Review Article

Bibliometric Analysis of Nursing Interventions to Improve Adherence to Treatment among Patients with Tuberculosis

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Abstract

Background: Interest in research on the topic of nursing interventions and medication adherence in tuberculosis (TB) patients has increased. In future research, researchers need information about trends and new things for the topic of nursing intervention research and medication adherence in tuberculosis patients in the future.

Purpose: The purpose of this research is to explore the trend of the number of publications, the trend of the number of citations, the journal with the highest number of publications, network visualisation, overlay visualisation, and

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density visualisation on the topic of nursing interventions and medication adherence in tuberculosis patients through bibliometric analysis.

Research method: Bibliometric analysis was used in this study. The data is identified through the https://app.dimensions.ai/ database, which is then selected using the PRISMA flowchart. Papers are limited to publication in 2018-2023, focusing on the fields of health sciences, nursing, public health, the science of services and health systems, information science, and types of publications are articles. Data were analysed using VOSviewer, and then the analysis results were reviewed by co-occurrence.

Results: A search for publications on nursing interventions to improve medication adherence in TB patients resulted in 60,204 articles. After being filtered through the specified criteria, the number of articles obtained was 3,237. The peak of publications on nursing interventions to improve medication adherence in TB patients occurred in 2018. Meanwhile, the lowest number of publications occurred in 2023. The health sector and other fields such as Human society, Information and computing science, and Psychology carry out research on nursing interventions to improve medication adherence in TB patients. In addition, health trends in nursing interventions to improve medication adherence in TB patients currently focus on using digital technology-based interventions such as mobile health applications, health education, and family support. The density visualisation shows that the topics not widely researched related to nursing interventions to improve medication adherence in TB patients are application, mobile health, health education, family, social support, stigma, and attitude.

Conclusion: The topic of nursing interventions to improve medication adherence in TB patients is a topic that needs to be further developed in various countries. Suggestions for other researchers: please choose a theme included in the visualisation category that has not been widely researched to find novelty for future studies.

Keywords: Bibliometric, nursing intervention, treatment, adherence, tuberculosis, DOTS program

Introduction

Tuberculosis is an infectious disease caused by the Mycobacterium tuberculosis bacillus. WHO reports that the number of diagnosed tuberculosis cases in 2021 globally is 10.6 million. This has increased by around 600,000 cases from 2020, which is estimated to be 10 million cases of TB. Of the 10.6 million cases, 6.4 million people have been reported and are undergoing treatment, and another 4.2 million people have not been found/diagnosed and reported (WHO, 2022). Indonesia is in the second position with the highest number of TB sufferers in the world after India. It is estimated that there are as many as 969,000 cases of TB in Indonesia; this figure has increased by 17% from 2020, namely 824,000 cases (WHO, 2022).

An increase in tuberculosis cases impacts reducing quality and threatening the welfare of people in a country (Girsang, 2023). The treatment success rate of all cases treated and reported in 2021 is 85.9%; this shows that the treatment success rate has not reached the national target (90%) (Ministry of Health, 2021). The number of loss to follow-up patients in Indonesia is 6.9%; this shows that there are still patients who have not started treatment or whose treatment has stopped for two consecutive months or more (Ministry of Health, 2021). The low level of adherence is a major contributor to treatment failure or loss of follow-up (Aruan et al., 2018). To overcome this, effective interventions are needed to increase adherence and completion of TB treatment.

There are five DOTS program interventions, one of which is TB treatment. According to WHO, TB treatment is a six to eight-month treatment regimen. Other supporting interventions can come from health workers. Health workers play an important role in encouraging good self-management behaviour in sufferers, for example, by reminding TB patients to adhere to taking medication (Minggarwati et al., 2023).

Trends in nursing interventions and medication adherence can be observed by searching data on Google Trends by typing the keywords Nursing intervention and Medication Adherence. However, these data only describe interest in nursing interventions and medication adherence in general. Researchers need more specific information, for example, scientific publications in the form of scientific articles and scientific seminar proceedings on the topic of nursing interventions to improve medication adherence in TB patients. So, the method used to see phenomena from year to year is using a search engine, which can facilitate the search for these trends by using the bibliometric analysis method.

