# From Morisky to Hill-Bone; Self-Reports Scales for Measuring Adherence to Medication

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## ABSTRACT

*There are a number of approaches to studying medication-taking behavior. Self-report measures have the benefits of being cheap, easy to administer, non-intrusive, and able to provide information on attitudes and beliefs about medication. Potential limitations to self-report are that the ability to understand the items, and willingness to disclose information, can affect response accuracy and, thus, questionnaire validity. A computerized systematic search of the PubMed databases identified articles on scales for medication adherence measuring using the MeSH terms medication adherence, compliance, and persistence combined with the terms questionnaire self-report. Adherence scales have identified mostly in the last few years (2005–2012). One of the main sources has been article (Lavsa et. al) which evaluated literature describing medication adherence surveys/scales to gauge patient behaviors at the point of care. Articles were included if they evaluated or reviewed self-reported adherence medication scale applicable to chronic diseases and with a good coefficient of internal consistency reliability (Cronbach's α (alpha)). Articles that contained data about self-report medication adherence scales use were included. A total of about one hundred articles were identified. Of those articles, 20% (20 of 100) were included in the review because of their relevance to the article topic. This article describes various self-report scales by which to monitor medication adherence, their advantages and disadvantages, and discusses the effectiveness of their application at different chronic diseases. There are many self-report scales for measuring medication adherence and their derivatives (or subscales). Due to the different nature of the diseases, there is no gold-standard scale for measuring medication adherence. It can be nevertheless concluded that the nearest to gold-standard is the Medication Adherence Questionnaire (MAQ) scale by Morisky et.al. but we found better internal consistency reliability in some other scales.*

***Key words:*** *adherence, medication, scale, self-report, Zagreb, Croatia*

## Introduction

Medication nonadherence is a growing concern to healthcare systems, physicians and other stakeholders because of mounting evidence that it is prevalent and associated with adverse outcomes and higher costs of care. Patients with chronic diseases often receiving multiple medications, are at higher risk for nonadherence to medication and medication adherence can be essential for improving health outcomes. To date, measurement of patient medication adherence and use of interventions to improve adherence is rare in clinical and pharmaceutical practice. Physicians' lack of knowledge and patients' lack of awareness account for about 70% of non-adherence, indicating the necessity to improve physician education, and patient involvement[1].

There are a number of approaches to studying medication-taking behavior. The most precise methods are directly observed therapy, biological methods and measurement of the level of medicine or metabolite (such as blood or urine drug concentrations)[2]. Numerous other methods include clinician reports, pill counts, rates of prescription refills, electronic medication monitors, patient diaries, and patient self-report measures that have the benefits of being cheap, brief, acceptable to patients, valid, reliable, have the ability to distinguish between different types of non-adherence, easy to administer, non-intrusive, and able to provide information on attitudes and beliefs about medication.

Potential limitations to self-report are that ability to understand the items, and willingness to disclose information, can affect response accuracy and thus questionnaire validity.

In the study the most common self-report questionnaires for measuring medication adherence were described, what is the basis for interventions to improve medication adherence.

Among the already well-known scales, the new one is inaugurated in Croatia: Culig adherence scale, applied in some investigations in Zagreb, Croatia.

The aim was to evaluate literature describing medication adherence surveys/scales to gauge patient behaviors at the point of care.

## Materials and Methods

A computerized systematic search of the PubMed databases identified articles on self-report scales for medication adherence measuring using the MeSH terms: medication adherence, compliance, and persistence combined with the terms questionnaire self-report. Self-report adherence scales are identified mostly in the last few years (2005–2012). One of the main sources was an article[3] which evaluated literature describing medication adherence surveys/scales to gauge patient behaviors at the point of care.

Articles were included if they evaluated or reviewed self-reported adherence medication scale applicable at chronic diseases and with good coefficient of internal consistency reliability (Cronbach's $\alpha$ (alpha)).

A total of about one hundred articles was identified. Of the articles, 20% (20 of 100) were included in the commentary because of their relevance to the article topic. This article describes various self-report scales by which to monitor medication adherence, their advantages and disadvantages, and discusses the effectiveness of their application at different chronic diseases.

