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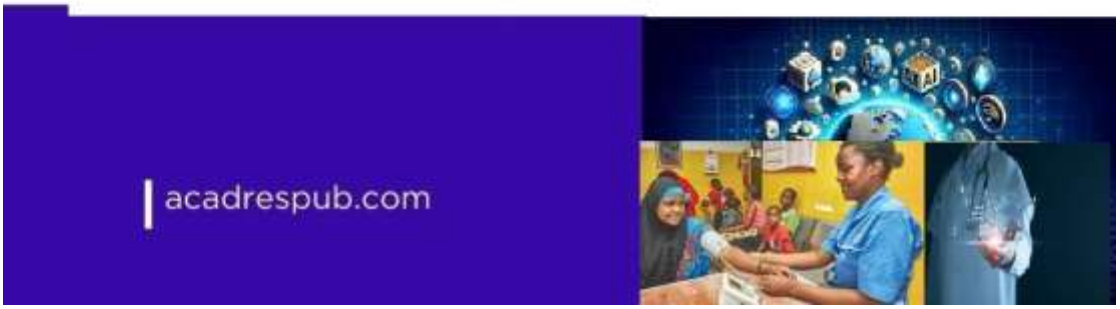

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A SYSTEMATIC REVIEW OF QUALITATIVE STUDIES ON FACTORS RESPONSIBLE FOR POOR ADHERENCE TO TREATMENT OF TUBERCULOSIS

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ABSTRACT

Tuberculosis (TB) remains a major global public health problem, mainly in low- and middle-income nations. Irrespective of the availability of effective treatment, poor adherence to anti-tuberculosis treatment continues to contribute to treatment failures, relapse, resistance to the drugs and increased mortality. Understanding the factors influencing poor adherence is essential for improving treatment outcome. This systematic review aimed to systematically review qualitative studies on factors responsible for poor adherence to tuberculosis treatment among patients receiving anti-TB therapy. A systematic review of qualitative studies was conducted using 13 electronic on-line databases to search for studies that are of quality. These included PubMed, Google Scholar, Scopus and CINAHL. Relevant studies published in English Language were selected based on pre-defined inclusion and exclusion criteria. Data were thematically extracted and analyzed to identify common factors responsible for treatment non-adherence.

Twenty-four inter-related primary factors responsible for poor adherence to the treatment of tuberculosis were identified from the ten selected studies. The factors were grouped according to their similarities in meaning. Having grouped and synthesized the primary factors derived from the patients using thematic analysis, four basic factors were arrived at based on the interpretations and conclusions derived from the authors. The factors were poor knowledge of TB, financial constraint, social stigma/discrimination, side-effects of medication, long duration of treatment, inadequate health services, lack of family/ social support, difficulties in transportation and poor relationship between healthcare workers and TB patient. Other contributory factors were poverty. Forgetfulness in taking daily drugs, cultural belief and substance abuse.

Poor adherence to TB treatment is influenced by multiple interrelated social, economic, personal and health system factors. Addressing these factors through patient education, improved healthcare delivery, psycho-social support and community-based interventions can enhance adherence and improve TB treatment outcome. Poor adherence is common with long-term treatment and it is influenced by the interplay of many of the identified factors that are deemed responsible by the patients. The findings in this review can help to inform policy-makers on the use of mobile TB clinics for good coverage, especially in places were poor adherences have been reported to be high so as to make TB services available, accessible, affordable, improve treatment outcome and general health of TB patients.

Keywords: Tuberculosis, treatment adherence, non-adherence, qualitative studies, Systematic review, anti-TB therapy

Introduction

Globally, tuberculosis (TB) is one of the leading infectious diseases and remained a major public health concern, especially in developing world. TB is caused by Mycobacterium tuberculosis and it primarily affects the lungs, but other parts of the body may also be affected. Irrespective of the availability of effective treatment, TB continues to cause significant morbidity and mortality nationwide. WHO (2025) stated that millions of new cases and deaths due to TB are recorded yearly with low- and middle-income countries bearing the greatest burden. Adherence to TB treatment regimen is crucial for successful recovery and prevention of complications. Standard anti-TB treatment usually needs patients to take multiple drugs consistently for a period of at least six months. However, many TB patients fail to complete their treatment as prescribed. Poor adherence to TB treatment has been implicated in prolonged infection, treatment failure, relapse, development of multidrug-resistant tuberculosis (MDR-TB) and increased healthcare costs. Many studies have shown that factors responsible for poor adherence to TB treatment are complex and multifactorial. The factors may include poverty, social stigma, side-effects of medication, lack of social support, poor knowledge about TB, prolonged duration of treatment, poor healthcare services, problem of transportation, poor relationship between healthcare providers and patients, cultural beliefs, substance abuse and forgetfulness in taking the drugs have been identified as contributing factors.

Qualitative studies provided deeper insight into patients' experiences, beliefs, perceptions and problems of adherence to TB treatment through interviews, focus group discussions and observations, qualitative research helps to explain why patients may fail to adhere to treatment regimen. However, many qualitative studies on TB treatment adherence exist, their findings are scattered across different settings and populations. Hence, there is a need for a systematic review to synthesize available qualitative evidence on factors responsible for poor adherence to TB treatment. The systematic review will help healthcare professionals, policy-makers and researchers to understand the major barriers in treatment adherence and identify strategies that may improve patients' adherence and outcome of treatment. The findings may also contribute to the development of effective interventions aimed at reducing the burden of TB and improving global TB control.

World Health Organization (WHO), (2023); Snauddin, (2025) and Lawal, (2025), stated that tuberculosis, popularly called TB is a major worldwide catastrophe and a serious challenge for public health. TB contributes greatly to the load of diseases, especially in developing nations. There has been increase in new cases of TB at the rate of one per second. This drastic increase led to the declaration of the disease as a 'Global Emergency' by World Health Organization in 2025. Recent reports by WHO (2025), indicted that globally, there was an estimated incidence of 10.7 million cases of TB in 2024, which is equivalent to 131 cases per 100,000 population and 1.23 million died in 2024, including about 150,000 deaths among people living with HIV.

TB is preventable, treatable and curable, but presently, there is alarming increase in cases of the disease, which has been linked to poor adherence to the treatment regime. Wilkinson (2007); Mjid et al (2014); and WHO, (2025), stated that tuberculosis, popularly called TB is an infective illness, caused by mycobacterium tuberculosis. The most important source of developing TB is from untreated pulmonary TB (PTB) patients. That is, persons who have active TB. When such persons cough or sneeze, tiny droplet nuclei containing the tubercle germs are released. Transmission of the micro-organism is through the inhalation of these droplet nuclei. It is estimated that ¼ of world population has latent TB infection, in which individuals harbor dormant Mycobacterium tuberculosis organisms without exhibiting symptoms of active. However, development of the disease is prevented in about 95% of infected persons as a result of adequate body immunity. Tuberculosis bacteria is given protection by its waxy thick coat which helps it to be in a latent state in the body of its host for years, except the immune system of the person's body gets weakened as in cases of HIV/AIDS, patients on medications with immune-suppressants or in people who are below 5years of age whose body immune system have not fully developed in which cases the chances of developing TB disease become very high.

Tuberculosis poses challenges to emerging economies as it predominantly affects persons at the peak of their fruitful lives Lawal (2025); Murray (2000), stated that the highest load of TB morbidity and mortality are seen mainly in persons who are 15 years and above. Although, TB disease can affect any one, if exposed to the bacteria and the immune

system of the body is weak. In Africa, TB largely affects adolescents and the young adults. However, Baw et al (2019) pointed out that in areas such as United States of America (USA) where TB incidence has moved from high to low, it is mainly an ailment of the aged and people who are immune-compromised. According to WHO (2025), economic challenges may exacerbate the conditions of existing groups who are vulnerable to developing TB and even give rise to new ones. There is an estimated 16% of European population who live below poverty line which is linked to increase in unemployment rates. This situation may increase the rate of developing TB with the implication for factors that favor the spread of the disease which include the quality of housing and sanitation. TB ailment has close relationship with poverty, persons who live in crowded places, especially with poor sanitary conditions, persons who do not eat adequate food, persons who indulge excessively in tobacco use, alcohol and drugs misuse, migrants, miners and prisoners. WHO (2016), had earlier stated that tuberculosis has been problematic to the entire world since pre-historic period and the pathogen that causes the disease has been identified to have caused more deaths than all other microbial pathogens, having had an estimated global incidence of 10.7 million, and a record of 1.23 million deaths globally in 2024. Also, in 2013, there was estimated incidence of 9 million and deaths of 1.5 million people diagnosed with TB. Over 20% of deaths worldwide is attributed to TB. According to Tiemersma (2011), until the early parts of 1990, tuberculosis was reflected as an ailment that has been controlled and this thought led to great reduction in political interest and planning for the ailment. But TB resurfaced and has become a serious problem for public health as there is increase in new cases at the rate of one per second. This drastic increase resulted in a declaration by WHO in 2005 that TB denotes a 'global emergency' because it resurfaced and has become epidemic worldwide.

Coker, (2000), Ogden (2004) and Maartens et al (2007), categorized the possible causes related to the development of TB as socio-economic, cultural and environmental. 95% of TB cases occur in developing countries and transmission increases in places that are densely populated, coupled with crowded living conditions. Other possible factors such as poverty, homelessness, malnourishment, persons who have been in prison, diabetics, and those who abuse drugs increase the possibility of moving from latent state to active TB disease. The ailment led to panic, not just of developing the ailment, but also that the person will develop the disease and be connected with the contributing causes which included inadequate feeding, poverty, alcoholism, drug dependence and HIV/AIDS. The incidence of TB is seasonal with its highest occurrence at every winter and spring, though; the reason for this is not clear but may not be unconnected to insufficiency of vitamin D during winter. Mjid (2014), high-lighted that there has been global increase in the prevalence of TB, though, the increase is not uniform across the globe. This unequal increase and distribution of the disease is linked to socio-economic inequality and racial discrimination. 80% of the world TB cases are estimated to be found in the developing nations such as South Africa, India, China, Nigeria and Indonesia. TB has remained a colossal challenge in developing world and with the HIV/AIDS epidemics at the beginning of the 1980s, several nations, specifically those in Sub-Saharan Africa have been faced with an ever-rising number of TB cases. The increase in number of cases of TB is further complicated by the inadequate resources, inadequate trained manpower and poorly organized treatment services for TB patients. Due to these challenges, a large number of TB patients in Sub-Saharan Africa adhere poorly to TB treatment, remain undiagnosed or opt for the use of alternative medicine which in most cases is often grossly ineffective.

