence, comprehension and preferences in Malaysia. *Int J Clin Pharm*. 2014; 36(5):904-13. [[CrossRef](#)]
29. Vinluan C.M., Wittman D., Morisky D. Effect of pharmacist discharge counselling on medication adherence in elderly heart failure patients: A pilot study. *Journal of Pharmaceutical Health Services Research*. 2015; 6(2):103-10. [[CrossRef](#)]
30. Granger B.B., Ekman I., Hernandez A.F., Sawyer T., et al. Results of the Chronic Heart Failure Intervention to Improve Medication Adherence study: A randomized intervention in high-4. Eisenberger U, Wüthrich RP, Bock A, et al. Medication adherence assessment: high accuracy of the new Ingestible Sensor System in kidney transplants. *Transplantation*. 2013;96(3):245-50. [[CrossRef](#)]
31. Berry D.L., Blonquist T.M., Hong F., Halpenny B. Partridge A.H. Self-reported adherence to oral cancer therapy: relationships with symptom distress, depression, and personal characteristics. *Patient Prefer Adherence*. 2015; 9:1587-92. [[CrossRef](#)]

32. Abegaz T. M., Shehab A., Gebreyohannes E. A., Bhagavathula A. S., Elnour A. A. Nonadherence to antihypertensive drugs. *Medicine*, 2017; 96(4): e5641. [[CrossRef](#)]
33. Mugwano I., Kaddumukasa M., Mubenyi L., et al. Poor drug adherence and lack of awareness of hypertension among hypertensive stroke patients in Kampala, Uganda: a cross-sectional study. *BMC Res Notes* 2016;9:3. [[CrossRef](#)]
34. Sadeghi E, Behnood-Rod A, Aerab-Sheibani H, et al. Controlled blood pressure in Iranian patients: a multi-center report. *Global J Health Sci* 2016;8:188–95. [[CrossRef](#)]
35. Cummings D.M., Wu J., Cene C., et al. Perceived social standing, medication nonadherence, and systolic blood pressure in the rural south. *J Rural Health* 2016;32:156–63. [[CrossRef](#)]
36. Hall E., Lee S., Clark P.C., et al. Social ecology of adherence to hypertension treatment in Latino migrant and seasonal farmworkers. *J Transcult Nurs* 2016;27:33–41. [[CrossRef](#)]
37. Mohammad Y., Amal A., Sanaa A., et al. Evaluation of medication adherence in Lebanese hypertensive patients. *J Epidemiol Global Health* 2016; 6: 157–67. [[CrossRef](#)]
38. Yue Z., Li C., Weilin Q., et al. Application of the health belief model to improve the understanding of antihypertensive medication adherence among Chinese patients. *Patient Educ Counsel* 2015;98:669–73. [[CrossRef](#)]
39. Pandey A., Raza F., Velasco A., et al. Comparison of Morisky medication adherence scale with therapeutic drug monitoring in apparent treatment-resistant hypertension. *J Am Soc Hypertens* 2015;9:420–6. [[CrossRef](#)]
40. Akintunde A.A., Akintunde T.S. Antihypertensive medications adherence among Nigerian hypertensive subjects in a specialist clinic compared to a general outpatient clinic. *Ann Med Health Sci Res* 2015;5:173–8. [[CrossRef](#)]
41. Hou Y., Zhang D., Gu J., et al. The association between self-perceptions of aging and antihypertensive medication adherence in older Chinese adults. *Aging Clin Exp Res* 2015;28:1113–20. [[CrossRef](#)]
42. Saadat Z., Nikdoust F., Aerab-Sheibani H., et al. Adherence to antihypertensives in patients with comorbid conditions. *Nephrol Urol Mon* 2015;7:e299863. [[CrossRef](#)]
43. Kubo M.N., Kayima J.K., Were A.J., et al. Factors associated with uncontrolled hypertension among renal transplant recipients attending nephrology clinics in Nairobi, Kenya. *J Transplant* 2015; 2015:746563. [[CrossRef](#)]
44. Kim J., Lee W., Hong Y., et al. Psychometric properties of a short self-reported measure of medication adherence among patients with hypertension treated in a busy clinic setting in Korea. *J Epidemiol* 2014; 24: 132–40. [[CrossRef](#)]
45. Li W.T.L., Kang C.D., Tsang P.P.M., et al. Determinants of medication adherence and blood pressure control among hypertensive patients in Hong Kong: a cross-sectional study. *Int J Cardiol* 2015;182:250–7. [[CrossRef](#)]
46. Okwuonu C.G., Ojimadu N.E., Okaka E.I., et al. Patient-reported barriers to hypertension control in a Nigerian population. *Int J Gen Med* 2014; 7:345–53. [[CrossRef](#)]
47. Fernandez-Arias M., Acuna-Villaorduna A., Miranda J.J., et al. Adherence to pharmacotherapy and medication-related beliefs in patients with hypertension in Lima, Peru. *PLoS ONE* 2014;9:e112875. [[CrossRef](#)]