## Results

### 1. Medication Adherence Questionnaire (MAQ)

The best known and most widely used scales for research adherence is the Medication Adherence Questionnaire (MAQ) by Morisky et al.[4] (Figure 1), which has several

| You indicated that you are taking medication for your (identify health concern, such as "high blood pressure"). Individuals have identified several issues regarding their medication-taking behavior and we are interested in your experiences. There is no right or wrong answer. Please answer each question based on your personal experience with your [health concern] medication. Interviewers may self identify regarding difficulties they may experience concerning medication-taking behavior. | | |
|---|---|---|
| | **(Please circle the correct number)** | |
| | **No=0** | **Yes=1** |
| 1. Do you sometimes forget to take your [health concern] pills? | | |
| 2. People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your [health concern] medicine? | | |
| 3. Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it? | | |
| 4. When you travel or leave home, do you sometimes forget to bring along your [health concern] medication? | | |
| 5. Did you take your [health concern] medicine yesterday? | | |
| 6. When you feel like your [health concern] is under control, do you sometimes stop taking your medicine? | | |
| 7. Taking medication everyday is a real inconvenience for some people. Do you ever feel hassled about sticking to your blood pressure treatment plan? | | |

8. How often do you have difficulty remembering to take all your medications? (**Please circle the correct number**)

    Never/Rarely……………………………………**0**

    Once in a while…………………………………**1**

    Sometimes………………………………….....**2**

    Usually…………………………………………**3**

    All the time……………………………………**4**

Source: Morisky DE, Ang A, Krousel-Wood M, Ward H. Predictive Validity of a Medication Adherence Measure for Hypertension Control. *Journal of Clinical Hypertension* 2008; 10(5):348-354.

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*Fig. 1. MAQ (Medication Adherence Questionnaire)*

advantages: identifies barriers to nonadherence, it is the shortest, easiest to score and very adaptable for various groups of medication. MAQ identifies barriers to nonadherence but not self-efficacy. Adherence to the medical regimen continues to rank as a major clinical problem in the management of patients with essential hypertension, as in other conditions treated with drugs and lifestyle modification. This article reviews the psychometric properties and tests the concurrent and predictive validity of a structured four-item self-reported adherence measure (alpha reliability=0.61), which can be easily integrated into the medical visit. Items in the scale address barriers to medication-taking and permit the health care provider to reinforce positive adherence behaviors. Another study assessed the factor structure and validity of the MAQ with cigarette smokers[5]. A principal component analysis was conducted on MAQ scores from a sample of smokers present for treatment in a clinical trial of naltrexone and the nicotine patch for smoking cessation. The purposeful nonadherence factor of the MAQ may be used as a brief screening tool for medication adherence with cigarette smokers seeking treatment. Information obtained with this questionnaire could be used to counsel patients regarding the importance of medication adherence.

The usefulness of the Patient Medication Adherence Questionnaire (PMAQ) was evaluated in HIV-infected patients on protease inhibitor (PI)-containing regimens[6]. Adherence to antiretroviral medications is critically important for the success of therapy in patients treated for HIV infection. Patients' psychological and behavioral factors are central in the acceptance and adherence to antiretroviral therapy. To improve the feasibility and the reproducibility of the PMAQ, the authors propose a revised form of the PMAQ, focusing on the variables identified as strong predictors of adherence.

## 2. Self-efficacy for Appropriate Medication Use (SEAMS)

The Self-efficacy for Appropriate Medication Use (SEAMS) was developed by a multidisciplinary team with expertise in medication adherence and health literacy. Its psychometric properties were evaluated among 436 patients with coronary heart disease and other comorbid conditions[7]. Reliability was evaluated by measuring internal consistency and test-retest reliability. The final 13-item scale had good internal consistency reliability (Cronbach's alpha=0.89). The SEAMS is a reliable and valid instrument that may provide a valuable assessment of medication self-efficacy in chronic disease management, and appears appropriate for use in patients with low literacy skills.

Because of poor adherence to oral osteoporosis medications, SEAMS was applied on five hundred women aged 55 years and older who were newly prescribed daily or weekly oral bisphosphonates, were randomly selected from Kaiser Permanente Southern California, a large integrated health care delivery system, and mailed a self-administered survey that included, among others, and

SEAMS[8]. Internal consistency reliability was evaluated using Cronbach's alpha (0.82).

