OBJN
Online Brazilian Journal of Nursing
ISSN: 1676 - 4285 | www.objnursing.uff.br

Submission: 29-May-2026
Approved: 17-Aug-2026

CARE MANAGEMENT TO REDUCE TREATMENT LOSS TO FOLLOW-UP AMONG ADULTS WITH TUBERCULOSIS: A SCOPING REVIEW

GESTÃO DO CUIDADO PARA REDUÇÃO DO ABANDONO AO TRATAMENTO DE ADULTOS COM TUBERCULOSE: REVISÃO DE ESCOPO

GESTIÓN DEL CUIDADO PARA REDUCIR LA PÉRDIDA DURANTE EL SEGUIMIENTO DEL TRATAMIENTO EN ADULTOS CON TUBERCULOSIS: REVISIÓN DE ALCANCE

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How to cite: Souza VMF, Silveira CGS, Braga ALS, Melo ASP, Silveira CS, Christovam BP. Care management to reduce treatment loss to follow-up among adults with tuberculosis: a scoping review. Online Braz J Nurs. 2026;25(1):e20267040. https://doi.org/10.17665/1676-4285.20267040

RESUMO

Objetivo: Mapear ações de gestão do cuidado à saúde que contribuíram para a redução do abandono do tratamento de adultos com tuberculose residentes em países em desenvolvimento. **Método:** Revisão de escopo que seguiu as recomendações do *Joanna Briggs Institute*, com buscas realizadas nas bases de dados MEDLINE, CINAHL, Embase, *Web of Science*, Scopus, LILACS. **Resultados:** 31 estudos compuseram a amostra final com maior representação de estudos desenvolvidos na África e publicados no ano de 2014 (15,15% cada). Os estudos analisados enfatizam quatro dimensões principais de gestão do cuidado: organização dos serviços de saúde, supervisão da adesão ao tratamento, manejo das reações adversas aos medicamentos e suporte social. **Conclusão:** As ações de gestão do cuidado identificadas concentraram-se no fortalecimento da estratégia *directly observed treatment, short-course*, monitoramento clínico e farmacovigilância, uso de tecnologias digitais, atenção farmacêutica e apoio nutricional, além de ações voltadas à educação em saúde, comunicação, aconselhamento, fortalecimento do vínculo e apoio social e familiar. Desse modo, essas intervenções contribuíram para melhorar a adesão ao tratamento e reduzir o abandono terapêutico entre pessoas com tuberculose.
Descritores: Tuberculose; Perda de Seguimento; Avaliação de Resultados em Cuidados de Saúde; Falha de Tratamento; Países em Desenvolvimento.

ABSTRACT

Objective: To map healthcare management interventions that have contributed to reducing treatment loss to follow-up among adults with tuberculosis living in developing countries. **Method:** A scoping review conducted in accordance with the recommendations of the Joanna Briggs Institute. Searches were performed in MEDLINE, CINAHL, Embase, Web of Science, Scopus, and LILACS. **Results:** The final sample comprised 31 studies, with studies conducted in Africa and those published in 2014 being the most frequently represented (15.15% each). The studies emphasized four main dimensions of care management: the organization of health services, supervision of treatment adherence, management of adverse drug reactions, and social support. **Conclusion:** The care management interventions identified focused on strengthening the directly observed treatment, short-course (DOTS) strategy; clinical monitoring and pharmacovigilance; the use of digital technologies; pharmaceutical care; and nutritional support, in addition to health education, communication, counseling, strengthening the patient–provider relationship, and social and family support. These interventions contributed to improving treatment adherence and reducing treatment loss to follow-up among people with tuberculosis.
Descriptors: Tuberculosis; Loss to Follow-Up; Outcome Assessment, Health Care; Treatment Failure; Developing Countries.