48. Girma F., Emishaw S., Alemseged F., et al. Compliance with antihypertensive treatment and associated factors among hypertensive patients on follow-up in Jimma University specialized hospital, Jimma, south west Ethiopia: a quantitative cross-sectional study. *J Hypertens*. 2014;3:174. [[CrossRef](#)]
49. Lee G.K.Y., Wang H.H.X., Liu K.Q.L, et al. Determinants of medication adherence to antihypertensive medications among a Chinese population using Morisky medication adherence scale. *PLoS ONE* 2013; 8 :e62775. [[CrossRef](#)]
50. Cuffee Y.L., Hargraves J.L., Briesacher B.A., et al. Reported racial discrimination, trust in physicians, and medication adherence among inner-city African Americans with hypertension. *Am J Public Health* 2013; 103: e55–62. [[CrossRef](#)]
51. Kretchy I, Owusu-Daaku F, Danquah S. Spiritual and religious beliefs: do they matter in the medication adherence behavior of hypertensive patients? *BioPsychoSocial Med* 2013;7:15. [[CrossRef](#)]
52. Ramli A., Ahmad N.S., Paridathathu T. Medication adherence among hypertensive patients of primary health clinics in Malaysia. *Patient Prefer Adherence* 2012; 6: 613–22. [[CrossRef](#)]
53. Migneault J.P., Decier J.J., Wright J.A., et al. A culturally adapted telecommunication system to improve physical activity, diet quality, and medication adherence among hypertensive African-Americans: a randomized controlled trial. *Ann Behav Med* 2012;43:62–73. [[CrossRef](#)]
54. Muntner P., Levitan E.B., Joyce C., et al. Association between antihypertensive medication adherence and visit-to-visit variability of blood pressure. *J Clin Hypertens* 2013;15:112–7. [[CrossRef](#)]
55. Zyoud S.H., Al-Jabi S., Swelleh W.M., et al. Relationship of treatment satisfaction to medication adherence: findings from a cross-sectional survey among hypertensive patients in Palestine. *Health Quality Life Outcome* 2013;11:191. [[CrossRef](#)]
56. Leung L.B., Busch A.M., Nottage S.L., et al. Approach to antihypertensive adherence: a feasibility study on the use of students health coaches for uninsured hypertensive adults. *Behav Med* 2012;38:19–27. [[CrossRef](#)]
57. Breaux-Shropshire T.L., Brown K.C., Pryor E.R., et al. Relationship of blood pressure self-monitoring, medication adherence, self-efficacy, stage of change, and blood pressure control among municipal workers with hypertension. *Workplace Health Saf* 2012;60:303–11. [[CrossRef](#)]
58. Oliveira-Filho A.D., Barreto-Filho J.A., Neves S.J., et al. Association between the 8-item Morisky medication adherence scale (MMAS-8) and blood pressure control. *Arq Bras Cardiol* 2012;99:649–58. [[CrossRef](#)]
59. Holt E.W., Muntner P., Joyce C.J., et al. Health-related quality of life and antihypertensive medication adherence among older adults. *Age Ageing* 2010;39:481–7. [[CrossRef](#)]
60. Berni A., Ciani E., Cecioni I., et al. Adherence to antihypertensive therapy affects ambulatory atrial stiffness index. *Eur J Int Med* 2011;22:93–8. [[CrossRef](#)]
61. Risser J., Jacobson T. A., Kripalani S. Development and Psychometric Evaluation of the Self-Efficacy for Appropriate Medication Use Scale (SEAMS) in Low-Literacy Patients With Chronic Disease. *Journal of Nursing Measurement*, 2007; 15(3): 203–219. [[CrossRef](#)]
62. Nguyen T-M-U., Caze A.L., Cottrell N.. What are validated self-report adherence scales really measuring a systematic review. *British Journal of Clinical Pharmacology*. 2014;77(3): 427–445. [[CrossRef](#)]
63. Svarstad B.L., Chewning B.A., Sleath B.L., Claesson C. The Brief Medication Questionnaire: a tool for screening patient adherence and barriers to adherence. *Patient Educ Couns*. 1999;37(2):113–24. [[CrossRef](#)]
64. Rickles N.M., Svarstad. Relationships between multiple self-reported nonadherence measures and pharmacy records. *Res Social Adm Pharm*. 2007;3:363–77. [[CrossRef](#)]
65. Warren S.R., Raisch D.W., Campbell H.M., et al. Medication adherence assessment in a clinical trial with centralized follow-up and direct-to-patient drug shipments. *Clin Trials*. 2013;10(3):441–8. [[CrossRef](#)]
66. Thompson K., Kulkarni J., Sergejew A.A. Reliability and validity of a new Medication Adherence Rating Scale (MARS) for the psychoses. *Schizophr Res*. 2000;42:241–7. [[CrossRef](#)]
67. Fialko L., Garety P.A., Kuipers E., et al. A large-scale validation study of the Medication Adherence Rating Scale (MARS). *Schizophr Res*. 2008;100:53–9. [[CrossRef](#)]