Ogden (2003), Daniel, (2006) and Lonnrott et al, (2019) stated that TB got to an epidemic proportion around the early 18th and 19th centuries in the developed world such as Europe and America. Within this period, TB mortality in London, Stockholm and Hamburg got to 700-900/ 100,000 populations yearly. The explanation given for the increase was that the ailment rose as a result of the increase in population and crowded living conditions, coupled with other contributory factors which included inadequate nutrition, that increases the vulnerability of progressing from dormant to active TB ailment. But around the early part of the 19th century, the proportion of morbidity and death of TB progressively reduced. Better living conditions, adequate feeding and the use of sanatoria were given as the reasons for the reduction. As a result of the decrease, TB was no more regarded as a problem to the advanced world. As such, attention and funding for the measures to control the infection greatly reduced.

Reichmann (1991), Coker, (2000) and Ogden (2003) stated that while the attention to and funding of TB control disappeared, the ailment came back in the developed world and this was explained as the "U-

shaped curve of concern" because it revealed the variations in the incidence of TB and its relationship with resource distribution. Awareness and attention about TB rose up again in the late 1980s due to raised number of new cases in the advanced world. The major explanation for the renewed interest was based on the out breaks of HIV/AIDS related TB in New-York, around late 1980s and early part of 1990s. The transmission of the ailment from the deprived and marginalized to the conventional Americans led an increasing panic towards the ailment. Bennett and Courval (2008), stated that in the US, TB in the 1980s and 1990s mainly affected the poor and the deprived group such that in the mid-1980s, it was estimated that the homeless in New-York had active TB of 968 /100,000 populations. Based on this, New-York city authorities initiated a great campaign to fight TB epidemic, by employing Directly Observed Treatment Short-Course (DOTS) and Directly Observed Therapy (DOT) approved by WHO in 1993 as treatment regimen for TB patients. Incentives and reimbursements which included travel tokens, free lunches and food coupons were also given to ensure that TB patients adhere to the long treatment regimens. Additionally, the use of detention, based on previous failures to complete treatments was made part of the strategy for the control of TB. These efforts showed that with enough attention, adequate resources, treatment plan that is individualized, treatment given in a variety of settings, close follow-up and food support, poor adherence to TB treatment may be greatly reduced and TB disease significantly put under check. However, the confinement of TB patients, using the prior poor adherence behaviors, rather than extant valuation of whether the patients will strictly adhere to treatment or not, and whether the TB patients posed a significant risk to others as a result of the likelihood of poorly adhering to TB treatment, caused a debate about the measures taken.

Lonnrott et al (2009), high-lighted that the prevalence of TB disease has been increasing among certain minority groups as well as in persons who abuse drugs, alcohol dependents and the homeless implying that the burden of TB has a strong socio-economic gradient within nations, between nations and within communities, while the highest risk of the disease is among the poorest people. Cox et al (2008) stated that many studies have evaluated the effect of TB in groups who are at risk of developing the disease and their findings showed link between TB and societal suffering. According to WHO (2011), In Wales and England, TB notifications rose by 12% between 1988 and 1992. Furthermore, WHO (2013), stated that in the developing nations, there are significant dissimilarities in incidence of tuberculosis. For example, in the shanty-towns of Calcutta and Delhi, the prevalence of TB is shown to be 49 /1000 population, compared with 2 per 1000 population in the non-slum places. In recent years, tuberculosis burden has declined in Western Europe, whereas, the disease has spread with the increasing world population especially in Africa and Asia with average of 2.7% yearly increase between 2004 and 2008.

According to Friedman & Sbarbaro (2006); Volmink & Garner (2006) adequate medical management of TB will usually make those suffering from the disease go back to an active and economically productive life, as the disease when fully treated does not leave the patient with any disability or residual death. But about 50% to 65% of patients diagnosed of TB do not complete their treatment, which results to poor adherence, Munro et al (2009), stated that the challenges experienced by patients diagnosed of TB in following the specified treatment regimen, outlined by the WHO has given rise to awareness of 'Medication Adherence' as a difficult behavioral task. Improving treatment outcomes need a good understanding of the actual challenges responsible for poor adherence to treatment of TB. Adherence need accessibility and adequate health care, but even with such systems, about 50% to 65% of TB patients still fail to complete their treatments. In the light of this, many specific strategies have been employed. Some aimed at changing the behavior of health personnel through training, motivation and supervision. Others are geared towards patients' education, direct supervision of patients as they take their drugs and tracing of patients who default.

Statement of Problem

Tuberculosis remains one of the leading infectious causes of mortality and morbidity worldwide, irrespective of the availability of effective treatment. The successful management of TB depends greatly on strict adherence to anti-TB therapy. However, poor adherence to treatment continues to be a major challenge, especially in low-and middle -income settings where the burden of the disease is highest. Poor adherence to TB treatment contribute to treatment failures, relapse, development of multidrug-resistant tuberculosis, increased healthcare cost and preventable deaths. The standard TB regimen requires patients to take medications for a prolonged period, which is usually six months or more. Many patients discontinue

treatment before completion due to several social, economic, cultural, personal and health system-related factors. Reported barriers included social stigma, poverty, side-effects of medication, poor knowledge of TB, challenges of transportation to healthcare facility, poor healthcare services, lack of social support and poor social relationship between healthcare providers and patients. Although, many qualitative studies have explored patients' experiences and perceptions about adherence to TB treatment. The findings remain fragmented across various populations and settings. There is limited synthesized qualitative evidenced that comprehensively explains the factors responsible for poor adherence to TB treatment. Without clear understanding of the factors, healthcare providers and policy makers may encounter problems in designing effective interventions to improve adherence and treatment outcomes.

Therefore, there is a need for systematic review of qualitative studies to identify, synthesize and critically analyze the factors that are responsible for poor adherence to treatment of TB. The findings of this review may provide evidence-based information that can guide policy formulation, patient-centered interventions, healthcare planning, and future research aimed at improving adherence and reducing the global burden of tuberculosis

Objectives of the Study

The main objective of the study was to review qualitative studies of factors responsible for poor adherence to treatment of TB.
The Specific Objectives

The specific objectives of the study are to:
1. Identify the factors responsible for poor adherence to TB treatment as reported in qualitative studies
2. Explore patients' perceptions and experiences regarding adherence to anti-TB therapy
3. Examine social and cultural factors responsible for poor adherence to TB treatment
4. Determine economic factors associated with poor adherence to TH treatment
5. Assess healthcare system-related factors contributing to poor adherence among TB patients
6. Synthesize evidence from qualitative studies on barriers to successful adherence to TB treatment
7. Provide recommendations that may improve adherence to TB and enhance treatment outcome

Research Questions
1. What factors are responsible for poor adherence to TB treatment as reported in qualitative studies
2. What are the perceptions and experiences of TB patients Sregarding adherence to anti-TB therapy
3. What social and cultural factors are responsible for poor adherence to TB treatment
4. What economic factors are associated with poor adherence to TH treatment
5. What healthcare system-related factors are contributing to poor adherence among TB patients
6. What are the evidences from qualitative studies on barriers to successful adherence to TB treatment
7. What recommendations can be provided to improve adherence to TB and enhance treatment outcome

Literature Review

This study covered extensive review of literature, ranging from tuberculosis across the globe,

Theoretical Framework, Concept of Directly Observed Therapy (DOT) and DOTS

Tuberculosis (TB) remains a major global public health challenge despite the availability of effective anti-tuberculosis medications. Successful TB treatment requires strict adherence to a lengthy treatment regimen, usually lasting six months or longer. However, poor adherence to treatment continues to contribute significantly to treatment failure, relapse, prolonged infectiousness, increased mortality, and the emergence of multidrug-resistant tuberculosis (MDR-TB). Several qualitative studies have identified multiple factors responsible for poor adherence to TB treatment.

Studies have shown that socio-economic factors play important roles in treatment non-adherence. Poverty, unemployment, transportation costs, and inadequate food supply often make it difficult for TB patients to attend clinic appointments regularly or obtain medications consistently. Patients from low-income backgrounds may prioritize survival needs over healthcare, thereby increasing the likelihood of treatment interruption. Financial burdens associated with frequent hospital visits have also been widely reported as barriers to adherence. Social stigma and discrimination are additional factors contributing to poor adherence to TB treatment. Many patients fear

rejection, isolation, or negative attitudes from family members, employers, and community members because TB is often associated with poverty, HIV/AIDS, or social exclusion. As a result, some patients conceal their illness and avoid regular attendance at treatment centres, thereby affecting treatment completion.

Inadequate knowledge and misconceptions about TB and its treatment also contribute to poor adherence. Some patients discontinue treatment once symptoms improve because they mistakenly believe they have been cured, while others lack adequate understanding of the importance of completing the prescribed regimen. Cultural beliefs, myths, and reliance on traditional medicine may further negatively influence adherence behaviour. Medication-related factors, particularly drug side effects, have also been identified as significant barriers to adherence. Anti-TB drugs may cause nausea, vomiting, diarrhoea, dizziness, blurred vision, skin rashes, and general weakness. Patients receiving treatment for both TB and HIV/AIDS may experience a high pill burden, reducing their motivation to continue therapy. Fear of adverse drug reactions may therefore discourage consistent medication use. Health system-related factors have likewise been implicated in poor adherence. Long waiting times at healthcare facilities, poor attitudes of healthcare providers, inadequate counselling, drug shortages, inflexible clinic schedules, and poor patient–provider relationships have all been identified as barriers to successful treatment adherence. Studies further emphasize the importance of patient-centred care and effective communication in improving adherence to TB treatment.

Social and family support also play critical roles in treatment adherence. Patients who receive emotional, financial, and practical support from family members, peers, and healthcare providers are more likely to complete their treatment successfully. Conversely, lack of support may lead to hopelessness, forgetfulness, and reduced motivation to continue treatment. Personal factors such as alcohol consumption, smoking, substance abuse, forgetfulness, and mental health challenges have also been associated with poor adherence. Some patients experience treatment fatigue due to the prolonged treatment duration, resulting in missed doses or treatment interruption. Gender-related challenges and migration issues have similarly been reported in some settings. Overall, literature indicates that adherence to TB treatment is a complex and multidimensional issue influenced by the interaction of structural, personal, social, and healthcare-related factors. Therefore, interventions aimed at improving adherence should address these multiple barriers simultaneously through health education, counselling, social support, improved healthcare delivery, financial assistance, and community-based interventions, including DOT and DOTS strategies.

Concept of DOT and DOTS

According to Tiemersma (2011), Munro et al. (2009), and World Health Organization (2003), tuberculosis is one of the deadliest infectious diseases and remains a major global public health concern despite the availability of effective treatment strategies. Although Directly Observed Therapy Short-Course (DOTS) has been widely adopted for TB control, TB continues to contribute significantly to global morbidity and mortality. Kaufmann and Parida (2007) noted that TB is preventable, treatable, and curable; however, the increasing burden of the disease has been linked to poor adherence to treatment regimens outlined under the DOTS strategy. Challenges associated with patients' inability to adhere consistently to treatment gave rise to concerns regarding poor adherence in TB management. Consequently, understanding the factors responsible for poor adherence is essential for improving treatment outcomes and strengthening TB control programmes. Dye et al. (2009), Raviglione and Uplekar (2007), and Lienhardt and Ogden (2004) reported that in 1991, the World Health Organization established two major objectives for global TB control: first, to detect at least 70% of new sputum smear-positive TB cases annually, and second, to achieve a treatment success rate of at least 85%. These objectives were introduced in response to the growing global TB epidemic. To achieve these goals, the World Health Organization in 1993 recommended the adoption of the Directly Observed Therapy Short-Course (DOTS) strategy for TB management and control worldwide.