Bibliometric analysis is a systematic review method that identifies research trends and current issues from previous publications in describing a particular area of research (Nandiyanto et al., 2023). There is no bibliometric analysis of nursing interventions to improve medication adherence in TB patients to identify trends and novelties. So, this research was conducted to answer the following questions:

Q1: How many publications are on the topic of nursing interventions to improve medication adherence in TB patients?

Q2: How many citations are there on the topic of nursing interventions to improve medication adherence in TB patients?

Q3: What is the most common list of journals discussing nursing interventions to improve medication adherence in TB patients?

Q4: What about network visualisation on the topic of nursing interventions to improve medication adherence in TB patients?

Q5: How about an overlay visualisation on the topic of nursing interventions to improve medication adherence in TB patients?

Q6: What about density visualisation on the topic of nursing interventions to improve medication adherence in TB patients?

Objective

The purpose of this research is to explore the trend of the number of publications, the trend of the number of citations, the journal with the highest number of publications, network visualisation, overlay visualisation, and density visualisation on the topic of nursing interventions and medication adherence in tuberculosis patients through bibliometric analysis.

Methodology

Research design

This study uses bibliometric analysis, which can provide a process of compiling an idea in the mind to describe, represent, symbolise, and present something in a way, either visually, verbally, or kinesthetically between publications and identify research trends in a field (Goksu, 2021).

Data source

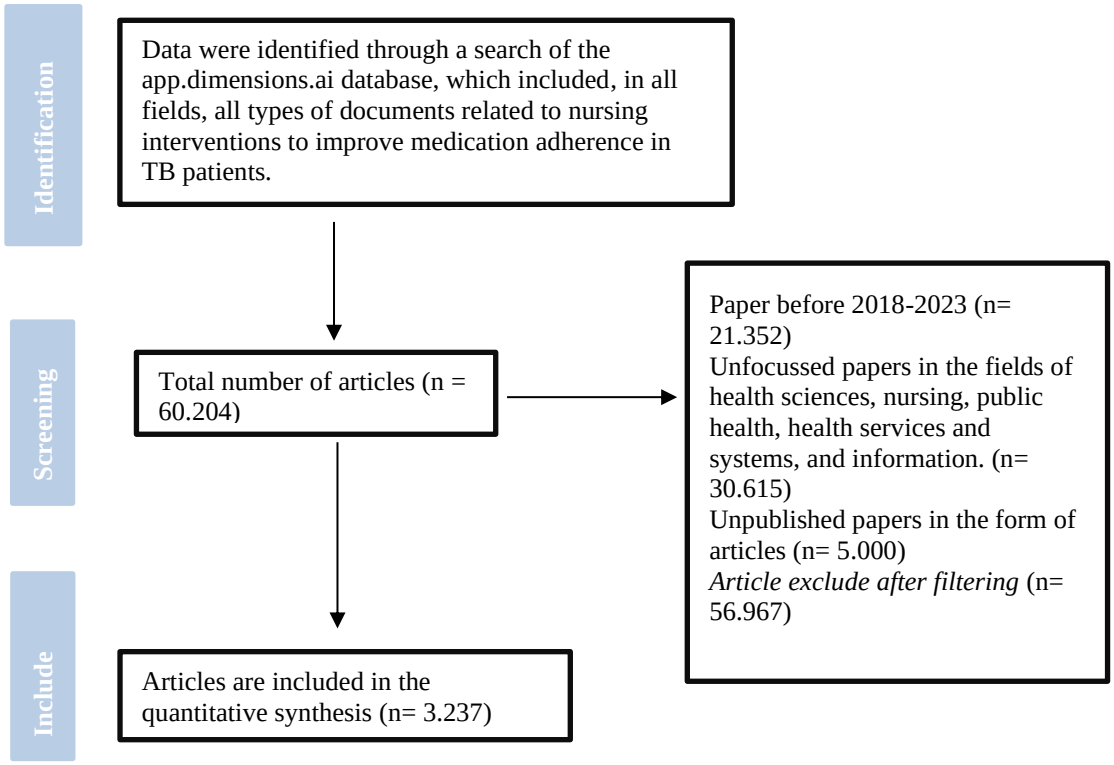
The data source used is based on online searches via https://app.dimensions.ai/. Data were collected on 6 June 2023 by a literature search using the steps following the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA).