## 3. Brief Medication Questionnaire (BMQ)

Brief Medication Questionnaire (BMQ) is a self-report tool for screening adherence and barriers to adherence. It has three main question headings and multiple sub-questions (Figure 2)[9,10]. The tool includes:

– a 5-item Regimen Screen that asks the patients about their medications that they were currently taking. Questions are asked to list the name of each medication, frequency of medication per day, number of days and times they have received each medication along with the number of times the patient missed taking medications in the past week,

– a 2-item Belief Screen consists of two questions that ask the patients whether they had any difficulty with any of the medications, and does the medication bother them in any way,

– a 2-item Recall Screen assesses the patient's difficulty in recalling and remembering the dosage regimen of their medications, and

– a 2-item Access screen that evaluates the patient difficulty in buying and refilling their medications in time.

Patient Name: _____    Patient Study ID __ __ __ __

**Brief Medication Questionnaire 1 (BMQ 1)**

This form asks about the medications you currently take for high blood pressure. Please include any medication that you might be taking for high blood pressure, including water pills.

1. Did you bring your medications with you today?

    1 ☐ No        2 ☐ Yes

2. How many medications do you currently take for high blood pressure?

    ___ medication(s)

3. What medication(s) do you currently take for high blood pressure?

| Medication name(s) or description | Leave blank |
|---|---|
| Drug A: | |
| Drug B: | |
| Drug C: | |
| Drug D: | |

4. Did you STOP taking any blood pressure medication in the past six months?

    1 ☐ Yes        2 ☐ No (Skip to next page)

5. What blood pressure medication was stopped? For what reason was it stopped?

    a. Medication Stopped        b. Reason stopped

1._____    _____

2._____    _____

1

*Fig. 2. Brief Medication Questionnaire (BMQ)*

This method was applied in the cross-sectional study of hypertensive people enrolled at least six months in the program to assist hypertensive and diabetic individuals, provided in Brazil[11].

The analysis of BMQ in this study showed that the regimen screen performed better than the other screens and the Medication Adherence Questionnaire (MAQ) for the identification of low adherence among people with uncontrolled hypertension. This finding is similar to the original study performed in the USA, which used a more reliable gold standard medication event monitoring systems (MEMS) than the insufficient acquisition of medications and uncontrolled blood pressure, although it was obtained in a smaller sample of patients (43 *vs.* 206).

On the BMQ regimen screen, the authors found 48.1% of patients with low adherence. The clinical profile of these patients (higher blood pressure, greater prevalence of CRI and worse self-perceived health) is insufficient to identify low adherence; therefore a more objective method to evaluate adherence is needed, potentially using the BMQ regimen screen which was strongly associated with control of blood pressure. From the point of view of program planning in public health, such evaluation can indicate which patients should receive educational reinforcement, pharmaceutical support and multidisciplinary care and which require adjustment of therapeutic regimens.

Evaluation of adherence may help clinicians discriminate between inadequate use of medication and insufficient treatment regimen.

## 4. The Hill-Bone Compliance Scale

The Hill-Bone Compliance Scale addresses barriers and self-efficacy but are limited in their generalizability.

The Hill-Bone Compliance Scale focuses on hypertensive patients. This scale assesses patient behaviors for three important behavioral domains of high blood pressure treatment: 1) reduced sodium intake; 2) appointment keeping; and 3) medication taking. This scale is comprised of 14 items in three subscales. Each item is a four point Likert type scale (Table 1). The content validity of the scale was assessed by a relevant literature review and an expert panel, which focused on cultural sensitivity and appropriateness of the instrument for low literacy[12].

This scale was validated in most investigations, among others for use in a South African primary health care setting[13], because hypertension is prevalent, under-diagnosed, and inadequately treated in Black South Africans. The authors demonstrated criterion validity and internal consistency for a modified Hill-Bone. Results compare favorably with those from an urban African-American setting (standardized Cronbach alpha was 0.74–0.84). This study demonstrates that many of the behavioral aspects of the fundamental elements of high blood pressure care and control, such as the medication taking, appointment keeping, and salt intake reduction, are measurable across cultures. Second, the study showed that vigorous psychometric methods can be used effectively in different cultural groups. Third, the study demonstrates that both concurrent and predictive validity can be assessed quickly in a clinical setting. In cases of insufficiently controlled blood pressure, it is important for practitioners to distinguish between »nonadherence« and »nonresponse« to antihypertensive drug treatment[14]. A reliable and valid adherence measurement based on the patient's self-report may be helpful in daily practice. In a primary care sample with 353 hypertensive patients, the authors applied two self-rating instruments to assess medication adherence