Directly Observed Therapy Short-Course (DOTS)

Directly Observed Therapy Short-Course (DOTS) is the internationally recommended strategy for TB treatment and control. According to World Health Organization (2003), DOTS is centred on Directly Observed Therapy (DOT), whereby TB patients take their medications under direct supervision, especially during the intensive phase of treatment, to discourage poor adherence. Since its introduction, DOTS has been widely implemented globally to

improve treatment adherence and strengthen TB control programmes. The DOTS strategy comprises five key components necessary for successful implementation:

- Sustained political and financial commitment.
- Diagnosis through quality-assured sputum microscopy services.
- Standardized short-course chemotherapy under proper case management conditions, including direct observation of treatment.
- Uninterrupted supply of quality anti-TB drugs.
- Effective monitoring and evaluation through standardized recording and reporting systems.

The World Health Organization conceptual framework for DOTS emphasizes the importance of human resources in implementing TB control interventions effectively. WHO (2004) highlighted that adequate human resource capacity is one of the most critical requirements for successful DOTS implementation. Effective healthcare personnel are essential for proper supervision, patient education, counselling, and overall programme implementation. Furthermore, achieving the tuberculosis-related targets of Millennium Development Goal 6 (MDG-6) and global TB elimination goals requires sustained efforts to overcome limitations in healthcare workforce capacity while maintaining high standards in public health programmes.

Volmink et al. (2006) explained that DOTS involves the administration of multiple anti-TB drugs daily for at least six months for newly diagnosed patients and eight months for retreatment cases under the supervision of healthcare personnel, treatment supporters, or, in some cases, self-administration. Although treatment may be directly supervised, patients remain largely responsible for presenting themselves regularly at DOT centres for treatment. According to World Health Organization (2008), treatment adherence under DOTS is evaluated through treatment success rates, with a target success rate of 85%. Poor adherence is generally defined as failure to comply with treatment instructions, resulting in treatment interruption or default rates exceeding acceptable limits. Additionally, World Health Organization (2009) and Chadha (2010) reported that several countries, including China, Cuba, India, Peru, and the United States, achieved significant treatment success through DOTS implementation. In some randomized controlled trials conducted in 2007, treatment success rates reached 86%, exceeding the WHO target of 85%.

However, despite these achievements, some studies have questioned whether DOT alone is solely responsible for improvements in TB control outcomes. Although DOTS has contributed to reductions in TB incidence and prevalence in several settings, it is often difficult to separate its impact from broader socio-economic development and improvements in healthcare systems.Ethical Questions Related to Directly Observed Treatment (DOT)

According to Lienhardt (2004), Ogden et al. (2004), and Sylla et al. (2007), the Directly Observed Therapy (DOT) strategy has been criticized for placing limited attention on cultural sensitivity, patient-friendliness, and the ethical acceptability of mandatory clinic-based daily treatment supervision. Critics argue that DOT may intrude on patients' independence and constitutional rights, suggesting that some implementation approaches may themselves contribute to poor adherence to TB treatment. However, Pope and Chaisson (2003) contended that the limited restriction on patient autonomy under DOTS is justified by the significant public health benefits associated with TB control and should therefore not be regarded as a major cause of poor adherence.

Vermiere et al. (2004) further questioned the power imbalance between TB patients and healthcare workers, describing DOT discourse as one characterized by domination and control. Nevertheless, some scholars maintain that limited interference with patient autonomy is acceptable because of the broader public health gains derived from TB control programmes. The authors also emphasized that TB control efforts that fail to recognize the socio-economic realities of vulnerable populations may worsen existing inequalities.

Lin et al. (2006) explained that individuals interpret the causes of TB differently based on cultural and social perspectives, and such interpretations may influence health-seeking behaviour at different stages of illness. Patients' beliefs and perceptions not only affect their attitudes toward treatment but also shape how they psychologically and socially cope with the disease. Anti-stigma programmes have therefore highlighted the importance of challenging harmful beliefs about TB and creating supportive environments where patients can openly discuss their illness without fear of discrimination.

Similarly, Sylla et al. (2007) and Lienhardt and Ogden (2004) argued that interventions aimed at changing beliefs and practices are more effective

when they build upon indigenous knowledge systems rather than relying solely on biomedical explanations. This demonstrates the need to understand underlying cultural practices, social structures, and power relations influencing treatment behaviour.

Mjid (2014) noted that health-seeking behaviour is often influenced by factors beyond patients' direct control. For healthcare workers to effectively support TB patients, patients must understand the causes, transmission, symptoms, prevention, and curability of TB, as well as the relationship between diagnosis and treatment. Adequate patient education is therefore essential for improving adherence.

Jossy et al. (2012), in a study conducted in Tanzania on patients' perceptions of adherence to TB treatment, developed a preliminary theoretical model showing that intention to adhere was the strongest determinant of adherence behaviour. Patients' decisions to seek biomedical care instead of traditional treatment were influenced by their beliefs about TB, desire for cure, and motivation to complete treatment. Social support was identified as an important facilitator of adherence by providing emotional, financial, and practical assistance, including reminders to take medications. Community-based DOT programmes involving close relatives or spouses as treatment supporters were therefore seen as effective in promoting adherence.

The findings of Jossy et al. align with the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB), which suggest that behavioural intention is influenced by attitudes, beliefs, and perceived social pressure. In TB treatment, patients' knowledge and beliefs about treatment, combined with social support, contribute significantly to adherence intentions. However, these theories have been criticized for paying limited attention to broader socio-cultural influences.

Garner et al. (2007) identified several complex factors contributing to poor adherence to TB medication, including poverty, illiteracy, poor healthcare access, and inadequate knowledge about TB. These barriers may reduce patients' ability to sustain long-term treatment. For example, TB patients living in impoverished communities may lack transportation fare or adequate food, thereby affecting regular attendance at DOT centres. Nevertheless, World Health Organization (2009) and Lonnroth et al. (2009) maintained that DOTS remains a cost-effective public health strategy when assessed using Disability-Adjusted Life Years (DALYs) saved. Dye et al. (2009), in a study involving 134 countries, found that TB incidence declined more rapidly in countries with higher Human Development Index (HDI), increased healthcare expenditure, reduced child mortality, improved sanitation, lower HIV prevalence, and stronger economic growth. These findings suggest that broader socio-economic development significantly contributes to TB control efforts.

Lienhardt and Ogden (2004), however, criticized the universal application of DOTS without adequate consideration of differing socio-economic, cultural, and environmental contexts. This criticism prompted further studies comparing DOT with self-administered treatment. Some studies conducted in South Africa, Thailand, and Pakistan produced mixed findings regarding the effectiveness of DOT. While some trials showed improved adherence under family-supported DOT approaches, others reported no significant difference between DOT and self-administration. According to World Health Organization (2009), family- or community-supported DOT achieved higher adherence and cure rates compared to clinic-based supervision alone. In 2007, treatment success rates reached 86% among patients supervised by family members, surpassing the WHO global target of 85%.

Despite these achievements, some scholars remain skeptical about the effectiveness of DOT in reducing poor adherence. Cox et al. (2008) argued that poverty, overcrowding, malnutrition, poor ventilation, and inadequate access to healthcare are more significant determinants of poor adherence than the treatment supervision model itself. Similarly, Munro et al. (2009) reported that self-supervised treatment achieved outcomes comparable to clinic-based DOT at lower costs in some settings. These findings support the importance of flexible, patient-centred approaches involving family members, communities, and healthcare workers.

Wang and Shen (2009) also reported no significant difference in treatment completion rates between direct observation and self-supervision in rural China. They therefore recommended the adoption of feasible and culturally acceptable DOT strategies that accommodate both patients and healthcare providers. Furthermore, Liu et al. (2006) demonstrated that financial challenges remain major barriers to treatment completion. Their study in rural China showed that TB patients often faced substantial household expenses related to diagnosis and treatment despite subsidized services. Delays in diagnosis, inadequate healthcare financing, and

limited competence among healthcare workers were also identified as contributors to poor adherence. Farmer (1997) observed that some patients discontinue TB treatment once symptoms improve because of unpleasant drug side effects and the complexity of the treatment regimen. Raviglione and Uplekar (2007) noted that although many countries adopted DOTS by 2000, progress in TB control remained slow in several regions.

Consequently, World Health Organization (2007) introduced the “Stop TB Strategy” to strengthen the original DOTS programme. The strategy emphasized rapid expansion of quality DOTS services, management of multidrug-resistant TB (MDR-TB), TB/HIV co-infection, involvement of private healthcare providers, strengthening weak health systems, patient empowerment, and promotion of research. Overall, adherence to TB treatment is recognized as a complex behavioural issue influenced by multiple interacting factors. Therefore, improving adherence requires a comprehensive understanding of human behaviour and the application of behavioural theories such as the Health Belief Model (HBM).

Conceptual Framework

The Health Belief Model (HBM) proposes that patients’ health behaviours are influenced by their beliefs, attitudes, and perceptions regarding illness and treatment. According to Becker (1999), factors contributing to poor adherence may not directly cause treatment interruption but may reduce patients’ motivation to initiate and complete lengthy treatment regimens. The HBM identifies both general and specific health beliefs as important determinants of adherence. General beliefs relate to willingness to follow medical instructions, while specific beliefs involve perceived vulnerability, seriousness of the illness, and confidence in diagnosis and treatment. Becker emphasized that even when patients are willing to use health services, supportive healthcare resources must be available to encourage adherence. Such supportive factors include accessible healthcare facilities, affordable transportation, availability of food, flexible clinic schedules, reduced waiting times, and positive attitudes from healthcare workers. Social and emotional support from family members, friends, neighbours, healthcare professionals, and communities also play critical roles, particularly where stigma is associated with TB.

Becker and Maiman (2005) further explained that the interaction of motivating, enabling, and reinforcing factors determines the extent to which individuals utilize healthcare services. Patients continuously evaluate these factors during treatment, and their decisions may change at different stages of care. Friedman and Sbarbaro (2006) reported that poor and vulnerable patients may avoid asking healthcare workers questions because of perceived power imbalances. Similar findings in Norway showed that migrants with uncertain residency status or poor language skills often feel disconnected from healthcare providers, thereby increasing the likelihood of poor adherence. Trostle (2008) argued that adherence should be understood within broader belief systems that shape social norms and behaviours. He suggested that strict DOT approaches may sometimes place excessive responsibility on patients while overlooking systemic healthcare failures.