Article Inclusion Criteria

Publications ranging from 2018–2023. Focus on the fields of health sciences, nursing, public health, health services and systems, and information. The type of publication is an article.

Selecting Data

PRISMA's stages include identification, screening, and inclusion. Stage 1, namely Identification, from the search results on https://app.dimensions.ai/, the results obtained were 60,204 articles, including the keywords Nursing Intervention AND Improving Medication Adherence AND Tuberculosis Patient. In stage 2 of screening, each search term was selected in the column, resulting in 56,967 articles being issued. At stage 3, the final sample yields 3,237 articles. The process details are as shown in Scheme 3.1.



Skema 1. PRISMA Flowchart (Page et al., 2021)

Data analysis

Data were analysed using VOSviewer. Vosviewer is used to analyse bibliometrics, find the most widely used references in certain disciplines, look for research topics that can be researched, and much more. The chosen type of analysis is to create a map based on text data. In this study, analyses were reviewed by co-occurrence.

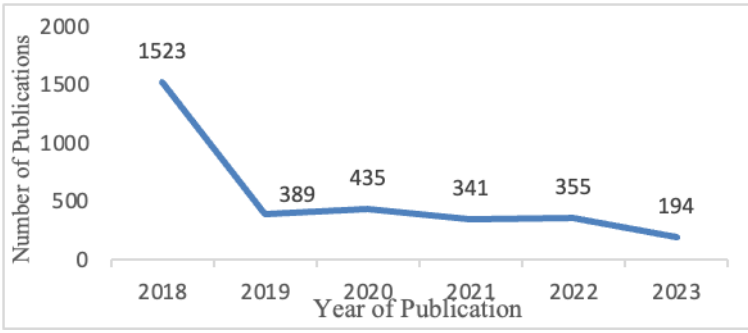
Co-occurrence Procedure

The co-occurrence analysis procedure goes through the following stages: The data source is selected, and the data is read from the reference manager file. Select the fields from which the terms will be extracted, namely the title and abstract fields. The

calculation method is selected as full calculation. The threshold selected for the minimum number of occurrences of a term is 10. The number of terms selected is 9.

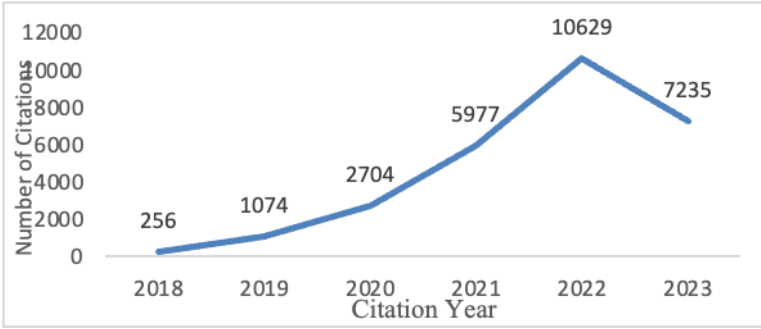
Results

Number of publications on nursing interventions to improve medication adherence in TB patients



Graph 1. Number of publications on nursing interventions to improve medication adherence in TB patients from 2018 to 2023 (n = 3,237) (source: https://app.dimensions.ai/)

Number of citations of nursing interventions to improve medication adherence in TB patients



Graph 2. Number of citations of nursing interventions to improve medication adherence in TB patients from 2018 to 2023 (n = 27,875) (source: https://app.dimensions.ai/)