**TABLE 1**
HILL-BONE COMPLIANCE SCALE

| HILL-BONE HIGH BLOOD PRESSURE COMPLIANCE SCALE | | | | | | |
|---|---|---|---|---|---|---|
| (NA=not applicable / DK=don't know) | None of the time | Some of the time | Most of the time | All the time | NA | DK |
| 1. How often do you forget to take your HBP medicine? | 1 | 2 | 3 | 4 | 8 | 9 |
| 2. How often do you decide not to take your HBP medicine? | 1 | 2 | 3 | 4 | 8 | 9 |
| 3. How often do you eat salty food? | 1 | 2 | 3 | 4 | 8 | 9 |
| 4. How often do you shake salt, fondor, or aromat on your food before you eat it? | 1 | 2 | 3 | 4 | 8 | 9 |
| 5. How often do you eat fast food? (KFC, McDonalds, fat cook, fish and chips) | 1 | 2 | 3 | 4 | 8 | 9 |
| 6. How often do you get the next appointment before you leave the clinic? | 1 | 2 | 3 | 4 | 8 | 9 |
| 7. How often do you miss scheduled appointments? | 1 | 2 | 3 | 4 | 8 | 9 |
| 8. How often do you leave the dispensary without obtaining your prescribed pills? (due to long line, closure of the clinic, forgot) | 1 | 2 | 3 | 4 | 8 | 9 |
| 9. How often do you run out of HBP pills? | 1 | 2 | 3 | 4 | 8 | 9 |
| 10. How often do you skip your HBP medicine 1–3 days before you go to the clinic? | 1 | 2 | 3 | 4 | 8 | 9 |
| 11. How often do you miss taking your HBP pills when you feel better? | 1 | 2 | 3 | 4 | 8 | 9 |
| 12. How often do you miss taking your HBP pills when you feel sick? | 1 | 2 | 3 | 4 | 8 | 9 |
| 13. How often do you take someone else's HBP pills? | 1 | 2 | 3 | 4 | 8 | 9 |
| 14. How often do you miss taking your HBP pills when you care less? | 1 | 2 | 3 | 4 | 8 | 9 |

(the »Hill-Bone Compliance to High Blood Pressure Therapy Scale« and Morisky's »Self-Reported Measure of Medication Adherence«) and comparing their psychometric properties. The use of both scales cannot be recommended. They showed considerable floor effects, and their ability to identify medication adherence was inconsistent for nearly every third patient. The power of both scales to predict uncontrolled blood pressure was essentially a chance. The underlying conceptual framework of medication adherence therefore needs to be rethought.

Turkish version of the Hill-Bone Compliance Scale to high blood pressure therapy scale was used to assess the validity and reliability for use in primary care in Turkey[15]. The Turkish Hill-Bone scale presented a factor structure consistent with the original scale, had a high level of internal consistency. It can be used for assessing hypertension patients' compliance with Turkish primary care settings.

Another objective of the study was to determine the reliability of the Hill-Bone Compliance Scale among elderly hypertensive patients[16]. Reliable approaches for measuring antihypertensive medication compliance in the outpatient setting are not readily available. The authors conducted a cross-sectional survey of community-dwelling patients attending the hypertension section of the Internal Medicine Clinic in a large multispecialty group practice. Participants (N=239) completed a self-administered questionnaire consisting of demographic questions and the Hill-Bone Compliance to High Blood Pressure Therapy Scale, which includes a nine-item medication compliance subscale. The medication compliance subscale of the Hill-Bone Compliance Scale appears reliable and may be a useful tool for detecting noncompliant patients in outpatient settings.

## 5. The Medication Adherence Rating Scale (MARS)

Adherence to medication is an important predictor of illness course and outcome in psychosis. The Medication Adherence Rating Scale (MARS) was developed from Morisky et al's Medication Adherence Questionnaire (MAQ), is a ten-item self-report measure of medication adherence in psychosis (Table 2)[17]. To summarize, the MARS is a quick, non-intrusive measure of medication adherence. Its reliability is adequate, but validity appears only moderate-weak. Items in the MARS about attitude to medication may be informative to clinicians identifying barriers to adherence in individual cases, but do not appear to be valuable in predicting adherence behavior over a large sample. Factor 1 (medication adherence behavior), corresponding to the Medication Adherence Questionnaire (MAQ), may be superior for this purpose. The MARS total score reproduced the expected relationships of higher adherence with more insight into the need for medication, and higher adherence with less psychopathology.

