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REVIEW

# Medication adherence of diabetes mellitus patients in Indonesia: A systematic review

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## Abstract

**Background:** Diabetes mellitus is a chronic disease that requires long-term drug therapy. Adherence in taking medication increases the potential to obtain the optimum therapeutic target. **Aim:** This systematic review aimed to identify and describe medication adherence of diabetes mellitus patients in Indonesia. **Methods:** A systematic review was carried out on published research articles from three electronic databases (Pubmed, Scopus, and DOAJ). The eligibility criteria were that studies should be cross-sectional designs, and should display the result data of the measurement of medication adherence level of diabetes mellitus patients in Indonesia. A manual search was also carried out using Google Scholar and from the bibliography of the articles found. The risk of bias was assessed using the NIH quality assessment tool for cross-sectional studies. The synthesis of the results was carried out using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart. **Results:** Thirty published research articles were selected. Medication adherence of diabetes mellitus patients in Indonesia had varying levels. It was dominated by the category of low level and non-adherence. The limitations of the evidence used were: small sample size, the majority using only one method to measure adherence, and the validity and reliability tested was only used in a small number of studies. **Conclusion:** This finding showed that non-adherence to medication was still a problem for patients undergoing diabetes mellitus treatment in Indonesia.

## Introduction

Diabetes mellitus is a metabolic disorder characterised by hyperglycemia caused by a disturbance in insulin secretion, insulin resistance, or both. Diabetes mellitus can reduce the patients' quality of life and cause various complications (Alfian *et al.*, 2021). Persistent high blood glucose levels can cause microvascular and macrovascular disease (Beckman & Creager, 2016; Sun *et al.*, 2021).

In 2019, there were 463 million people with diabetes mellitus. By 2045, it is estimated that the number of people with diabetes mellitus worldwide will increase to 700 million (Patty *et al.*, 2021). Indonesia is ranked seventh out of the top ten countries with the most diabetes mellitus sufferers, with 10.7 million people suffering from the disease (IDF, 2019).

Diabetes mellitus is classified as a disease that requires long-term drug therapy. The goal of diabetes mellitus treatment is not to cure but to keep blood glucose levels in the normal range (Marin-Penalver *et al.*, 2016). Forty-five per cent of diabetic patients in the world fail to control blood sugar levels within the targeted limit. One of the main factors that inhibit blood sugar level control in diabetes mellitus patients is non-adherence to taking medication (Polonsky & Henry, 2016; Andanalusia *et al.*, 2019).

The proportion of diabetes mellitus patients that do not adhere to taking medication ranges from 25 to 91% globally (Khunti *et al.*, 2017). Adherence in taking medication plays a vital role in achieving optimal therapeutic outcomes. Medication adherence has a significant correlation with blood glucose level and can maximise the effectiveness of drug therapy (Lin *et al.*,

2017; Mosen et al., 2017; Giugliano et al., 2018; Patel et al., 2019).

Many studies have been conducted to examine the prevalence of medication adherence in diabetes mellitus patients in Indonesia. However, to date, a systematic review has never been done. This systematic review presents evidence related to medication adherence in diabetes mellitus patients in Indonesia.

**Method**

The research in this systematic review aimed to determine the description of the prevalence of medication adherence in diabetes mellitus patients in Indonesia.

**Information sources and search strategy**

The literature search was conducted electronically in July 2020. Three databases used were Pubmed, Scopus, and DOAJ. The keywords used were combinations of "diabetes", "medication adherence", "Indonesia," and "diabetes", "adherence", "compliance," and "Indonesia", which were found in the titles or abstracts of articles on the three databases. Searches on electronic databases were complemented by manual searches using Google Scholar and references from the paper found. The literature was limited to articles in English and Indonesian.

**Eligibility criteria**

Articles included in this systematic review must meet the

criteria of primary study using a cross-sectional study design. The sample was patients with diabetes mellitus who had reported the category or level of medication adherence.

**Selection and data collection process**

All search result articles were uploaded to EndNote X9, and duplicated articles were removed. The selection process consisted of three stages. In the first stage, one reviewer screened all titles and abstracts. In the second stage, further screening of articles was done by two reviewers. The third stage was preparing a list of articles to be reviewed, and data extraction was carried out. Extracted data included the sample size, the research setting, the method of measuring medication adherence, and the outcome of the level or category of medication adherence. The study of risk assessment bias was done using the NIH quality assessment tool for observational cohort and cross-sectional studies.

**Results**

The article searches on three databases resulted in 72 titles. The two main reasons for an article to be excluded was either if the study design was not cross-sectional or if the outcome data did not include the category or level of medication adherence. A total of 30 articles were used. Figure 1 shows the Prisma flowchart of this systematic review (Liberati et al., 2009). Table I shows studies meeting inclusion criteria.