List of most journals that discuss the topic of nursing interventions to improve medication

adherence in TB patients

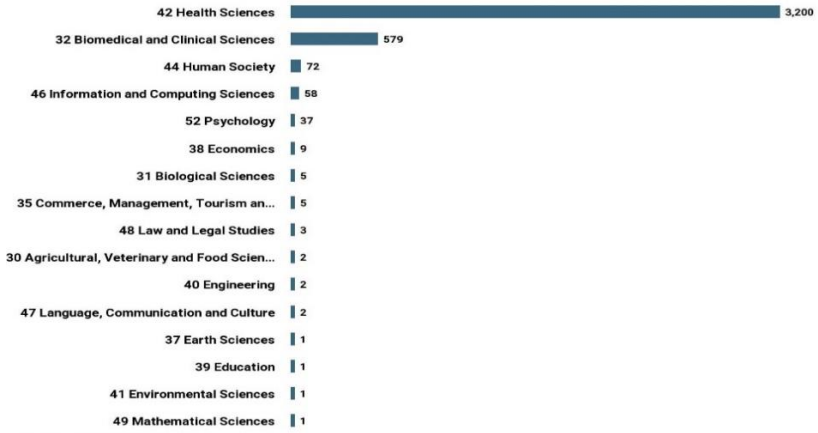


Figure 1. The number of publications based on the most journal categories that discuss the topic of nursing interventions to improve medication adherence in TB patients (source: https://app.dimensions.ai/).

Network visualisation of the topic of nursing interventions to improve medication adherence in TB patients

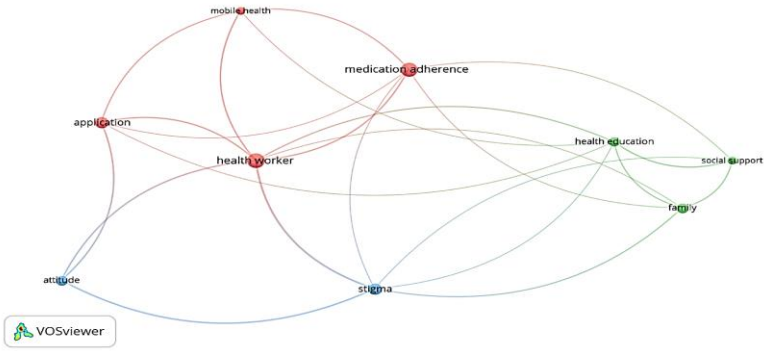


Figure 2. Network visualisation of the topic of nursing interventions to improve medication adherence in TB patients (Source: VosViewer)

Overlay visualisation of the topic of nursing interventions to improve medication adherence in TB patients

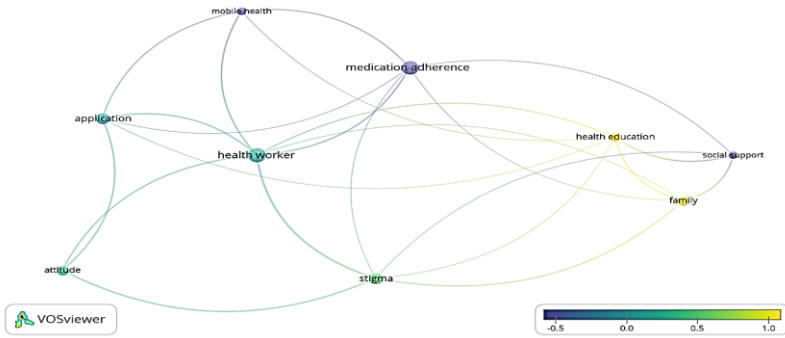


Figure 3. Overlay visualisation of the topic of nursing interventions to improve medication adherence in TB patients (Source: VosViewer)

Density visualisation of the topic of nursing interventions to improve medication adherence in TB patients