The internal consistency of the MARS was moderate (alpha=0.60), but lower than the value produced by Thompson et al.[18] during the original development of the scale (alpha=0.75). This may not represent a weakness

| Nr | Claim or question | Compliant |
|---|---|---|
| 1 | Do you ever forget to take your medication? | No |
| 2 | Are you careless at times at taking medication? | No |
| 3 | When you feel better do you sometimes stop taking your medication? | No |
| 4 | Sometimes if you feel worse when you take the medication do you stop taking it? | No |
| 5 | I take my medication only when I am sick | No |
| 6 | It is unnatural for my mind and body to be controlled by medication | No |
| 7 | My thoughts are clearer on medication | Yes |
| 8 | By staying on medication, I can prevent getting sick | Yes |
| 9 | I feel weird, like a zombie, on medication | No |
| 10 | The medication makes me feel tired and sluggish | No |

Compliant='No' response for q1–6, 9–10 'Yes' response for q7,8.

of the scale, however, as there are reasons to expect a reduced alpha value for scales with the format of the MARS, notably the binary response choice, a small number of items, and scale multidimensionality. Though it is likely that the internal consistency of the MARS could be improved either by adding more response options or by adding more items, it is debatable whether this would constitute an improvement to the measure, or whether it would compromise its quick, simple format.

In addition to replicating the three factors of the MARS, the current study examined the relationships of the individual factor scores. Factor 1 (adherence behavior) was the only factor total score to correlate with keyworker-rated medication adherence. This factor correlation was of equal strength to the whole scale correlation. It therefore appears that where the concern is simply whether or not someone is taking their medication, factor 1 may be a better indicator than the whole MARS scale. This four item subscale is quicker to administer, has a higher internal consistency than the overall scale, and appears valid for this purpose. Factor 2 total score (attitude towards medication) correlated with insight into illness and insight into the effects of medication but failed to correlate with keyworker rated adherence. The current study[16] has a number of limitations. A single item keyworker rating for medication adherence was used to determine the concurrent validity of the MARS. Although the proportions of participants rated as being adherent (69%) or not adherent (31%) to their medication regimen using this method was in line with previous estimates[19,20,21] a multi-item measure would have been preferable. The sample was mixed, containing both inpatients and outpatients, and it is possible that the inaccuracy was introduced due to retrospective completion among inpatients. The results do not identify an effect of the inpatient completion of the measure, but placing this extra memory demand on questionnaire completion, especially among a group who may have cognitive deficits,

was not ideal. An all-outpatient sample would have been preferable to eliminate this problem. Furthermore, all participants had consented to a treatment trial, so may not be fully representative of those with psychosis. In particular, they are likely to be a better engaged group.

## 6. Adherence to Refills and Medications Scale (ARMS)

The Adherence to Refills and Medications scale (ARMS) was developed, pilot tested, and administered to 435 patients with coronary heart disease in an inner-city primary care clinic[22]. Psychometric evaluation performed overall and by literacy level, included an assessment of internal consistency, test-retest reliability, and factor analysis. Criterion-related validity was evaluated by comparing scores with Morisky's self-reported measure of adherence, medication refill adherence, and blood pressure measurements. Lexile analysis was performed to assess the reading difficulty of the instrument.

The final 12-item scale had high internal consistency overall (Cronbach's alpha=0.814) and among patients with inadequate (alpha=0.792) or marginal/adequate literacy skills (alpha=0.828) (Table 3). Factor analysis yielded two subscales, which pertained to taking medica-

**TABLE 3**
ADHERENCE TO REFILLS AND MEDICATION SCALE

1. How often do you miss scheduled appointments?
2. How often do you forget to take your medicine?
3. How often do you decide not to take your medicine?
4. How often do you forget to get prescriptions filled?
5. How often do you run out of medicine?
6. How often do you skip a dose of your medicine before you go to the doctor?
7. How often do you miss taking your medicine when you feel better?
8. How often do you miss taking your medicine when you feel sick?
9. How often do you take someone else's medicine?
10. How often do you miss taking your medicine when you are careless?
11. How often do you change the dose of your medicines to suit your needs (like when you take a more or less pill than you're supposed to)?
12. How often do you forget to take your medicine when you are supposed to take it more than once a day?
13. How often do you put off refilling your medicines because they cost too much money?
14. How often do you plan ahead and refill your medicines before they run out?