Conner and Norman (2003) similarly argued that rigid DOT strategies might not have gained universal acceptance if TB affected all social classes equally. Oshi et al. (2010) identified prolonged treatment duration as one of the major causes of poor adherence, while Tiemersma (2011) highlighted drug toxicity resulting from prolonged use as another contributing factor. Other factors associated with poor adherence include age, educational level, family support, poverty, stigma, access to healthcare services, healthcare workers’ attitudes, and inadequate knowledge about TB. While some studies suggest that older patients adhere better because of greater responsibility, others found no significant relationship between age and adherence.
Educational status has consistently been linked to treatment adherence. Studies conducted by Shargie and Undtjorn (2007) and Corbett et al. (2003) revealed that patients with lower educational levels are more likely to adhere poorly because they may not fully understand treatment instructions. Conversely, patients with higher educational attainment and better knowledge about TB demonstrated improved treatment outcomes.
However, Volmink and Garner (2006) argued that the influence of family support on adherence remains statistically inconclusive, despite evidence suggesting that supportive relationships may positively influence treatment completion.

Methodology
Types of Study:
This systematic review considered studies that used qualitative methods.

A comprehensive on-line database search was carried out because conducting a systematic review is a search process that needs compliance to a strict scientific process. On-line databases were searched published articles from 1st of April 2022 to 30th of March 2026 for published and medical journals for identification of qualitative studies on TB patients', DOT supporters' and health personnel's viewpoints on poor adherence to treatment of TB. The published materials were assessed for relevance to poor adherence to TB treatment. The search was supplemented with citation searches and reference lists. Full text articles of studies that fell into the inclusion criteria were retrieved. Materials identified from reference lists searches were also assessed for relevance to poor adherence to TB treatment. Concept map was used to enlarge all key words and the searches were carried out in three stages:

Stage 1
In this stage, few sets of key words were used to look for articles that had been reviewed by other researchers in the field so as to justify this study and to expand words for in-depth search. Medline, Nursing and Allied Health (CINAHL) and Virginia Henderson library of Sigma Theta Tau International were used to check studies that have been done on patients' adherence to TB treatment. This was completed by searching Cochrane, Campbell African Journal On-line (AJOL) and Joanna Biggs Institute (JBI) database. The result of these searches at this stage showed that two different group of authors had conducted systematic reviews on adherence behavior between 2020 and 2024. In order to justify this study, the review was therefore conducted on qualitative studies done between 2020 and 2026.

Stage 2
Medline, CINAHL, web of science were the relevant online databases used to check reference lists of articles that were identified on this topic of interest.

Stage 3
This stage involved searching and retrieving of the articles that were identified from the reference lists using PubMed, Global Health, Psycho-INFO and Google Scholar, New-York Academy of medicine, professional organization that are relevant to the objective under review and these are World Health Organization (WHO) and STOP TB partnership in other to identify documents that are potentially relevant which may not have been indexed in PubMed and for relevant reports, guidelines, unpublished researches for factors that are associated with poor adherence in various articles, as well as synthesizing the factors that lead to poor adherence to treatment of TB. This systematic review therefore, considered articles on qualitative studies of TB, DOTS and those that described poor adherence, adherence, non-adherence, compliance, non-compliance, defaults, concordance and non-concordance of TB patients to treatment regimen.

Phenomena of interest:
Articles on qualitative studies that investigated factors that were responsible for poor adherence to treatment of tuberculosis were reviewed.

Inclusion Criteria
For studies included, the qualities were assessed with the use of a pre-determined checklist and the data were extracted into a standard form and they were:
1. Studies that were based on "poor adherence, adherence, non-adherence, compliance, non-compliance, concordance, non-concordance and default for the control of TB, describing patients', health personnel's or DOT supporters' perspectives were included.
2. Studies that used qualitative research design only, researches that used "mixed" methods (qualitative and quantitative), but reported qualitative findings were also included.
3. Only published articles in English Language were included.
4. Studies that were based on patients who were 15 years and above, or used the term 'adult' were included.
5. Studies conducted between 1st of April 2020 and 30th of March 202026 were included

Exclusion Criteria
1. Studies that did not specify population groups were excluded.
2. Studies that did not meet the objectives/aims of this study were excluded.
3. Due to scarce resources and limited time for the study, studies published in other languages were excluded.
4. Studies that had been reviewed by other researchers identified in previous research studies were excluded.
5. Studies carried out by single authors were also excluded.

Search Strategies
Systematic approach helps in translating ideas and concepts across various studies and it is a favorable approach to synthesize qualitative health research (Alderson et al, 2024). 14 on-line databases were searched using the key words –TB AND adherence OR non-adherence, TB AND concordance OR non-

concordance, TB AND compliance OR non-compliance, TB AND treatment default from 1st of April 2021 to 30th of March 2026.

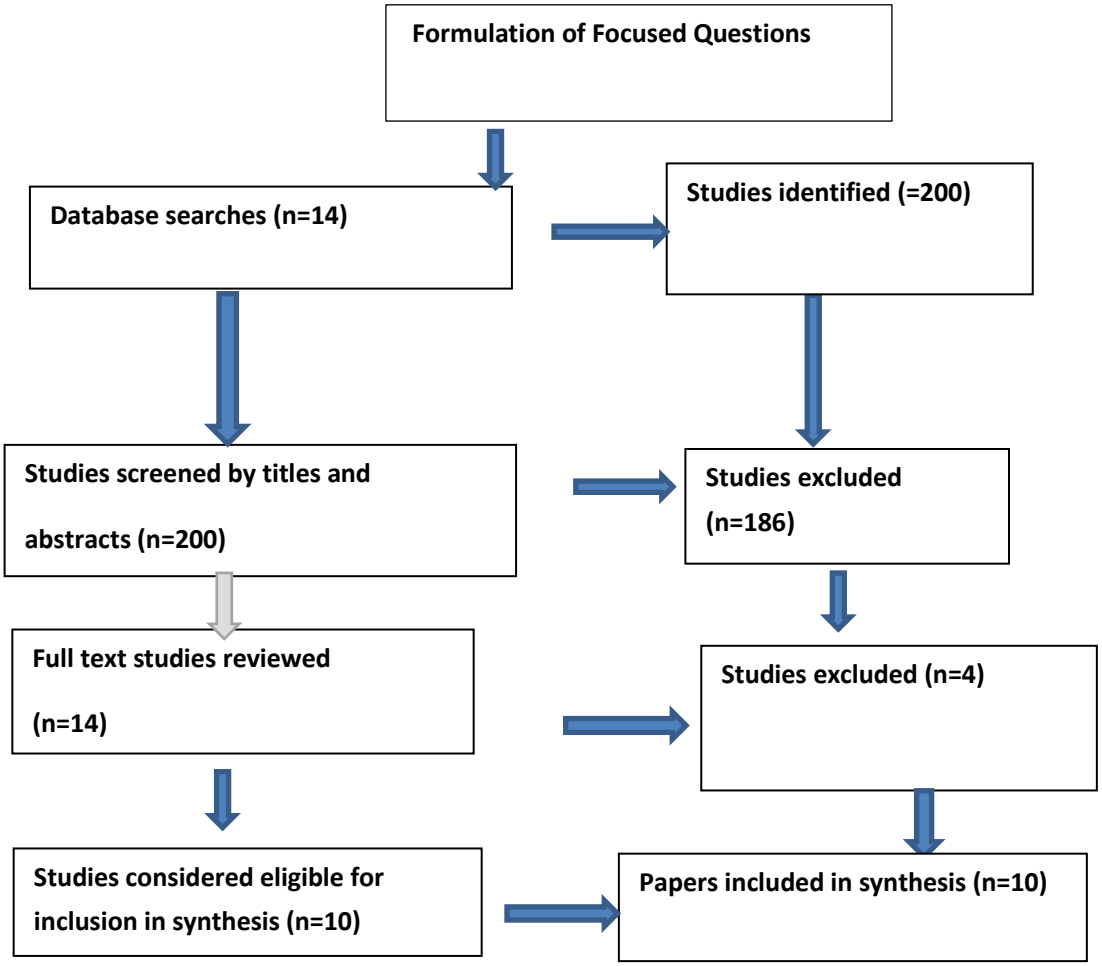
Selection of Studies for Inclusion

200 citations were identified in the different databases. Titles and abstracts of papers that are potentially of relevance to the objective of this study were retrieved. Fourteen (n=14), met the inclusion criteria and were retrieved, while one hundred and eighty-six papers (n=186) were excluded because they did not meet the inclusion criteria. Out of the 186 papers that were excluded for not meeting the inclusion criteria, 172 were published between 2000 and 2009, 4 were published in other languages and 10 others used pre-determined factors such as, "social context of adherence to TB treatment in urban risk groups in UK", making their objectives/aims to be different from that of this study. 14 papers were therefore, considered for inclusion in the study.

Validation of Selected Studies

To validate the selection of studies, the fourteen (14) studies that were potentially relevant were screened and subjected to full text review. 4 of the studies were excluded because 2 studies included TB patients who were less than 15 years at the period of their studies in their populations and 2 studies were reported by single authors. Ten studies met the inclusion criteria and were therefore, considered eligible for this study.

Figure 1:
Search Process and Study Selection



Assessment of Methodological Quality:

Schulz et al (2015); Egger et al (2013), referred to quality as the achievement of optimal standard. The quality of individual studies was assessed using Joanna Biggs Institute (JBI) checklist for qualitative study. Evaluating study quality allows for the description of a range of quality across included studies, so the approach was chosen based on the fact that good quality studies give strong backing more to study synthesis.

Table 1: Methodological Quality Assessment Tool for Included Studies (n= 10)

Quality Criterium	Met Criterium	Did Not Meet Criterium	Unclear
Is this study quality research?	10	0	0
Are the research questions clearly stated?	10	0	0
Is the qualitative approach clearly justified?	10	0	0
Is the approach appropriate for the research question?	10	0	0
Is the study context clearly stated?	10	0	0
Is the role of the researcher clearly described?	10	0	0
Is the sampling method clearly described?	10	0	0
Is the sampling strategy appropriate for the research question?	10	0	0
Is the method of data collection clearly described?	10	0	0
Is the data collection method appropriate for the research question?	10	0	0
Is the method of analysis clearly described?	10	0	0
Is the analysis appropriate for the research question?	10	0	0
Are the claims made supported by sufficient evidence?	10	0	0

Coding of Studies

The 10 studies that met the inclusion criteria were coded for easy referencing and identification using numerical numbers 1-10.

Critiquing the Selected Studies

Study 1

Topic: Risk factors associated with default among TB patients in Darjee district of West Bengal, India.

Authors: Roy N, Basu M, Das S, Mandal A, Dutt D, Dasqupta S (2021).
Aim: to identify the risk factors associated with default among TB patients in Darjee.
Method: qualitative and quantitative (mixed study), case-control study of 79 defaulters as cases and 79 who completed treatment as controls. (n=158)
Qualitative findings: The reasons given for defaulting were alcohol misuse, adverse effects of drugs, long distance of DOT Centre, inadequate knowledge about TB and social stigma.