68. Chan A. H. Y., Horne R., Hankins M., Chisari C. The Medication Adherence Report Scale (MARS-5): a measurement tool for eliciting patients' reports of non-adherence. *British Journal of Clinical Pharmacology*. 2020; 86(7): 1281-1288. [CrossRef]

69. Horne R., Weinman J. Self-regulation and self-management in asthma: exploring the role of illness perceptions and treatment beliefs in explaining non-adherence to preventer medication. *Psychol Health*. 2002;17(1):17-32. [CrossRef]

70. Kripalani S., Risser J., Gatti M. E., Jacobson T. A. (2009). Development and Evaluation of the Adherence to Refills and Medications Scale (ARMS) among Low-Literacy Patients with Chronic Disease. *Value in Health*, 2009; 12(1): 118-123. [CrossRef]

71. Kim M.T., Hill M.N., Bone L.R., Levine D.M. Development and testing of the Hill-Bone Compliance to High Blood Pressure Therapy Scale. *Prog Cardiovasc Nurs*. 2000;15(3):90-6. [CrossRef]

Науқастардың емделуге бейілділігін ғылыми зерттеулер мен алғашқы медициналық-санитарлық көмек дәрігерінің тәжірибесінде бағалау құралдары

[Байгожина А.Т.](#)¹, [Умбетжанова А.Т.](#)², [Дербисалина Г.А.](#)³, [Бекбергенова Ж.Б.](#)⁴

¹ Медицина мамандығының 1 курс магистранты, Астана медициналық университеті, Астана, Қазақстан.

E-mail: Aijana.med.ad-y@mail.ru

² Дәлелді медицина курсы бар жалпы дәрігерлік тәжірибе кафедрасының доценті, Астана медициналық университеті, Астана, Қазақстан. E-mail: ayatemir@mail.ru

³ Дәлелді медицина курсы бар жалпы дәрігерлік практика кафедрасының меңгерушісі, Астана медициналық университеті, Астана, Қазақстан. E-mail: derbissalina@gmail.com

⁴ Дәлелді медицина курсымен жалпы медициналық практика кафедрасының ассистенті, Астана медициналық университеті, Астана, Қазақстан. E-mail: zhanna_bekbergen@mail.ru

Түйіндеме

Бүгінгі таңда науқастардың терапияға бейілділігін зерттеу мәселелері және оны алғашқы медициналық-санитарлық көмек деңгейінде диагностикалау әдістері өзекті болып табылады. Емдеуге бейілділікті бағалаудың ең қарапайым, ыңғайлы және арзан әдістерінің бірі - әртүрлі сауалнамалар арқылы науқастарға сауалнама жүргізу. Бейілділікке байланысты факторларды анықтау науқасты емдеудің тиімділігін арттыру, декомпенсация жағдайларын төмендету, қайта ауруханаға жатқызу жиілігін азайту және мемлекеттік шығындарды азайту бойынша бірқатар шараларды жүзеге асыруды негіздеуге мүмкіндік береді.

Әдістеме: зерттеуде дәлелді деректерді іздеу әдістері қолданылды. PubMed/Medline, Cochrane Central Register of Controlled Trials, Google Scholar халықаралық дерекқорларында PICO сәйкес кілт сөздер мен клиникалық нәтижелерді қолдану арқылы 210 жарияланым табылды. PRISMA және қосу/шығару критерийлерін қолдану ең өзекті дереккөздерді таңдауға мүмкіндік берді (20 жарияланым).

Зерттеу мақсаты: дәрілік терапияны ұстану бойынша шетелдік медициналық сауалнамалардың артықшылықтары мен кемшіліктерін талдау.

Қорытынды. Шолуды талдай отырып, Morisky шкаласы (MMAS-8) ең сапалы, қарапайым және кеңінен қолданылатын сауалнама екенін анықтауға болады. MMAS-8 небәрі 9 жыл ішінде 200-ден астам шетелдік зерттеулерде қолданылды. Ғылыми зерттеулер үшін өзін-өзі тиімділік шкаласы мен қысқаша дәрілік сауалнамаға артықшылық беріледі, өйткені нәтижесінің интерпретациясы көп уақыт алады, дәрігер мен науқастың уақыты шектеулі, балл қоюдың қиындығына байланысты амбулаторлық қабылдауда қолдану үшін ыңғайлы емес. Дәрілерді қабылдау туралы есеп беру шкаласы әртүрлі медициналық жағдайлар үшін қолданылған, бірақ психиатриялық ауруы бар пациенттің бейілділігін зерттеулер үшін ұсынылады. Дәрі-дәрмекпен толықтыру және сақтау сауалнамасының шектеулері бар және ол қолданылған зерттеуді ескере отырып, өте сенімді емес. Диагностикалық құрал ретінде Hill-Bone көрсеткішінің сезімталдығы мен ерекшелігі анықталмаған және қосымша тестілеуді қажет етеді. Өкінішке орай, терапияның сақталуын бағалаудың «алтын стандарты» жоқ, бірақ Morisky шкаласы (MMAS-8) оған жақынырақ боп саналады.