**TABLE 4**
ADHERENCE SCALE CULIG

| Cause of nonadherence | Never | Very rare (1–2 yearly) | Sometimes (3–5 yearly) | Often (more than 5 yearly) |
|---|---|---|---|---|
| 1 I was not at home | 0 | 1 | 2 | 3 |
| 2 The drug was not available due to short supply | 0 | 1 | 2 | 3 |
| 3 I just forgot | 0 | 1 | 2 | 3 |
| 4 I take a number of drugs several times a day | 0 | 1 | 2 | 3 |
| 5 I wanted to avoid side effects | 0 | 1 | 2 | 3 |
| 6 I did not want other people seeing me taking drug | 0 | 1 | 2 | 3 |
| 7 My doctor frequently changes my therapy | 0 | 1 | 2 | 3 |
| 8 I felt the drug to be toxic/harmful | 0 | 1 | 2 | 3 |
| 9 I was sleepy at medication time | 0 | 1 | 2 | 3 |
| 10 I had cold | 0 | 1 | 2 | 3 |
| 11 I felt depressed or broken | 0 | 1 | 2 | 3 |
| 12 I had problems with medication timing | 0 | 1 | 2 | 3 |
| 13 I consumed all of it | 0 | 1 | 2 | 3 |
| 14 I felt well | 0 | 1 | 2 | 3 |
| 15 I was afraid of developing drug dependence | 0 | 1 | 2 | 3 |
| 16 The drug was too expensive | 0 | 1 | 2 | 3 |

tions as prescribed and refilling medications on schedule. The ARMS correlated significantly with the Morisky adherence scale (Spearman's rho=−0.651, p<0.01), and it correlated more strongly with measures of refill adherence than did the Morisky scale. Patients with low ARMS scores (which indicated better adherence) were significantly more likely to have controlled diastolic blood pressure (p<0.05), and tended to have better systolic blood pressure control. Lexile analysis demonstrated that the instrument had a favorable reading difficulty level below the eight grades. The ARMS is a valid and reliable medication adherence scale when used in a chronic disease population, with good performance characteristics even among low-literacy patients.

## 7. Scale for measurement adherence to medication applied in Zagreb, Croatia

This scale was applied in the study that was designed as a cross-sectional survey by use of a self-administered 33-item questionnaire[23]. The questionnaire listed 16 common reasons for nonadherence and study subjects had to answer questions on each of these reasons as the possible cause of his/her nonadherence (Table 4). This final 16--item scale had good internal consistency reliability (Cronbach's alpha=0.89)[24]. These answers were used to analyze the impact of each of these reasons for nonadherence.

The study included 635 individuals collecting or buying drugs for the treatment of chronic diseases, with special reference to subjects taking antihypertensive agents (N=361). The survey was conducted at Zagreb (Croatia) pharmacies and the questionnaire was filled out by study subjects with instructions and help provided by the pharmacist as questionnaire administrator.

According to medication adherence, study subjects were divided into two groups of adherent and nonadherent subjects, as declared by themselves. The subjects answering the respective question that they had never failed to take their medication on time were considered as adherent, and all others as nonadherent subjects.

In Table 5 are the references of scales for measuring adherence, in Table 6 scales are systematized according to disease suitable for measuring adherence at certain diseases and in Table 7 are Cronbach α, coefficient commonly used as a measure of the internal consistency reliability of an adherence measurement scale. The mostly scales have good internal consistency reliability, because some professionals as a rule of thumb require a reliability of 0.70 or higher[25].