Conclusion: What is needed is a line of approach that is responsive to patients' needs while holding the patients to their personal and societal duties.

Critique

The aim of this study was to identify factors that led to treatment default in part of India. The title precisely stated the aim with the purpose matching the introduction. The method adopted and study selection were adequate and valid for the aim. There were no discrepancies between the texts and the tables. The interpretation of data arose logically and clearly. All populations of interest were represented and these included patients, health workers and DOT supporters. The researchers suggested further works on the subject area.

However, the study cannot be generalized because of small sample size. Additionally, according to Friedman and Sbarbaro (2019), patients and health workers may not speak out, especially about the health care systems' inadequacy (if any) during interview and focus group discussions for fear of later victimization. This study also had a definition of poor adherence as 3 weeks default which is different from WHO definition of 8 weeks default.

Discussion

This study identified factors responsible for poor adherence as inadequate knowledge about TB, adverse drug reaction, long distance to DOT Centre, stigma and alcohol misuse. Awofeso and Makanjuola (2020) stated that adhering to treatment of TB is significantly higher among patients who understand the natural course, complications and treatment of the ailment. This is in line with this finding as majority of the patients who adhered poorly claimed not to have understood what the disease actually is, showing that there is a relationship between knowledge of TB and poor adherence to treatment. In this primary study, a patient reported that it is not certain that the anti-TB drugs can destroy the organism as such, sought other alternative treatments, after commencing initial treatment. Adverse drug reaction is also an identified factor as patients complained of the unpleasant metallic taste of the drugs in their mouth. The long distance to DOT Centre, coupled with social stigma led to poor adherence. Long distance can consume a lot of patients' time and energy which patients will have to continue with for a long time. Stigma may force patients into hiding their ailments from others and the community for fear of discrimination and isolation. However, according to Gillian et al (2015), patients should not bear the entire responsibilities for poor adherence, but should be made team members to encourage active participation in their treatments. To optimize TB treatment, patients should be given adequate information about TB.

Overview

Study was published in international journal of Tuberculosis; Lung Diseases. PubMed. The topic is appropriate for the journal. The data were well summarized in the abstract. The study was logically and clearly presented by five authors.

Study 2

Topic: Adherence to drug medication among TB patients in a tertiary health institution in South-East, Nigeria.

Authors----Ubajaka C, Azuike A, Ugoji J, Nwibo O, Ejiofo O, Modebe I, & Umeh U (2015).

Aim: To identify the factors responsible for non-adherence to treatment among TB patients in South East, Nigeria.

Method--Descriptive cross-sectional study of 217 TB patients, using self-administered interview and semi-structured questionnaire.

Findings: Factors identified were lack of transport fare to DOT center, forgetfulness, drugs finished, feeling of recovery and side-effects of TB drugs.

Conclusion---patients are given two weekly clinic appointment during intensive phase of treatment, at which adherence is higher. At continuation phase of treatment, they are given monthly appointments which have been leading to forgetfulness. To relief patients of financial burden of going to DOT center, Home-based therapy (HB-T), which allows medication for patients at home and supervision by community volunteers may be implemented. A previous study in India revealed that transport fare is significantly associated with poor adherence to TB medication. They therefore, advised that introduction of HB-T be made in the area to tackle the problem of finance and forgetfulness.

Critique

This study has a concise statement of the aim and title. The purpose is in-line with the introduction. In-depth interviews and questionnaire were used for data collection from 217 patients. This method of data collection is valid for the identification of factors responsible for poor adherence to TB treatment. Interpretations of data were in-line with that of other researchers.

However, Interview may not bring out all information from the patients as indicated by Friedman and Sbarbaro (2006) that in a study in Ethiopia, impoverished patients who were at risk of putting up poor adherence behaviors were hesitant in meeting health workers with their questions as a result of the power imbalance that existed between them. This study used only TB patients and gave no information about health workers' and DOT supporters' view of adherence, as such, it is not generalizable.

Discussion

The factors identified are: no money for transport to treatment Centre, adverse reaction to TB drugs, feeling of recovery, drugs finished and forgetfulness. No transport money to go for treatment at DOT Centre can pose a great challenge as patients whose homes are farther than 20km may find it difficult to trek, coupled with their poor state of health. Liu et al (2007) pointed out that the treatment of TB is not entirely free and there is a relationship between finance and poor adherence to treatment of TB. Drugs finished and forgetfulness may be due to the two-monthly appointment given to patients at the continuation phase of the long treatment period.

Overview

Seven authors carried out this study and presented their findings in a logical and clear manner. It was published in the BMC Public Health journal. The topic is appropriate for the journal. The abstract accurately summarized the data.

Study 3

Topic: Predictors of TB and Anti-retroviral (ARV) Medication non-adherence in Public Primary Care Centre in South Africa.

Authors: Naidoo P, Larl P, Louw J, Matseke G, Mchunu G & Tutshama, B (2013).

Aim : To Determine the Predictors of TB and Anti-retroviral (ARV) Medication non-adherence in Public Primary Care Centre in South Africa.

Method: Cross-sectional studies of 3 districts with 14 primary health care facilities each, were selected on the basis of the highest TB caseload per clinic. All adult TB patients from one month of treatment were screened and selected randomly for the study. Total of 3,107 patients were used.

Findings: Poverty, tobacco use, alcoholism and having one or more co-morbid condition were given by the patients as reasons for poor adherence to TB treatment completion.

Conclusion: A comprehensive treatment program, addressing poverty, alcohol misuse, tobacco use and psycho-social counselling is needed for TB patients.

Critique

The title and aim of the study were stated accurately. The purpose matched the introduction. It used a fairly large population size and covered 14 health Centre in 3 different districts. The method used in selecting subjects was adequate. There were no discrepancies between the texts and the tables. Interpretation of results arose logically from the data.

However, the short comings of interview and questionnaire used may have included the lack of full and important information from the patients. The patients who have co-morbid condition may not divulge the information for fear of broadcast to other people. Also, health workers and DOT supported were not reflected in the study.

Discussion

New factors aside those seen in studies 1 and 2 are alcohol consumption, tobacco misuse and one or more co-morbid condition. Alcohol consumption and tobacco misuse are personal lifestyles showing that there is a relationship between personal factors and poor adherence behaviors.

Overview

The article was published in African Journal On-line (AJOL). The topic is appropriate for the journal. The abstract is accurately summarized in the data and the authors presented the articles logically and clearly.

Study 4

Topic: Barriers and Facilitators of Adherence to TB Treatment in Patients with Concomitant TB and HIV Treatment: A qualitative study of DOT clinics in Norway.

Authors: Gebremariam K, Bjune G, & Frich C (2011).

Aim: To identify Barriers and Facilitators of Adherence to TB Treatment.

Method: qualitative study using in-depth interviews with 15 TB/HIV co-infected patients and focus group discussion with 9 health professionals. (n=24)

Findings: Barriers to treatment completion included side-effects of drugs, pill burden, economic constraints, lack of food, and stigma with non-disclosure of HIV status and inadequate communication with health professionals. Other factors include socio-economic factors such as poverty, lack of health facilities, level of support available to patients from family and other networks and social stigma that emanates from these relationship and the relationship with health

providers which in turn became delicate issue, given the sensitivity of dealing with chronic diseases of significant mortality toll.

Critique
The title and aims of the study were well stated. The purpose corresponded with the introduction. The method used was valid for the aim. The sample selection was adequate for the study. There were no differences between the texts and tables.
However, the study cannot be generalized because of its small sample size

Discussion
The interpretation came up logically from the data and in-line with the intent of other researchers.
Overview
This study was published in PubMed and topic is appropriate for the journal. The authors logically and clearly presented the study.

Study 5
Topic: Barriers to successful TB treatment in Tomsk, Federation of Russia.
Authors: Gelmanova Y,Keshavjee S, Golubchi T, Berezina I, Strelis K, Yanova , Atwood S & Murray M (2011):
Aim: To Determine the Barriers to successful TB treatment in Tomsk, Federation of Russian.
Objective: to identify barriers to successful treatment in Tomsk, Siberia by analyzing individual and programmatic risk factors for non-adherence, default and the acquisition of MDR in TB patient cohort in the Russian Federation.
Methods: a retrospective cohort study of consecutively enrolled, newly detected smear-positive adult TB patients initiating therapy in a DOTS program in Tomsk.
Findings: Substance abuse was strongly associated with non-adherence.
Conclusion- the researchers opined that substance abuse was a strong predictor of non-adherence and treatment default. DOTS program may be of benefits to the patients by incorporating measures to diagnose and treat alcohol abuse within the medical management of patients who are undertaking TB treatment.

Critique
The study aimed at identifying the barriers to successful treatment of TB in Tomsk. The title is clearly stated and the purpose matched the introduction. The method of study selection was adequate and valid for the study. There were no discrepancies between the texts and the tables.
However, the discussion only repeated the results and were done using narrative approach. The study cannot be generalized because of its small size.

Overview
The study was published in PubMed. Presentation of the study by the authors was logically and clearly done.

Study 6
Topic: A descriptive survey of 'Direct observation and adherence to TB treatment in Chongqing, China.
Authors: Hu D, Liu X, Chen J, Wang Y, Wang T, Zeng W, Smith H & Garner P (2011).
Aim: To determine the adherence of TB patients to treatment.
Method: survey of 401 TB patients in the municipality of the country: A record assessment at one TB center, patient and village doctor in-depth interviews.
Result: patients reported being charged expensive fees for ancillary treatments such as liver protecting drugs and that contributed mainly to poor adherence.

Critique
The title and the aim of this study were clearly stated. The purpose corresponded with the introduction. The method was valid and subjects' selection was adequate. There were no discrepancies between the tables and the texts

Discussion
Interpretations of data arose logically and clearly and were narrated based on findings. Further work was suggested.
Overview
Study was published in Scandinavian journal of Public Health. The topic is appropriate for the journal. There were eight authors who logically and clearly presented the study.

Study 7
Topic: Factors associated with Interruption of Treatment among Pulmonary TB patients in Plateau State, Nigeria.
Authors: Luka I, Idris S, & Nsubuga P (2011).
Aim: To Examine the Factors associated with Interruption of Treatment among Pulmonary TB patients in Plateau State.
Method: Structured questionnaire and focus group discussion on barriers to treatment were used.
Findings: The factors given are distance from DOT Centre, lack of transport money to DOT Centre, long duration of treatment, feeling of wellness,

smoking, alcoholism and unfriendly attitudes of health workers.

Critique
The title and the aim were clearly stated. The purpose corresponded with the introduction. The method was valid for the study and the sample size was adequate, though the study cannot be generalized because of the small sample size. There were no discrepancies between the tables and the texts. The interpretation of the factors came up logically from the data. There was suggestion for further studies.

Overview
The study was published in PubMed. The journal is appropriate for the topic. The abstract precisely summarized the data, which was logically and clearly presented by the authors.