RESUMEN

Objetivo: Mapear las intervenciones de gestión del cuidado en salud que han contribuido a reducir la pérdida durante el seguimiento del tratamiento en adultos con tuberculosis residentes en países en desarrollo. **Método:** Revisión de alcance realizada de conformidad con las recomendaciones del Joanna Briggs Institute. Se efectuaron búsquedas en las bases de datos MEDLINE, CINAHL, Embase, Web of Science, Scopus y LILACS. **Resultados:** La muestra final estuvo compuesta por 31 estudios, con una mayor representación de investigaciones realizadas en África y publicadas en 2014 (15,15% cada una). Los estudios destacaron cuatro dimensiones principales de la gestión del cuidado: organización de los servicios de salud, supervisión de la adherencia al tratamiento, manejo de las reacciones adversas a los medicamentos y apoyo social. **Conclusión:** Las intervenciones de gestión del cuidado identificadas se centraron en el fortalecimiento de la estrategia de tratamiento directamente observado de corta duración; el seguimiento clínico y la farmacovigilancia; el uso de tecnologías digitales; la atención farmacéutica; y el apoyo nutricional, además de la educación para la salud, la comunicación, el asesoramiento, el fortalecimiento de la relación entre pacientes y profesionales y el apoyo social y familiar. Estas intervenciones contribuyeron a mejorar la adherencia y reducir la pérdida durante el seguimiento del tratamiento entre las personas con tuberculosis.
Descriptores: Tuberculosis; Pérdida durante el Seguimiento; Evaluación de Resultados en la Atención de Salud; Fracaso del Tratamiento; Países en Desarrollo.

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What is already known:

- Tuberculosis treatment loss to follow-up remains one of the principal challenges to disease control, particularly in developing countries.
- Despite advances, gaps remain in mapping the care management interventions that effectively contribute to reducing tuberculosis treatment loss to follow-up.
- Literature describes several interventions aimed at reducing treatment loss to follow-up; however, the evidence remains fragmented, with strategies generally addressed in isolation.

What this article adds:

- Integrated strategies combining multidisciplinary follow-up, health technologies, and social support appear to have greater potential to improve treatment adherence.
- Organizing the evidence into instrumental and expressive care interventions provides a framework to guide healthcare managers and nurses in planning, implementing, and evaluating care strategies, thereby promoting treatment adherence and continuity.
- The care management interventions mapped included strengthening the DOTS strategy; clinical monitoring and pharmacovigilance; incorporating digital technologies; providing pharmaceutical care, nutritional support, health education, and counseling; strengthening patient–provider relationships and social support; and training healthcare professionals. These interventions were associated with improved adherence, higher cure and treatment success rates, reduced treatment loss to follow-up, and greater safety during tuberculosis treatment.

INTRODUCTION

Tuberculosis (TB) is an infectious, communicable disease caused by the bacterium *Mycobacterium tuberculosis*, also known as Koch's bacillus. The disease primarily affects the lungs but may also involve other organs and systems. It can be transmitted when people with infectious TB expel bacteria into the air, particularly by coughing. Although TB can be severe, it is considered both curable and preventable[1].

Beginning in the 1940s, the following drugs used to treat TB were developed: streptomycin (STR) in 1946, isoniazid (INH) in 1952, rifampicin (RIF) in 1965, ethambutol (EMB) in 1968, and pyrazinamide (PZA) in 1970[2].

Because of the high efficacy of these drugs, TB was once believed to be on the path toward complete eradication[3]. Nevertheless, TB remains a major global public health problem. The principal factors aggravating this situation include poor treatment adherence, as treatment requires the continuous use of medications for six to nine months; the emergence of multidrug-resistant TB (MDR-TB), characterized by simultaneous resistance to isoniazid and rifampicin, the two principal drugs used in treatment; and HIV coinfection, as TB remains the leading cause of death among people living with HIV[4].

According to the 2024 Tuberculosis Epidemiological Bulletin, TB is currently the second leading cause of death from an infectious disease. In 2023, 80,012 new TB cases were reported in Brazil, corresponding to an incidence of 37.0 per 100,000 population. Furthermore, Brazil accounts for one-third of all cases in the Region of the Americas and is included among the 30 countries with the highest burdens of TB and TB–HIV coinfection[1].