Алғашқы медициналық-санитариялық көмек жағдайында сауатты орындалған клиникалық зерттеулер шеңберінде белгілі сенімділік критерийлерінің көмегімен анағұрлым жақсы валидацияланған қарапайым балл санау жүйесімен 10 сұрақтан аспайтын ықшамды шкалаларға артықшылық беру керек. Көптеген зерттеулерде дәлелденген ең сенімді, ақпараттық және жоғары дәлелді сауалнама MMAS-8 шкаласы деп санауға болады.

Түйін сөздер: бейілділік, диагностикалау әдістері, шкалалар, сауалнамалар, алғашқы медициналық-санитарлық көмек.

Инструменты оценки приверженности пациентов к лечению в научных исследованиях и практике врача первичной медико-санитарной помощи

[Байгожина А.Т.](#)¹, [Умбетжанова А.Т.](#)², [Дербисалина Г.А.](#)³, [Бекбергенова Ж.Б.](#)⁴

¹ Магистрант 1-го года обучения специальности медицина, Медицинский университет Астана, Казахстан.

E-mail: Aijana.med.ad-y@mail.ru

² Доцент кафедры общей врачебной практики с курсом доказательной медицины, Медицинский университет Астана, Казахстан. E-mail: ayatemir@mail.ru

³ Заведующая кафедры общей врачебной практики с курсом доказательной медицины, Медицинский университет Астана, Казахстан. E-mail: derbissalina@gmail.com

⁴ Ассистент кафедры общей врачебной практики с курсом доказательной медицины, Медицинский университет Астана, Казахстан. E-mail: zhanna_bekbergen@mail.ru

Резюме

На сегодняшний день актуальны проблемы изучения приверженности к терапии пациентов и методы ее диагностики на уровне первичной медико-санитарной помощи. Наиболее простым, удобным и малозатратным способом оценки приверженности к лечению является анкетирование пациентов с помощью опросников. Выявление факторов, ассоциированных с приверженностью, позволит обосновать выполнение ряда мероприятий для повышения эффективности лечения пациентов, снизит случаи декомпенсации состояния, частоту повторной госпитализации и уменьшит затраты государства.

Методология: в исследовании использована стратегия поиска данных с помощью ключевых слов и клинических исходов согласно клиническому вопросу PICO в международных базах данных PubMed/ Medline, Cochrane Central Register of Controlled Trials, Google Scholar, было идентифицировано 210 публикаций. Применение PRISMA и критериев включения/исключения позволило отобрать наиболее релевантные источники (20 публикаций).

Цель исследования: проанализировать преимущества и недостатки инструментов оценки приверженности к лекарственной терапии.

Выводы: наиболее качественным, простым и широко используемым опросником является шкала Morisky (MMAS-8). MMAS-8 использовался более чем в 200 зарубежных исследованиях только за 9 лет. Шкала самоэффективности и краткий лекарственный опросник предпочтительнее для научных исследований, так как интерпретация результатов не очень удобны для применения на амбулаторном приеме из-за сложности подсчета баллов, учитывая ограниченное время врача и пациента. Шкала репортирования приверженности к лекарственной терапии использовалась при различных нозологиях, но рекомендуется предпочтительнее у пациентов с психическими заболеваниями. Опросник восполнения лекарств и приверженности имеет некоторые ограничения и недостаточно надежен, учитывая исследование, в котором оно применялось. Чувствительность и специфичность шкалы Hill-Wope как диагностического инструмента не установлены, требует дальнейшего тестирования. К сожалению, нет «золотого стандарта» по оценке приверженности к терапии, но более приближенным к нему является шкала Morisky (MMAS-8).

В условиях первичной медико-санитарной помощи следует отдавать предпочтение шкалам, валидированным в рамках качественно выполненных клинических исследований, включающим не более 10 вопросов, с легким подсчетом баллов. Наиболее надежным, информативным и с высоким уровнем доказательности, проверенным на многочисленных исследованиях опросником, можно считать шкалу MMAS-8.

Ключевые слова: приверженность, методы диагностики, шкалы, опросники, первичная медико-санитарная помощь.