Study 8
Topic: Factors contributing to TB Treatment Initiation and Adherence in a South African Community.
Authors: Cramm J, Finkenflugel H, Meller V & Nieboer A (2010).
Aim: to determine the perception of TB Treatment Initiation and Adherence in a South African Community.
Method--------stratified sampling design. A total of 1,020 household were selected randomly in proportion to the total number of households in each neighborhood, in the Eastern Cape population in South Africa.
Findings------social stigma is the most common factor for poor adherence and may influence TB patients' decisions in health-seeking behaviors and adherence to TB treatment.
Conclusion--- Stigma appears to affect case-finding and case-holding. Interventions should therefore, be directed at improving attitude and perceptions to potentially reduce stigma. This requires a patient-centered approach to empower TB patients and active involvement in the development of stigma reduction programs.

Critique
The title and the aim of this study were clearly stated. The purpose corresponded with the introduction. The method used was valid for the study, with adequate sample selection.
Discussion
This study was written in a logical and clear manner, and there was suggestion for further research of this nature.

Overview
This study was published in the journal of Res; Diseases and the topic is appropriate for the journal. The abstract clearly summarized the data, which the authors clearly and logically presented.

Study 9
Topic: Barriers and Enablers in the management of TB treatment, in Addis Ababa, Ethiopia.
Authors-Sagbakken M, Frich C, Bjune G (2010).
Aim: To identify the Barriers and Enablers in the Management of TB Treatment in Addis Ababa, Ethiopia.
Method: A qualitative study which included 50 in-depth interviews and 2 focus groups made up of TB patients, their relatives and health personnel.

Findings: loss of employment or the possibility to work led to a chain of interrelated barriers for many of the patients to comply with TB medication adherence. More so, every day treatment was taking a lot of time and energy, inflexible procedures of the treatment Centre reinforced most of the emergent challenges. Persons who have no adequate source of income or lacked concrete assistance from families, friends and communities claimed that the full expenditure of initiating and completing tuberculosis treatment is more than their available sources of income. This was an obstacle to adherence at the initial stage of management. Inability to get adequate finance over a long period, coupled with every day amassing costs and other challenges, caused vulnerability of persons diagnosed of TB to the disruption of taking their medication in the subsequent stages of management. Patients who became poverty stricken and financially exhausted due to the ailment, and whose health and social statuses were not restored, were mainly at risk of having poor-adherence. These groups of patients, have no access to any significant monetary and useful supports over a long time, most often, as a result of exhaustion from families and friends who may have become tired of helping, both in terms of social and financial and socially supports.

Conclusively, the researchers opined that patients' strength to accomplish TB treatment is an outcome of active engagements involving economic and social costs as well as other problems that may croup up as the long treatment period goes on. Programs that will enable the adherence of patients to TB treatments, must address both personal and health-related factors.

Critique
The title and the aim of this study were stated clearly. The purpose corresponded with the introduction. The method was valid for studying the barriers that prevent TB treatment completion. The sample selection is adequate though, the size of the population is small, and as such the study cannot be generalized. There results showed no discrepancies between the texts and the tables.
Discussion
The authors presented their data logically and clearly and suggested further work on the topic.
Overview
This study was published in PubMed and the topic is appropriate for the journal. The abstract adequately, gave summary of the data. The authors presented the study logically and clearly.

Study 10
Topic: Factors that lead to adherence and non-adherence to anti-TB treatment among pulmonary TB patients. In Jiangsu province, India.
Authors: Weiguo X, Wei L, Yang Z, Limei Z, Hongbing C & Jianming W (2010).:
Aim: To examine the factors that lead to adherence and non-adherence to Anti-TB Treatment among Pulmonary TB Patients:
Method: Qualitative and Quantitative approaches (mixed method) were used. Convenient sampling technique with semi-structured questions as guide for in-depth interview of 20 TB patients, aged 22 to 40 years who were randomly selected, 10 local health care workers, 5 village doctors and 5 community hospital doctors were invited for in-depth interviews (n=40).
Findings: The in-depth interviews revealed that heavy financial burdens, extra fee for medical examination, hospitalization and liver protection drugs, adverse drug reactions, long period of treatment, travel-related costs to DOT Centre, lack of social support and social stigmas were factors accountable for non-adherence.
Conclusion: The researchers opined that more importance should be given to treatment adherence under the current Tb control program. Heavy financial burdens, lack of
Social support and adverse drug reactions are associated with non-adherence. Direct observation and regular visits by health workers appear to reduce the risk of non-adherence. More patient-centered interventions and greater attention to structural factors are required to improve adherence.
The title and aim were precisely stated. The purpose corresponded with the introduction. The method was valid for the study. The study selection was adequate, but had small sample size and so, cannot be generalized. The results did not show discrepancies between the tables and the texts.

Overview
The study was published in Scandinavian journal of Public Health and the topic is appropriate for the journal. The abstract is well summarized from the data and the authors presented the study in a logical and clear way.

Types of Outcome
The key outcome variables were considered to be Socio-economic variable which include finance, no food, transport-related costs, distance from treatment Centre, loss of job, no job, extra fee for liver protection drugs and support from family members, friends health care personnel and community.
Individual attitudinal variables were assessed and these include the fear of social stigma, inadequate or lack of knowledge of TB and its treatment, duration, adverse reactions of TB drugs and whether it is curable, feeling of recovery following few weeks of treatments and the consequences of poor adherence to treatment, substance abuse, alcohol and tobacco misuse. Co-morbidity conditions like patients' HIV statuses were considered.

Data Extraction
Quality data were extracted from all the papers included in the review, using standardized data extraction tool from Joanna Biggs Institute (JBI). The data included details about the populations, study methods and results relevance to the review questions and aims of this study.

Results and Data Presentation

TABLE 2: Data presentation.

Ref/ code	Country	Data collection method	Participants' characteristics	Research setting.	Identified factors responsible for poor adherence to TB treatment
Roy et al (2015): 1	India	In-depth interview, structured questionnaire, focus group discussion	50 adult TB patients and 2 health worker(n=52)	DOT Centre	Alcohol consumption, adverse effect of drug, long distance to DOT Centre, inadequate knowledge about TB, stigma.
Ubajaka et al (2015): 2	Nigeria	Interviews, questionnaire	Cross-sectional study of 217 TB patients (n=217).	DOT	No transport fare to DOT Centre, forgetfulness, drugs finished, feeling of recovery, side-effects, and medical expenses.
Naidoo et al (2013):3	South Africa	Questionnaire	Cross-sectional studies. 3,107 adult TB patients from 3 districts, with 14 primary care facilities (n=3,107).	DOT	Poverty, alcohol misuse, tobacco use, no money and having one or more co-morbid conditions.
Gebermariam et al (2011):4	Norway	In-depth interview & focus group discussion.	15 TB patients & 9 health workers. (=24).	DOT	Side-effects, pill burden, economic constraints, lack of food, poverty, lack of health facilities, long distance from DOT Centre, stigma & no support.
Gelmanova et al (2011):5	Russia	In-depth interview, focus group discussion	12 adult TB patients, 4 health workers (=16).	DOT	Substance abuse and finance.
Hu et al (2011): 6	China	In-depth interview, questionnaire, focus group discussion.	401 adult TB patients and one village doctor (=402).	DOT	Extra fee charged for liver protecting drug,
Luka et al (2011):7	Nigeria	Structured questionnaire, focus group discussion	30 TB patients, 4 health workers. (n=34)	DOT	Distance from DOT Centre, no transport fare, long duration of treatment, feeling of wellness, tobacco use, alcohol misuse, unfriendly attitudes of health workers.
Cramm et al (2010):8	South Africa	Structured interview, focus group	Adult TB patients, relatives in 1,020 house-holds & health workers (n=not specified).	Community.	Stigma, no support and finance.

Sagbakken et al (2010):9	Ethiopia	In-depth interview, focus group discussion.	50 adult TB patients, 2 focus group discussions of 9 TB patients' relatives & health workers (n=68).	DOT	Loss of job, daily treatment consumes a lot of time and energy, finance, rigid routine of health clinic.
Weiguo et al (2010): 10	China	In-depth interview, focus group.	20 adult TB patients, 10 local health care workers,5 village doctors and 5 community hospital doctors (n=40).	DOT Centre	Heavy financial burden, extra fee for medical examination, hospitalization and liver protection drugs, adverse drug reactions, long period of treatment, travel-related costs to DOT Centre, no support and stigma.
Total population studied by codes (1, 2, 3, 4, 5, 6, 7, 9, &10, n=3,960), excluding code 8 that did not specify number of people in each of the house-holds used.					

Data Analysis

From the ten studies that met the inclusion criteria, one was from India (1), two from Nigeria (2, 7), two from South Africa (3, 8), one from Norway (4), one from Russia (5), two from China (6, 10) and one from Ethiopia (9) with overall estimated sample size of three thousand, nine hundred and sixty adult TB patients from nine studies (1, 2, 3, 4, 5, 6, 7, 9, & 10) excluding (8) that used house-holds in the community but did not give the number of people used in each house-hold. The population used comprised TB patients, health workers, DOT supporters and patients' relatives. Nine of the studies were conducted in both urban and rural areas (2, 3, 4, 5, 6, 7, 8, 9, 10) and one was conducted in a rural area (1) All the ten studies (1, 2, 3, 4, 5, 6, 7, 8, 9, 10), are qualitative researches conducted between 2010 and 2015. Eight of the studies collected their data through in-depth interview and focus group discussions (1, 4, 5, 6, 7, 8, 9, and 10), while two used questionnaires (2, 3). Eight studies used WHO definition of eight weeks of drug default as poor adherence to the treatment of TB (1, 3, 4, 5, 6, 7, 8, and 9), one used one month (2), and one used ten months (10). All the studies were on curative TB treatment (1, 2, 3, 4, 5, 6, 7, 8, 9, and 10). Nine of the studies (1, 2, 3, 4, 5, 6, 7, 9, and 10) were conducted at different DOT Centre in urban and rural areas, while one was conducted in house-holds of a community (8).

All the studies included TB patients in their samples (1, 2, 3, 4, 5, 6, 7, 8, 9, and 10). Eight of the studies included health workers, patients' relations and DOT supporters in their studies (1, 3, 5, 6, 7, 8, 9, and 10), while two studies (2, 4) used adult TB patients alone in collecting their data. Twenty-four factors were identified by the patients in the different studies. These factors are also referred to as primary factors as they were given directly by patients, DOT supporters and health workers. These factors are: finance (2, 3, 4, 5, 6, 7, 8, 9, 10), long duration of treatment (2, 3, 4 ,5 ,6, 7, 9, 10), side-effects of drugs (2, 3, 4, 5, 6, 7, 8) 10), stigma (1, 3, 4, 8, 10) long distance from DOT Centre (1, 2, 4, 7, 10), travel-related costs (6, 10), alcohol consumption (1, 3, 5, 7,10), no support (4, 8, 10), poverty (3, 4), tobacco use (3, 7), inadequate knowledge of TB (1), substance abuse (1), loss of job (9), no job (7), forgetfulness (2), feeling of recovery (2), drugs finished (2), no transport fare to DOT Centre (2), one or more co-morbid condition (3), rigid routine of health clinic (9), treatment consumes a lot of time and energy (9), pill burden (4), no food (4), extra medical fees for liver protection drugs (6,10), unfriendly attitude of health workers (7).