The World Health Organization (WHO) estimates that 25% of the global population has been infected with the TB bacillus. Of these individuals, approximately 5%–10% are at risk of developing active disease during their lifetime, particularly within the first few years after infection. Approximately 90% of TB cases each year occur in countries with medium or low Human Development Index (HDI) values, including India, Ethiopia, Gabon, China, South Africa, the Central African Republic, Indonesia, Nigeria, Pakistan, Papua New Guinea, Kenya, Mongolia, Lesotho, Liberia, Mozambique, Namibia, Myanmar, the Philippines, Sierra Leone, Thailand, Uganda, the United Republic of Tanzania, Vietnam, Zambia, Angola, Bangladesh, Brazil, the Democratic People's Republic of Korea, the Republic of the Congo, and the Democratic Republic of the Congo[5-9].

In this context, TB is strongly associated with the social determinants of health, because factors such as living conditions, income, educational attainment, and access to health services affect the risk of developing and transmitting the disease as well as timely diagnosis, treatment initiation, and treatment adherence. Income inequality in developing countries is therefore an important risk factor associated with TB treatment loss to follow-up and is estimated to contribute to approximately 1.9 million cases annually[10].

Healthcare management and the organization of care involve implementing an interconnected set of good practices whose actions, although interdependent, complement one another in the complex task of structuring high-quality services[11]. These practices are guided by intervention planning, resource allocation, and the strengthening of relationships among members of the multidisciplinary team, thereby contributing to efficient, high-quality, and well-structured care. Moreover, continuity is essential to integrated and participatory management, making it necessary to establish clear guidelines, identify barriers, and address existing challenges[12].

From this perspective, healthcare management establishes a dialectical rather than dichotomous relationship between managing and caring. It is a dynamic, context-dependent, systemic process that connects knowledge of management and care, creating an interface between them in professional practice[11].

In this study, care management is understood from a broad perspective that extends beyond the exclusively administrative or organizational dimensions of health services. Care management encompasses the coordination of care-related, clinical, managerial, and care-coordination interventions implemented in an integrated manner to ensure

treatment continuity, patient safety, comprehensive care, and improved health outcomes[11].

From this perspective, clinical monitoring, the management of adverse drug reactions, the prevention of events that may compromise treatment adherence, health education, the strengthening of relationships between healthcare professionals and patients, treatment supervision, and social support are inseparable components of care management. These components support professional decision-making and help patients remain in treatment[11].

Accordingly, this review adopted a comprehensive approach to care management, encompassing not only interventions aimed at organizing health services but also those addressing clinical follow-up and the management of conditions that directly influence the continuity of TB treatment. This methodological approach is based on the understanding that reducing treatment loss to follow-up depends on integrating care-related, managerial, and organizational practices that work complementarily to address the multiple barriers to treatment adherence[11].

Highlighting publications on initiatives and strategies developed to promote TB treatment adherence is therefore essential, because care processes are intrinsically related to managers' competencies across different areas of practice. Such initiatives may replace or complement traditional models and thereby help ensure continuous and effective treatment[12].

This review therefore highlights the relevance of healthcare practices for populations affected by TB. Its objective was to map healthcare management interventions that have contributed to reducing treatment loss to follow-up among adults with TB living in developing countries.

The research question was formulated using the Population, Concept, and Context (PCC) mnemonic, defined as follows: i) population: adults with TB; ii) concept: healthcare management interventions that contribute to reducing loss to follow-up during TB treatment; and iii) context: countries with low or medium levels of development.

METHOD

This study is a scoping review based on the methodological approach recommended by JBI[13], an international research organization that provides guidance for systematic reviews. It also followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) checklist[14]. The study protocol was registered on Open Science Framework (OSF) and is available from https://doi.org/10.17605/OSF.IO/DE34S.

The review question was initially formulated according to the PCC mnemonic – P (population/participants), C (concept), and C (context) – as follows: What healthcare management interventions have contributed to reducing treatment loss to follow-up among adults with TB living in developing countries?

The eligibility criteria were based on the PCC framework. Regarding the population/participants, the review included adults aged 18 years or older undergoing treatment for TB. Patients with multidrug-resistant TB (MDR-TB) and/or HIV/AIDS were excluded because these populations have already been extensively addressed in specific studies. Regarding the concept, the review included studies addressing healthcare management interventions that contributed to reducing loss to follow-up and/or discontinuation of TB treatment.