**TABLE 6**
SCALES SUITABLE FOR MEASURING ADHERENCE AT CERTAIN DISEASES

| No | Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----|-------|---|---|---|---|---|---|---|---|
| 1. | Morisky-Green | | + | | | | + | | + |
| 2. | SEAMS | + | | + | | | | + | |
| 3. | BMQ | | + | | + | | + | | |
| 4. | Hill-Bone | | + | | | | | | |
| 5. | MARS | | | | | + | | | |
| 6. | ARMS | + | | | | | | | |
| 7. | Culig | + | + | | | | | | |

1 – Chronic disease, 2 – Arterial hypertension, 3 – Coronary heart disease, 4 – Diabetes, 5 – Psychosis, 6 – AIDS/HIV, 7 – Osteoporosis, 8 – Smoking cessation

**TABLE 5**
REFERENCES OF SCALES FOR MEASURING ADHERENCE

| No | Scale | Literature (only first author) | Reference No. |
|----|-------|-------------------------------|---------------|
| 1. | Morisky-Green | Morisky-Green | 3 |
| | | Toll BA, McKee SA | 4 |
| | | Duong M, Piroth L | 5 |
| 2. | SEAMS | Risser | 6 |
| | | Reynolds | 7 |
| 3. | BMQ | Svarstad | 8 |
| | | Mini | 9 |
| | | Ben | 10 |
| 4. | Hill-Bone | Kim | 11 |
| | | Lambert | 12 |
| | | Koschack | 13 |
| | | Karademir | 14 |
| | | Krousel-Wood | 15 |
| 5. | MARS | Fialko | 16 |
| | | Thompson | 17 |
| 6. | ARMS | Kripalani | 21 |
| 7. | Culig | Culig | 22 |

**TABLE 7**
CRONBACH α AT SOME ARTICLES REGARDING TO ADHERENCE MEASURING

| No | Scale | Literature | Cronbach α |
|----|-------|-----------|-----------|
| 1. | Morisky-Green | Morisky-Green | 0.61 |
| | | Toll BA, McKee SA | – |
| | | Duong M, Piroth L | – |
| 2. | SEAMS | Risser | 0.89 |
| | | Reynolds | 0.82 |
| 3. | BMQ | Svarstad | – |
| | | Mini | – |
| | | Ben | 0.66 |
| 4. | Hill-Bone | Kim | 0.84 |
| | | Lambert | 0.79 |
| | | Koschack | 0.25 & 0.73 |
| | | Karademir | 0.72 |
| | | Krousel-Wood | – |
| 5. | MARS | Fialko | 0.60 |
| | | Thompson | 0.75 |
| 6. | ARMS | Kripalani | 0.81 |
| 7. | Culig | Culig | 0.89 |

## Conclusions

There are many self-report scales for measuring medication adherence and their derivatives (or subscales). Due to the different nature of the diseases, there is no gold-standard scale for measuring medication adherence. It can be nevertheless concluded that the most frequently used is a Medication Adherence Questionnaire (MAQ) scale by Morisky et al.[4], but we found a better internal consistency reliability in some other scales.

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## OD MORISKY DO HILL-BONE; RAZLIČITE SKALE ZA MJERENJE USTRAJNOSATI PREMA TERAPIJI

**SAŽETAK**

Postoji niz načina kojima se utvrđuje ustrajnost pacijenata prema terapiji. Naročito su pogodna ispitivanja koja se svode na iskazivanje samih pacijenata s obzirom da su jeftina i neposredna, a ujedno dolazimo do stavova pacijenata o uzimanju lijekova. Ograničenja takvih istraživanja su moguća nedovoljna razumljivost pitanja od strane pacijenata te nepovjerenje i strah pacijenata vezanih uz objavljivanja podataka o uzimanju lijekova. Pretraživanjem PubMeda uz ključne riječi adherence, compliance i persistence (ustrajnost) te self-report questionnaire došlo se do svih do sada poznatih skala za mjerenje ustrajnosti. Većina skala je dizajnirana u zadnjih nekoliko godina (2005–2012). Jedan od najznačajnijih izvora je članak Lavse i dr. u kojem se opisuju i evaluiraju skale za ocjenjivanje ustrajnosti. Kriterij uključenja bio je mogućnost primjene kod utvrđivanja ustrajnosti u kroničnih bolesti i relativno visoki koeficijent unutarnje konzistentnosti (Cronbach α). Pregledano je oko stotinjak članaka i 205 je uključeno u ovaj prikaz. U članku se prikazuju pojedine skale zajedno sa svojim prednostima i nedostacima te se raspravlja o mogućnostima identifikacije uzroka neustrajnosti kod pojedinih kroničnih bolesti. Iako postoji niz različitih skala, još uvijek se ne može govoriti o zlatnom standardu, iako je tome najbliža medication Adherence Questionnaire (MAQ) skala nazvana još i, prema svom autoru, Morisky skala.