Following Greg (2012), the most frequently recurring responses and area of interest were identified. Details were extracted from each study and for each question high-lighted. All similar primary factors were grouped, using thematic analysis which helps to highlight the identification, observation and recording of factors within a data.

Data Synthesis

This review was embarked on, to identify the factors that are responsible for poor adherence to TB treatment. In order to identify the factors, qualitative research findings were selected, using Joanna Biggs Institute (JBI) quality tool checklists for qualitative

study. The findings of the studies were assembled, synthesized and categorized on the basis of similarity in meaning.

Some of the studies discerned between the patients who were taking treatments in urban and rural areas, but there was no significant variation in the different settings. Based on that, results were synthesized across all the studies.

The most recurring factor in the studies is financial challenge. One study pointed out that developing TB disease has its own implication for employment (9). The study suggested that TB patients hide their ailment because of fear of having their appointments terminated, if their employers find out that they have TB. Other job-related challenges are fear of losing job if employer finds out and difficulty in getting sick-leave for treatment. The report of the study showed that this category of patients will rather stick to their jobs than be faced with dismissal from duties. The patients being in such dilemma will opt to keep their jobs as they also have more demanding issues to tackle. Patients interrupt their treatments due to the cost of management from diagnosis, to hospitalization and travel-related costs (1, 2, 3, 4, 5, 6, 7, 8, 9, & 10). In some settings, patients reported that they had to pay extra fee for liver protection drugs and that led to poor adherence (6 &10). However, there were some cases where the health personnel refused to acknowledge the fact that extra financial burden caused patients to adhere poorly (6 & 10) because as far as they were concerned, TB treatment is free. Not accepting patients' reason for poor adherence may become a contributory factor in poor adherence which may even make patients not to come back for treatment following missed appointments.

Dilemmas occurring between job and treatment as well as the unspoken costs of treatment (1, 2, 3, 4, 5, 6, 7, 8, 9, &10) that patients encounter may result in expenses that exceed their income. This may lead to lack of economic power which results in poverty. Poverty generally, is seen as a barrier for the assessment of an improved health, such as having access to health care services, eating adequate food, clean drinking water and good sanitation. The possibility of becoming poor was given by both health workers and patients as one of the reasons for poor adherence (4, 7, 9, & 10). Impoverished patients on drugs, the quality and quantity of food patients have at their disposal while on TB treatment was reported to be a factor in poor adherence. Patients also reported that they cannot take drugs in empty stomach, or cannot stay in the hospital if there is no food (3, 4).

Adverse reaction to TB drug.

All the studies (1, 2, 3, 4, 5, 6, 7, 8, 9, &10) indicated adverse reaction to anti-TB drugs as one of the causes of poor adherence. Some of the patients pointed out that they stopped taking their drugs due to the adverse reaction they encountered. Some of the patients reported that they did not know about the adverse drugs reaction until they were faced with it and did not know what do (2, 3, &10). In a number of instances, the health workers were not told about the adverse reaction to the drugs (3), while others who reported, did not get any help, so they stopped treatment (6, 9).

Organizing treatment and care for patients

Distance to treatment Centre was a challenge to many of the TB patients (1, 2, 4 &7). Two studies (2, & 7) reported that the DOT supporters who were expected to come to their homes for administration of the drugs made them travel to their own homes, even in their frail condition so they had to stop treatment. In one study (9), treatment under DOT program consumes a lot time and energy and the time required to take drugs under observation interfere with their efforts to carry out other daily activities, and this led to adhering poorly to drug intake. Other challenges usually encountered at DOT Centre were long hours of waiting, rigid and inconvenient appointment times, coupled with long queues and lack of privacy (9). The relationship of health provider also affected adherence level. One study reported that (2) reported that poor follow-up by health workers and DOT supporters, and maltreatment by supporters (2) which included talking harshly to patients when they missed appointments patients into adhering poorly to treatments.

Many of the studies pointed out that requirements for TB treatments has great effects on the patients' behaviors regarding treatment. The long treatment period could be tiring (1, 2, 3, 4, 7, 8,), stopping treatment due to the long period (4, 6 &7) and pill burden (2) were all decisive factors in completing or not completing treatments.

How illness and wellness are interpreted

One study (2) indicated that some of the patients stopped treatments because of the feelings of recovery or due to the fact that few weeks after commencing treatments, they start feeling better. This challenge may be associated with patients' believes and ideas of the history of TB.

Knowledge of TB

One study (1) reported not having knowledge about TB. The patients only understood poorly that they must take the treatments for a long time. This represents a factor in adhering poorly to TB medications as patients did not understand the reason for treatment completion.

Patients' personal lifestyles

The patients, DOT supporters and health workers believed that patients' personal behaviors will influence whether they will adhere to TB treatment or not. Alcohol misuse (1), tobacco misuse (3 &7), substance abuse (3 &5) were reported to have been influencing patients' poor adherence to treatments. Patients who adhere poorly to treatments were seen as not having interest and do not have regard for their health and the health of others within their communities. Forgetfulness (2) in taking TB treatments was also reported as a factor in poorly adhering to TB drugs.

Stigmas and social supports

Two major factors that cut across all the studies are stigmatization and lack of social supports from family members, friends, health workers and communities (1, 2, 3, 4, 5, 6, 7, 8, 9, &10). The patients may have feelings of guilt and shame when diagnosed of TB and as such, hide their diagnosis. Social stigma may also instill fear into the patients, such that they may be afraid of seeking financial support or time-off from their employers to enable them go for treatments, and this may be a factor in adhering poorly to TB medication.

Discussion

In this review, the identified factors that are responsible for poor adherence to TB treatment are inter-related and they include financial challenges (2, 3, 4, 5, 6, 7, 8, 9, and 10). The challenges are further made complex by the limitations within the health care system which include long duration of treatment (1, 2, 3, 4, 5, 6, 7, 9, &10), side-effects of anti-TB drugs (1, 2, 3, 4, 5, 6, 7, 8, 9, & 10), long distance from DOT Centre (1, 2, 4, 7, &10), drugs finished (2), rigid routine of health clinic (9), TB treatment consumes a lot of time and energy (9), pill burden (4), extra fee charged for diagnosis, hospitalization and liver protection drugs 1 &10), unfriendly attitudes of health workers (7) and the stigmatizing (1, 3, 4, 8, 10) social symbolism of tuberculosis.

Primary and secondary factors that are involved in poor adherence to TB treatment regimen were identified. The primary factors are those that were reported by the patients, while the secondary factors were the researchers' interpretations of the factors as seen in the researchers' conclusions. Each study had characteristics that are similar, though with slight differences in content like the case of 'no food' (7), and 'no transport fare' in (2), were grouped together and gave rise to the approach towards the interpretations of this review. The translations were then condensed into a whole to give full interpretations. Based on the factors that have been translated and the secondary interpretations from the authors, a model that portrays the understanding of the major factors that are responsible for poor adherence behavior was developed. (Fig 2). The elements or factors of the model are economic, personal, social, and health services.

Economic factor: comprised finance (2, 3, 4, 5, 6, 7, 8, 9, & 10), poverty (3, 4), no food (4), extra fee charged for liver protection drugs (1 & 10), no transport fare to DOT Centre (2), loss of job (9), no job (7), drug finished (2) and costs of treatment (1 &10).

Social factor: comprised 'stigma (1, 3, 4, 8, 10) and 'no support' (4, 8, 10) from family, friends or community'.

Personal factor: comprised 'feeling of recovery (2), poor knowledge of TB (1), substance abuse (1), alcohol abuse (1, 3, 5, 7), tobacco abuse (3, 7), and forgetfulness' (2).

Health service factor: comprised 'rigid health clinic (9), poor treatment from health workers (7), unfriendly attitude of health workers (7), long period of treatment (1, 2, 3, 4, 5, 6, 7, 9, 10), long distance from DOT Centre (1, 2, 4, 7), no health facility (8) drug side-effects (1, 2, 3, 4, 5, 6, 7, 8, 9 10), pill burden (4), daily treatment consumes a lot of time and energy (9) and drugs finished (2).

These four, became the basic factors that were discussed using narratives approach.

Economic Factors

World Health Organization (2011) acknowledged that under the Directly Observed Treatment Short-course (DOTS) programme, TB patients are expected to present themselves regularly for treatment. However, Liu et al. (2006) argued that economic, social, and drug-related side effects often create barriers beyond the direct control of patients. These challenges are further intensified by the unavailability, inaccessibility, and unaffordability of healthcare services, thereby influencing patients' decisions either to adhere or not to adhere to treatment.

This review revealed a significant relationship between inadequate financial resources and poor adherence to TB treatment, as identified in nine studies (2, 3, 4, 5, 6, 7, 8, 9, and 10). Financial burdens associated with accessing healthcare services, including indirect costs and job loss (9), often expose TB patients to frustration and psychological distress due to limited access to social support systems (4, 8). Kaufmann and Parida (2007) supported this assertion, stating that both direct and indirect costs associated with treatment may contribute significantly to poor adherence. Similarly, Makanjuola et al. (2014) observed that the prolonged duration of TB treatment and the medical expenses incurred from diagnosis to completion of therapy greatly influence patients' adherence behaviour, with many patients discontinuing treatment at various stages of the regimen.

Liu et al. (2007) conducted a survey on the affordability of TB treatment and found that TB care is not entirely free, as patients still incur expenses related to diagnosis, hospitalization, and transportation. The study revealed that many patients spend a substantial proportion of their annual income on TB treatment despite receiving medications at no cost. The researchers concluded that economic hardship constitutes a major factor contributing to poor adherence. Furthermore, Gillian and Alimuddin (2015) identified poverty as a major determinant of poor adherence to TB treatment. Poverty limits individuals' access to quality healthcare services, adequate nutrition, clean water, and proper sanitation. Kumarasamy et al. (2005) also emphasized that, in some cultures, food is considered essential for recovery from illness. Patients who lack adequate food intake may experience severe adverse drug reactions and difficulties tolerating anti-TB medications. Consequently, some patients avoid taking drugs on an empty stomach, thereby affecting adherence. However, contrary findings were reported by World Health Organization (2009), Lonnroth (2009), and Jaiswal et al. (2003), who found no statistically significant relationship between economic factors and poor adherence among TB patients in India. These studies argued that the benefits of adherence and successful treatment outweigh the financial burdens involved, making adherence ultimately cost-effective.

Social Factors

Social factors identified in this review include social support and stigma. Stigma (1, 3, 4, 8, and 10) and inadequate social support (4, 8, and 10) were repeatedly identified as contributors to poor adherence. Lin et al. (2007) described social support as the care and assistance accessible to TB patients through relationships with family members, friends, groups, and the wider community. Jossy et al. (2012) explained that social support positively affects health in two major ways: first, by buffering the effects of stressful life events, and second, by providing emotional stability that reduces stress-related health complications. Sources of support identified include family members, neighbours, friends, co-workers, religious organisations, self-help groups, and healthcare professionals.