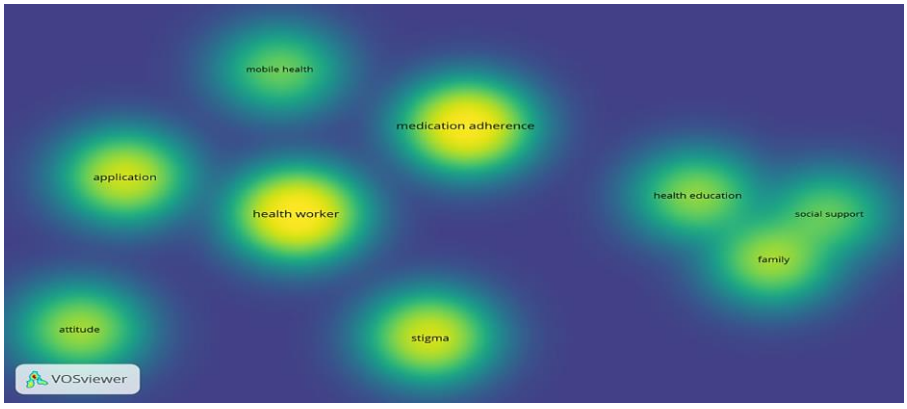


Figure 4. Density visualisation of the topic of nursing interventions to improve medication adherence in TB patients (Source: VosViewer)

Discussion

The highest publication was in 2018, with 1523 articles published. One of the articles published in 2018 was "Impact of Nursing Interventions on Adherence to Treatment with antituberculosis drugs in Children and young people: A Nonrandomized Controlled Trial". The article describes the nursing interventions implemented in all patients, including two educational steps, namely providing written information and providing follow-up phone calls. The results of the study found that treatment adherence increased after the intervention was carried out by nurses (Guix-Comellas et al., 2018).

The highest number of citations related to nursing interventions to increase medication adherence in TB patients is in 2022, with a total of 10,629. One of the most cited articles in 2022 was "Effects of an mHealth Intervention for Pulmonary Tuberculosis Self-management Based on the Integrated Theory of Health Behavior Change: Randomized Controlled Trial." The results of the mHealth intervention were obtained from this article. ITHBC can increase understanding and awareness, thereby increasing compliance (Bao et al., 2022). This analysis is in line with the study of Tukayo et al. (2020), which states that knowledge is very important for sufferers to have because the higher the knowledge, the better the level of compliance.

The number of journals in the field of Health sciences is at the top, with a total of 3,200 articles, and Biomedical and Clinical Sciences totalling 579. Journals in the fields of Human society, Information and computing science, and Psychology are also included in the science that discusses the topic of nursing interventions to increase adherence to taking medication in TB patients.

Human Society

Social contact becomes a risk factor when interactions occur, and sputum splashes are inhaled by healthy people, especially if close contact (Pramono and Wiyadi, 2021). This is in line with the theory, which states that the transmission process of tuberculosis occurs when the patient coughs so that the saliva droplets fly in the air and are inhaled by other people (Purba and Manihuruk, 2023).

Psychology

Tuberculosis affects the physical health and psychological condition of sufferers (Kurniyawan et al., 2022). Psychological distress is a term to describe an unpleasant subjective state of depression and anxiety that has emotional and physiological manifestations that interfere with life activities and result in negative views of the environment, self, and others (Ayana et al., 2019).

Information

The health education program is a strategy designed to increase public knowledge (Ratnasari, 2023). Activities carried out by public health extension workers include providing health education and health promotion (Abebe et al., 2022). This analysis is in line with the research of Efendi et al. (2022), which states that holistic support provided by nurses to patients by providing emotional, intellectual and psychological support can motivate sufferers to increase medication adherence.

There are nine terms divided into three clusters; this shows the distribution of clusters and the strength of published studies. Network visualisation shows the network between visualised terms (Habibi et al., 2022).

Table 4.1 Clusters for the topic of Nursing Intervention to Increase Adherence to Taking Medication in Tuberculosis Patients (source: Vosviewer and https://app.dimensions.ai/)

Clusters	Clusters Color	Number of terms	Clusters member terms
1	Red	4	Application, Health Worker, Medication Adherence, Mobile Health
2	Green	3	Family, Health Education, Social Support
3	Blue	2	Attitude, Stigma

Cluster 1 analysis shows four terms: Application, Health Worker, Medication Adherence, and Mobile Health. The second cluster has three terms: Family, Health Education, and Social Support. The third cluster has two terms, namely attitude and stigma. The following is a discussion of the nine terms:

Application

Health technology information systems continue to develop, so the development of health applications is also needed to optimise health services and management at various levels of health services (RI Ministry of Health, 2021). The Indonesian Ministry of Health's TB sub-directorate, together with the KNCV Indonesia Foundation (YKI), developed two applications, namely SOBAT TB and EMPATI Client, as efforts and solutions for TB education and services during a pandemic (Septiani et al., 2022). Sobat TB is an Android-based application intended to provide health information about tuberculosis. The purpose of the Buddy TB application is that it is hoped that it can be used by health workers in monitoring, evaluating, and making efforts to track TB sufferers (Kartika et al., 2022). Empathy Client is an application specifically for TB RO patients to increase medication adherence and monitor the occurrence of side effects of TB RO visually (video-observed treatment) (Septiani et al., 2022).