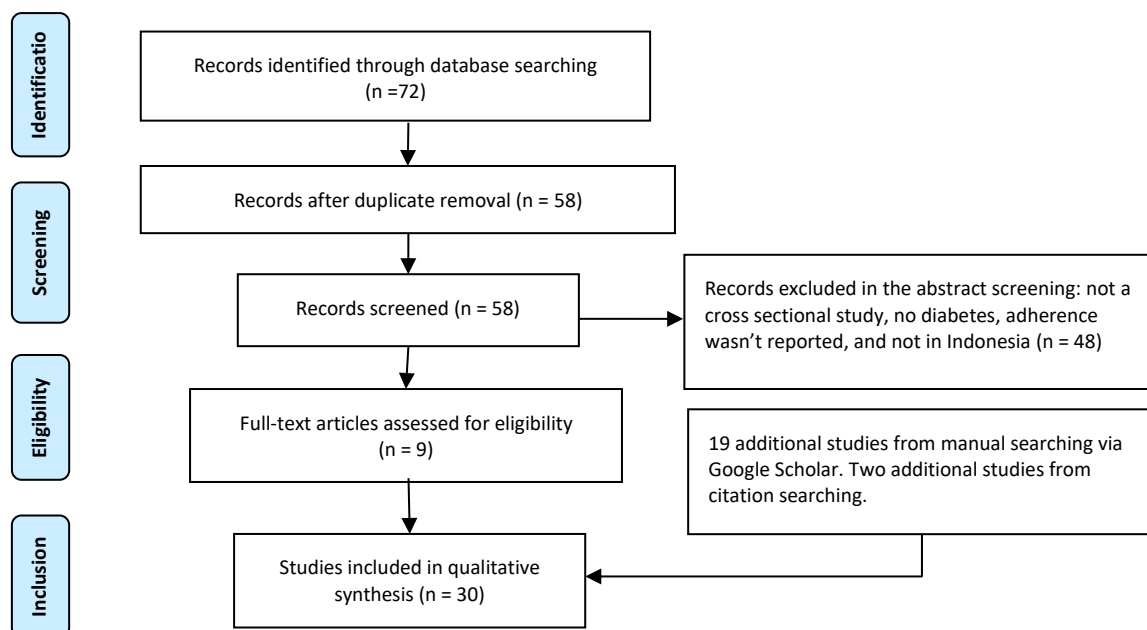


Figure 1: Flow diagram of systematic review

**Table I: Studies meeting the inclusion criteria**

Research years	Samples (n)	Settings	Measurement methods	Adherence findings
Masruroh et al., 2021	48	H	MMAS-8 questionnaire	High (17%), medium (52%), low (31%).
Azyenela et al., 2020	58	PHC	MMAS-8 questionnaire	High (34.5%), medium (29.3%), low (36.1%)
Ramadan et al., 2020	175	PHC	MMAS-8 questionnaire	High (37.1%), medium (40.6%), low (22.3%).
Kartono et al., 2020	140	PHC	MARS questionnaire	High (41.4%), low (58.6%)
Firdiawan, 2020	200	PHC	MARS questionnaire	High (57%), (low 43%)
Mutmainah et al., 2020	200	H	MARS questionnaire	High (72.5%), moderate (23%), low (4.5%)
Aditama et al., 2020	40	PHC	Self-developed questionnaire	Adherence (20%) and non-adherence (80%)
Wulandari et al., 2020	143	PHC	Adherence is represented by HbA1c level	Adherence (25%) and non-Adherence (75%)
Coal, 2019	243	PHC	MMAS-8 questionnaire	High (16.05%), medium (23.05%), low (60.91%)
Achrom & Wima, 2019	143	H	MMAS-8 questionnaire	High (23.78%), medium (39.16%), low (37.06%)
Angraini et al., 2019	67	P	MMAS-8 questionnaire	High (20.9%), medium (29.7%), low (49.4%)
Katadi et al., 2019	179	PHC	MARS questionnaire	High (43%) and low (57%)
Andarmoyo et al., 2019	180	PHC	MMAS-8 questionnaire	Adherence (30.6%) and non-Adherence(69.4%)
Andalusia et al., 2019	60	PHC	ARMS questionnaire	Adherence (8.3%) and non-Adherence (91.7%)
Hastuti et al., 2018	44	PHC	MMAS-8 questionnaire	High (4%), medium (30%), low (66%)
Nazari et al., 2018	40	PHC	MMAS-8 questionnaire	High (50.0%), medium (27.5%), low (22.5%)
Nugraha & Siti, 2018	66	PHC	MMAS-8 questionnaire	High (11%) and medium (89%)
Mocolomban et al., 2018	45	P	MMAS-8 questionnaire	Adherence (37.78%) and non-Adherence (62.22%)
Saraswati et al., 2018	200	PHC	Not mentioned	Adherence (50.9%) and non-Adherence (49.1%)
Adikusuma & Nurul, 2017	40	H	Pill count	Adherence (50%) and non-Adherence (50%)
Alfian et al., 2016	91	H	MMAS-8 questionnaire	High (20.9%), medium (29.7%), low (49.4%).
Sari, 2016	34	PHC	MMAS questionnaire	High (23.53%), medium (20.59%), low 55.88%) MMAS: High (50%), medium (22.9%), low (27.1%)
Srikartika et al., 2016	48	H	MMAS-8 questionnaire and MPR	MPR: Adherence (58.3%) and non-Adherence (41.7%)
Alfian, 2015	110	H	MARS questionnaire	High (18.2%), medium (39.1%), low (42.7%)
Hair et al., 2015	55	PHC	Not mentioned	High (30.9%), medium (47.3%), low (21.8%)
Boyoh et al., 2015	58	H	Not mentioned	Adherence (37.9%) and non-adherence (62.1%)
Wijaya et al., 2015	138	PHC	Pill count	Adherence (45.65%) and non-adherence (54.35%)
Nafi'ah et al., 2015	25	PHC	Interview	Adherence (0%) and non-Adherence (100%)
Rosyida et al., 2015	33	PHC	MMAS-8 questionnaire and p count	MMAS: High (18.2%), medium (24.20%), low (57.6%) Pill count: Adherence (30.3%) and non-Adherence (69.70%).
Salistyaningsih et al., 2011	45	PHC	Not mentioned	Adherence (68.9%) and non-Adherence (31.1%)