Suparna et al. (2010) noted that the family often provides the most significant form of support for TB patients. Similarly, Katabira et al. (2009), in their study on patients' perceptions of TB treatment adherence in Tanzania, found that social support plays a vital role in encouraging adherence. Kaona et al. (2004) further reported that social support strengthens patients' commitment to treatment through emotional encouragement, financial assistance, and reminders to take medications. However, Volmink and Garner (2007) argued that evidence supporting the effectiveness of social support in improving TB treatment adherence remains statistically insignificant. The review also identified stigma as a major factor contributing to poor adherence (4, 8, and 10). Negative societal attitudes towards TB may compel patients to conceal their diagnosis and treatment status, thereby reducing adherence. Chani et al. (2010), in a study conducted in China, reported that stigma associated with TB often results in social exclusion and restrictions on participation in community activities. Fear of discrimination may discourage patients from disclosing their condition to family members or communities, thereby limiting support and increasing the likelihood of treatment default. Jossy et al. (2012) further stated that stigma and discrimination may discourage TB patients from initiating or continuing treatment, ultimately resulting in poor health outcomes. Additionally, Oshi et al. (2014) observed that employed TB patients risk losing their jobs if employers become aware of their condition. Unemployment (7), job loss (9), and the high cost of treatment therefore remain strong social determinants of poor adherence.

Personal Factors

Personal factors identified in this review include substance abuse (1), alcoholism (1, 3, 5, and 7),

forgetfulness (2), poor knowledge of TB (1), co-morbid conditions (3), and perceived recovery (2).

Patients' decisions regarding medication adherence are influenced by physiological, psychological, social, and cultural factors. Substance abuse, alcoholism, and tobacco use may impair memory and judgment, thereby contributing to forgetfulness and poor adherence to treatment regimens. The perception of "feeling recovered" also influences adherence behaviour. Patients may discontinue medication once symptoms subside, despite medical advice to complete treatment. Dick (2010) observed that poor adherence is more common among patients who lack adequate information about TB and its treatment procedures. Insufficient knowledge regarding the importance of completing treatment regimens may therefore contribute significantly to non-adherence. Nonetheless, patients' personal interpretations and beliefs may interact with healthcare service factors either to improve adherence or to worsen treatment outcomes.

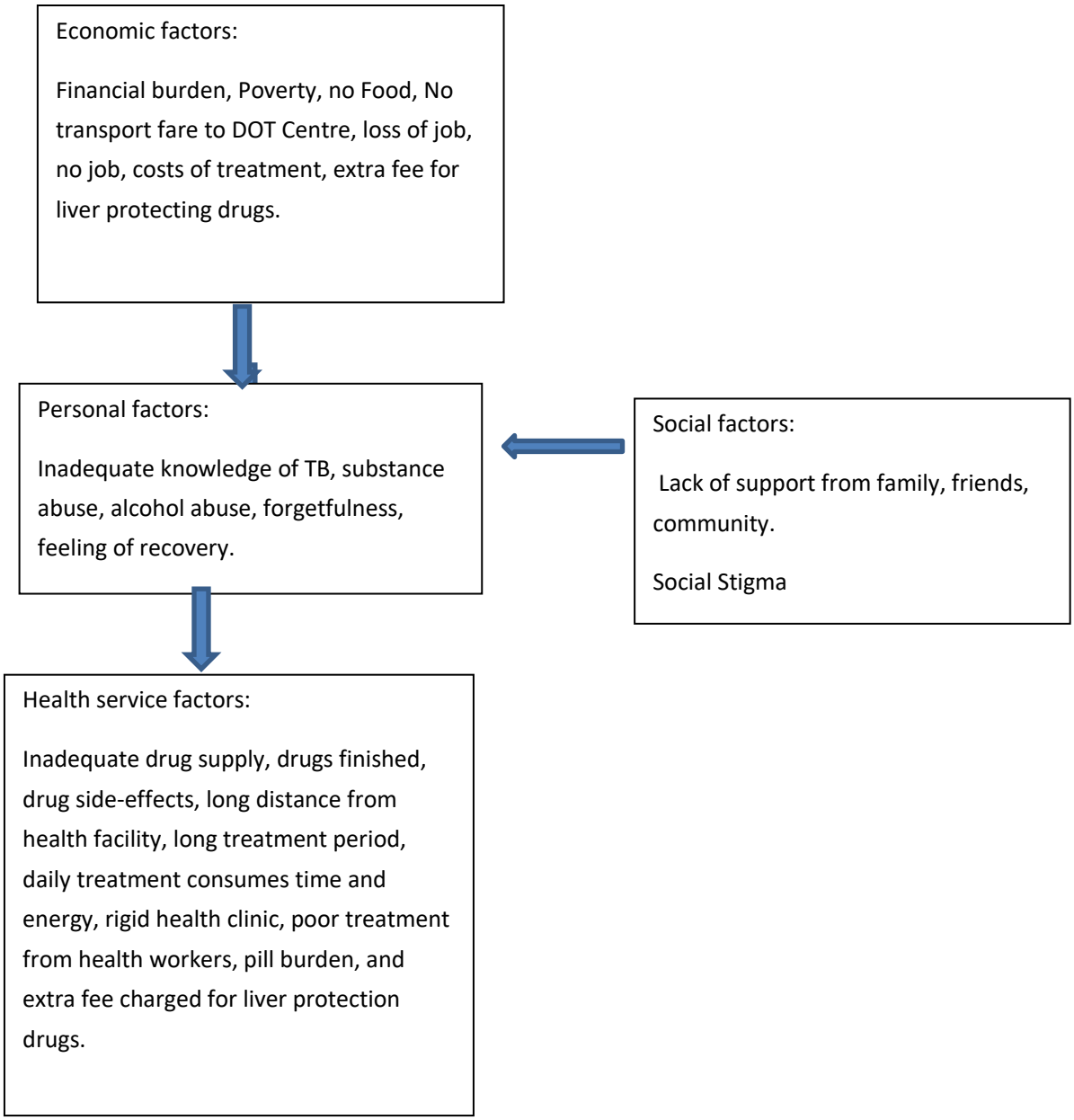
Health Service Factors

Health service-related factors identified in this review include prolonged treatment duration (1–10), long distance to DOT centres (1, 2, 4, 7, and 10), side effects of TB drugs (1–10), inadequate drug supply (2), time-consuming treatment procedures (9), pill burden (4), rigid clinic schedules (9), poor attitudes of health workers (7), drug shortages (2), and additional charges for liver-protection drugs (6 and 10). Dye et al. (2009) reported that poor adherence to TB treatment is largely associated with healthcare service factors such as treatment duration, accessibility of healthcare facilities, attitudes of health workers, and the quality of patient–provider relationships. Daniel and Alausa (2006) noted that many TB patients fail to adhere to treatment because the treatment duration is excessively long. Wang and Shen (2009) similarly argued that the lengthy treatment regimen and use of multiple medications constitute major challenges for TB patients, making treatment appear burdensome and exhausting.

Accessibility to treatment centres also significantly influences adherence. Kaona et al. (2004) found that poor access to TB treatment centres contributes to non-adherence, particularly among patients living in rural areas with inadequate transportation infrastructure. Chang et al. (2004) and Makanjuola et al. (2014) further established a direct relationship between the distance from patients' residences to DOT centres and adherence levels. Patients living within 20 kilometres of treatment centres were found to adhere better than those residing farther away. Similarly, Chani (2010) reported that locating healthcare facilities more than 20 kilometres from patients poses significant challenges, particularly regarding transportation availability and travel costs. These barriers may discourage regular attendance at treatment centres.

The attitudes of healthcare personnel also play a critical role in treatment adherence. Tekle et al. (2002) established a strong relationship between unfriendly attitudes of healthcare workers and poor adherence among TB patients. Supportive patient–provider relationships, effective communication, health education programmes, and full implementation of the DOT strategy were identified as essential measures for improving adherence. Volmink and Garner (2006) emphasized the importance of cordial interpersonal relationships between patients and healthcare providers in promoting adherence. Likewise, Corbett et al. (2006) noted that the quality of healthcare workers and effective communication with patients are crucial factors in reducing poor adherence to TB treatment.

Figure 2:
Model of Identified factors or elements responsible for poor adherence to treatment of TB.



Conclusion:

This review of ten selected studies on factors responsible for poor adherence of TB patients to treatments showed many inter-related responses for poor adherence. The data collected are too heterogeneous to draw any conclusion on the actual factors that are responsible for poor adherence to TB treatment regimen. It is most significant to comprehend the extrapolative factors for poor adherence so that specific strategies can be employed to target the populations at risk. However, the review synthesis showed that TB patients most often experience some difficult challenges in taking their treatment. Some of the challenges may not be under their direct control as the treatment regimen takes a long time. Taking a long course of treatment is not an easy task and it

involves making hard decision such as personal and social costs that will be involved and these may change the behavior of the patient as treatment goes on. Therefore, consideration should be placed on identified factors responsible for poor adherence to medication under the present international TB control strategy (DOTS). Factors such as financial challenges, adverse reaction of TB drugs and personal factors like alcoholism should be tackled, as they have relationship with poor adherence. Since distance from the clinics were identified as being responsible poor adherence to TB treatment regimen, there is need to organize mobile TB clinics, place smaller health Centre in strategic locations for easy reach and make anti-TB drugs more available, especially in rural communities, while leaving the patients to their personal and societal duties towards TB treatment adherence. More patient-centered care is needed to discourage poor adherence to TB treatment so as to reduce the worldwide disease burden attributed to tuberculosis.

Recommendations

Based on the findings of this review, the following recommendations are suggested as measures to help in the eradication of poor adherence to TB treatments, if TB must be eliminated by 2050 as stipulated in MDGs-6 by the United Nations.

1. Ensuring that there is delivery of TB treatment to smaller DOT Center.
2. Use of mobile TB clinics can be put in place for good coverage, especially in places where poor adherences have been reported to be high, to make the services available, accessible and affordable.
3. Policies should be made for the motivation and supervision of treatment for health workers through training, re-training and management processes aimed at improving health workers attitudes towards the patients diagnosed of TB should be put in place.
4. Plan the strategic actions to be taken any time a patient does not keep pre-arranged appointments. This may be in the form of phone calls, text messages or home-visits by health workers to tackle forgetfulness and other related personal factors.
5. The need for health education on necessary information about TB and its treatment regimen.
6. More DOT supporters should be recruited to reduce stress on the available few.
7. Given incentives and reimbursements in terms of money for transport and food at DOT Centre, at each visit before or after treatments, so as to improve the attractiveness of visiting the treatment Centre.
8. Fixed-dose combination drugs should be introduced to reduce the problems of drug side-effects.

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