Health Worker

Health workers have an important role in improving the maximum quality of health services in the community (Nasution et al., 2023). Efforts made by health workers for TB patients include providing counselling and information on how to take medication, length of treatment, drug side effects, monitoring drug side effects, and conducting home visits to monitor the treatment of TB patients (Pasaribu et al., 2022).

Medication Adherence

Compliance with taking medication is the behaviour of completing medication according to the recommended medication schedule and dosage (Al Rasyid et al., 2022). Factors that affect adherence to taking medication in TB patients are individual

personality, knowledge, health workers, family support and Drug Supervisory Officers (PMO) (Nabila, 2023).

Mobile Health

Mobile Health is an innovation in the digital health sector that provides healthcare support and interventions through technology such as gadgets, tablets, and electronic devices to support medical care (Jannah et al., 2021). Mobile health interventions and programs commonly found are text messages via cell phones (Latif et al., 2020) and videos (Pampalia and Waluyo, 2019). According to WHO, there are several options for intervening in tuberculosis patient care using an SMS service basis, including pure SMS applications on cell phones that use subscribed cell phone networks and programs installed on smartphones such as Facebook-Messenger, Whatsapp and Viber (Farhana et al., 2022). This analysis is in line with research conducted by Ali and Prins (2019); from the study, it was found that patients in the intervention group who were given treatment reminders via SMS had a lower non-compliance rate, a higher cure rate, and better knowledge compared to with the control group.

Indonesia's National TB Control Strategy 2020–2024 supports compliance and management of adverse drug reactions by trying the use of new technology, namely Video Direct Observed Therapy (VDOT) (Ministry of Health RI, 2020). Videos Directly Observed Therapy (VDOT) and Video Observed Therapy (VOT) are interventions that can potentially improve TB treatment adherence. With medication being observed via video, medication adherence can be recorded directly (VDOT) or indirectly (VOT) while the patient is taking medication. Therefore, healthcare providers can remotely monitor the drug intake process (Ximenez et al., 2022). This analysis is in line with the research of Sekandi et al. (2020), which stated that VDOT is feasible and acceptable for monitoring and supporting TB treatment. VDOT resulted in high adherence rates, indicating that digital technologies hold promise in improving treatment regimens.

Family

Support from the family plays a role in the patient's treatment period (Nasution et al., 2023); one of the important roles of the family in providing support to patients is reminding patients always to take their medicine (Khumairoh, 2023), and reminding patients of the dangers caused if the patient does not take medicine (Andriani and Prasida, 2023), This analysis is in line with the research of Meldawaty et al (2023), which states that there is a relationship between good family support and medication adherence.

Social Support

Social support can increase adherence to TB treatment, improve psychological health, reduce stress, and increase self-efficacy in dealing with the disease (Baniqued et al., 2020). This analysis is in line with research by Efendi et al. (2022b), which explains

that social support is needed by drug-resistant TB patients while undergoing treatment programs to reduce stigmatisation, depression or other psychological pressures so that it will increase treatment adherence and increase treatment success.

Health Education

Health education is a planned and dynamic learning process which aims to modify behaviour through increasing skills and knowledge and changing attitudes related to improving lifestyles towards a healthier lifestyle. Health education through visual media such as leaflets, videos, and electronic-based visual systems can facilitate the process of conveying information (Rumaolat, 2022). This analysis aligns with research by Field Alqahtani et al. (2018), where adherence was increased after health education using phone media was provided.