H= Hospital, PHC= Public Health Center, P=Pharmacy

**Setting**

Eight studies took place in a hospital setting (1, 6, 10, 20, 21, 23, 24, and 26), 20 studies used a set in a health

care centre (Puskesmas) (2-5, 7-9, 12-17, 19, 22, 25, and 27-30), and as many as two studies took place in pharmacies (11 and 18). The sample size of diabetes

mellitus patients in each study varied and ranged from 25 to 243 patients.

#### **Medication adherence measurement method**

Twenty-four studies stated that they used one method of measuring medication adherence (1-18, 20-22, 24, 27, and 28). Four studies did not mention the technique used for measuring medication adherence (19, 25, 26, and 30). Two studies used a combination of medication adherence measurement methods (23 and 29).

Measuring medication adherence using a questionnaire was found in 22 studies (1-7, 9-18, 21-24, and 29). The MMAS-8 questionnaire was the most widely used in 16 studies (1-3, 9-11, 13, 15-18, 21-24, and 29).

#### **Medication adherence**

Adherence to taking medication is described in terms of the level of adherence (17 studies), namely low, medium, and high, and the category of medication adherence (13 studies), namely adherence and non-adherence. Nine studies showed results dominated by low medication adherence (2, 4, 9, 11, 15, 21, 22, and 24), while nine studies were dominated by non-adherence to taking medication (7, 8, 13, 14, 18, and 26-29).

#### **Discussion**

Medication adherence in patients with diabetes mellitus needs to be evaluated to determine whether modification of the treatment strategy is necessary. The method used the most was a questionnaire; MMAS-8 questionnaires were the most widely used. Although there is no gold standard method to measure medication adherence, several studies suggest using a combination method to ensure the validity of the data obtained (Brown and Bussell, 2011; Lam and Fresco, 2015). Only two studies used a combination of medication adherence measurement methods.

The questionnaire used must be valid and reliable. Of the 19 studies that used the MMAS-8 and MARS questionnaires, only nine stated that it was tested for validity and reliability.

The results showed that the level and category of medication adherence in diabetes mellitus patients varies greatly. The results were dominated by low and non-adherence. Low medication adherence can prevent optimal control of blood glucose levels, increase medical costs, and increase mortality (Alfian, 2015; Patel et al., 2019).

The findings showed that the study was mainly limited to a small study conducted in one institution with small sample size. There were five studies conducted in several public health centres in one city and one study conducted in two hospitals in one province. The sample size used varied from 25 to 243 samples. An adequate sample size is required to estimate the prevalence of the parameter in the population with good precision (Pourhoseingholi et al., 2013). The sampling methods used in the study were also varied, namely total sampling, simple random sampling, purposive sampling, and accidental sampling. Total sampling and simple random sampling are ideal for generalising research results to the population (Polit & Beck, 2010).

The limitation of the systematic review was the limited number of databases used. Efforts were made to overcome this by conducting manual searches using Google Scholar. The limitations of the studies used meant that it was in general difficult to represent diabetes mellitus patients' medication adherence in Indonesia.

#### **Conclusion**

This finding shows that non-adherence to taking medication was still a problem for diabetes mellitus patients in Indonesia. Medication adherence remains an important issue for patients, providers, and key stakeholders in diabetes mellitus healthcare.

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