Regarding the context, studies conducted in the previously mentioned low- and middle-income countries, which account for approximately 90% of TB cases worldwide, were included. Primary care settings, such as primary healthcare centers, and secondary-level outpatient services specializing in TB care were considered. Studies conducted in hospital settings were excluded.

Descriptive observational designs, including case series, case reports, and descriptive cross-sectional studies, were eligible, as were experimental and quasi-experimental studies, including randomized clinical trials and nonrandomized controlled trials. Analytical observational studies, such as prospective and retrospective cohort studies, case-control studies, and analytical cross-sectional studies, were also included.

In addition, systematic and scoping reviews were eligible, as were publications based on manuals issued by the Brazilian Ministry of Health and other national or international organizations. Studies published in any language were included, with no date restrictions, through January 14, 2026. Absence of a date restriction was justified by the long history of TB, which has affected humankind for millennia.

The search strategy was developed from the components of the research question structured according to the PCC mnemonic (Population, Concept, and Context). Controlled vocabulary terms from Medical Subject Headings (MeSH), Descritores em Ciências da Saúde (DeCS), Emtree, and CINAHL Headings were combined with free-text terms related to TB, treatment adherence and loss to follow-up, care management, and developing countries. The descriptors and keywords were combined using the Boolean operators AND and OR.

The search strategy was initially developed for MEDLINE via PubMed and subsequently adapted to the indexing conventions and syntax of CINAHL, Embase, Web of Science, Scopus, and LILACS. Searches were performed without restrictions on language or publication date and included studies indexed through January 14, 2026. The complete search strategies used for each database are presented in Table 1.

Table 1 – Database search strategies. Niterói, RJ, Brazil, 2026

Database	Search strings
MEDLINE/ PubMed	https://doi.org/10.1079/searchRxiv.2024.00729
EMBASE	*('tuberculosis'/exp OR tuberculosis:ti,ab) AND ('patient compliance'/exp OR 'medication adherence'/exp OR adherence:ti,ab OR compliance:ti,ab OR 'treatment adherence':ti,ab OR 'treatment completion':ti,ab OR 'treatment abandonment':ti,ab OR 'treatment default':ti,ab OR 'loss to follow up':ti,ab OR 'treatment failure'/exp) AND ('case management'/exp OR 'health care delivery'/exp OR 'health services administration'/exp OR 'patient centered care'/exp OR 'directly observed therapy':ti,ab OR DOTS:ti,ab OR telemedicine/exp OR pharmacovigilance/exp OR 'social support'/exp) AND ('developing country'/exp OR 'developing countries':ti,ab OR 'low income country':ti,ab OR 'middle income country':ti,ab OR LMIC*:ti,ab)*
SCOPUS	*(tuberculosis) AND (adherence OR compliance OR "treatment adherence" OR "treatment completion" OR "treatment default" OR "treatment abandonment" OR "loss to follow-up" OR "treatment failure") AND ("case management" OR "care management" OR "patient-centered care" OR "health management" OR DOTS OR "directly observed therapy" OR pharmacovigilance OR telemedicine OR "digital health" OR "social support") AND ("developing countries" OR "low-income countries" OR "middle-income countries" OR LMIC)*
WEB OF SCIENCE	*TS=(tuberculosis) AND TS=(adherence OR compliance OR "treatment adherence" OR "treatment completion" OR "treatment default" OR "treatment abandonment" OR "loss to follow-up" OR "treatment failure") AND TS=("case management" OR "care management" OR "patient-centered care" OR DOTS OR "directly observed therapy" OR pharmacovigilance OR telemedicine OR "digital health" OR "social support") AND TS=("developing countries" OR "low-income countries" OR "middle-income countries" OR LMIC)*
LILACS	*(tw:(tuberculose OR tuberculosis)) AND (tw:(adesão OR aderência OR "adesão ao tratamento" OR "abandono do tratamento" OR "perda de seguimento" OR "falha terapêutica")) AND (tw:("gestão do cuidado" OR "gestão em saúde" OR "coordenação do cuidado" OR "atenção centrada no paciente" OR DOTS OR "tratamento diretamente observado" OR farmacovigilância OR "apoio social" OR telemedicina OR "saúde digital")) AND (tw:("países em desenvolvimento" OR "países de baixa renda" OR "países de média renda")*
CINAHL	*(MH "Tuberculosis+" OR TI tuberculosis OR AB tuberculosis) AND (MH "Medication Adherence" OR MH "Patient Compliance" OR TI adherence OR AB adherence OR TI compliance OR AB compliance OR TI "treatment adherence" OR AB "treatment adherence" OR TI "treatment completion" OR AB "treatment completion" OR TI "treatment default" OR AB "treatment default" OR TI "treatment abandonment" OR AB "treatment abandonment" OR TI "loss to follow-up" OR AB "loss to follow-up") AND (MH "Case Management" OR MH "Patient-Centered Care" OR MH "Social Support" OR MH "Telehealth" OR TI "care management" OR AB "care management" OR TI DOTS OR AB DOTS OR TI pharmacovigilance OR AB pharmacovigilance) AND (MH "Developing Countries" OR TI "developing countries" OR AB "developing countries" OR TI LMIC* OR AB LMIC*)*