Attitude

Attitude is a predisposing factor for a person's behaviour (Ardat, 2020). The lack of a caring attitude toward TB sufferers is due to the thought that TB disease cannot be cured (Hutajulu, 2019), even though the patient's good attitude influences adherence to taking medication and becomes a supporter in undergoing the treatment process (Nabila, 2023). This analysis is in line with the study of Nopiayanti et al. (2022), where respondents who had a positive attitude were obedient in taking TB drugs; the more positive the attitude of the respondents, the higher the compliance of respondents.

Stigma

The stigma experienced by pulmonary TB patients causes effects of psychological stress, depression, fear of TB patients to relate to other people, and lack of participation in social life (Cheng et al., 2019). This analysis is in line with the results of Aryani's research (2021), which shows that respondents agree that some people think that people with tuberculosis are disgusting. Some people choose not to let people with tuberculosis live in society.

Several colours are distributed from the Visualisation overlay; some are dark blue, light blue, green, and yellow. Yellow or a lighter colour indicates that recent research has focused on that colour. The focus of recent research on the topic of nursing interventions to improve medication adherence in TB patients is currently related to health education and family. The analysis aligns with the efforts made by the Indonesian Ministry of Health (2020), namely optimising communication, information, and education about tuberculosis to the public so that they can achieve the target of finding and treating 90% of TB cases (Treatment Coverage) in 2024. Lack of knowledge and education about tuberculosis is one factor that influences treatment adherence (Wagania et al., 2023). The family has an important role in managing TB patient disease (Letmau et al., 2023). Family members must be involved during the disease process, from the beginning to achieving successful treatment results; this aligns with WHO recommendations to

include family support interventions in managing TB patients (Saidi and Abdul Manaf, 2023).

In a density visualisation picture, there are points located in the middle and on the edges. The dot in the middle and the yellow colour show the saturation level of a study. Most research that discusses nursing interventions to improve medication adherence in TB patients is related to Health workers and Medication adherence; this shows that the level of saturation of these topics is already very high. Topics that have not been widely studied related to nursing interventions to improve medication adherence in TB patients are application, mobile health, health education, family, social support, stigma, and attitude.

The new guideline being promoted by WHO is TB treatment by emphasising the importance of digital technology in supporting the implementation of the end TB strategy (Kemenkes, 2020). Since 2015, WHO has raised the profile of digital technology (e-health and m-health) as a means to support national TB programs around the world (Lee et al., 2020). However, information on how mobile health (m-health) is used in TB education and treatment programs is still lacking, requiring further literature review (Latif et al., 2023).

The urgency of knowledge in improving treatment adherence and prevention of transmission is very important for TB sufferers; lack of knowledge will lead to more spread and worsening of the disease; this can be overcome by conducting health education (Latif et al., 2023). Stigma also affects treatment adherence in TB sufferers (Chen et al., 2021). This analysis is in line with the research of Akbar et al. (2020), which states that there is a relationship between self-stigma and self-efficacy for medication adherence. Stigmatised TB patients use health services less frequently and hide their illness due to low self-esteem and social isolation (Chen et al., 2021). For this reason, the support of both the family and the community is needed. This is because the family is included in the social support system and is considered a resource that can participate in conveying health messages (Roslaini, 2023).

This bibliometric analysis on the topic of nursing interventions to improve medication adherence in tuberculosis patients has several limitations. Firstly, this method is based on a limited set of keywords and is potentially limited by the database used to collect the articles. Second, even though this research uses tools such as Dimensions, Vosviewer, and Mendeley, subjective research by the authors can still lead to errors.

Conclusion

The peak of publications on nursing interventions to improve medication adherence in TB patients was in 2018 and has decreased in 2019-2023. The health sector and other fields such as Health sciences, Biomedical and Clinical Sciences, Human society, Information and computing science, and Psychology carry out research on precision

health and precision medicine. This is closely related to using digital technology, such as mobile health applications, for interventions to improve medication adherence in TB patients. In addition, the trend of nursing interventions to improve medication adherence in TB patients currently focuses on health education and family. The topic of nursing interventions to improve medication adherence in TB patients is a topic that needs to be further developed in various countries. Suggestions for other researchers: please choose a theme included in the visualisation category that has not been widely researched to find novelty for future studies.

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