Source: prepared by the authors, 2026.

The database searches were conducted in January 2026. The information sources were MEDLINE, CINAHL, Embase, Web of Science, Scopus, and LILACS.

The retrieved records were imported into Rayyan[15], where duplicates were identified and removed. Two reviewers independently selected the studies at every stage of the review. During title and abstract screening, 4,348 records were assessed, of which 288 (6.62%) generated disagreements between the reviewers, resulting in an initial agreement rate of 93.38%. During full-text assessment, 125 articles were evaluated, with 20 disagreements (16.0%), corresponding to an initial agreement rate of 84.0%.

All disagreements were discussed by the two reviewers. When consensus could not be reached, the studies were referred to a third reviewer, whose decision regarding inclusion or exclusion was considered final. This procedure was adopted to ensure the methodological consistency, transparency, and reliability of the selection process.

Potentially eligible studies were organized into folders, read in full, and assessed for eligibility. The included studies were subsequently presented in tables. The entire process, from identification to final study inclusion, was reported in a PRISMA-ScR flow diagram[14].

The analyses were conducted descriptively, in accordance with the objective of the review. The search process was developed with the assistance of a scientific research specialist with expertise in literature searches and was peer-reviewed using the Peer Review of Electronic Search Strategies (PRESS) guideline[16].

The extracted data were organized in a chart containing the following information: title, author, year, database, study design, objective, classification of the type of management intervention identified in the study (instrumental or expressive), and principal findings related to reducing TB treatment loss to follow-up among adults living in low- and middle-income countries.

Management interventions comprise expressive and instrumental actions involving both direct and indirect care. These actions integrate the technical, political, social, communicative, citizenship-building, and organizational dimensions of healthcare professionals' practice. Managers must therefore combine the two approaches: the instrumental approach to ensure that the work is performed and the expressive approach to ensure that individuals feel motivated to perform it.

Two reviewers independently classified management interventions as instrumental or expressive based on the theoretical framework for care management proposed by Bárbara Pompeu Christovam and colleagues. This framework integrates the technical and organizational dimensions of care (instrumental actions) with its relational, communicative, and subjective dimensions (expressive actions)[11].

Instrumental actions comprised interventions related to service organization, care protocols, treatment monitoring, follow-up technologies, and pharmacovigilance. Expressive actions comprised strategies related to welcoming and person-centered care, the patient–provider relationship, health education, psychosocial support, therapeutic communication, and the strengthening of interpersonal relationships[11]. Initial agreement was 93.9% (31 of 33 studies), indicating excellent agreement. Disagreements were resolved by consensus with the participation of a third

researcher.

Finally, this study proposes key strategies for TB management by translating the evidence analyzed into practical recommendations and concrete contributions aimed at strengthening good healthcare practices and improving the care pathway provided to patients.

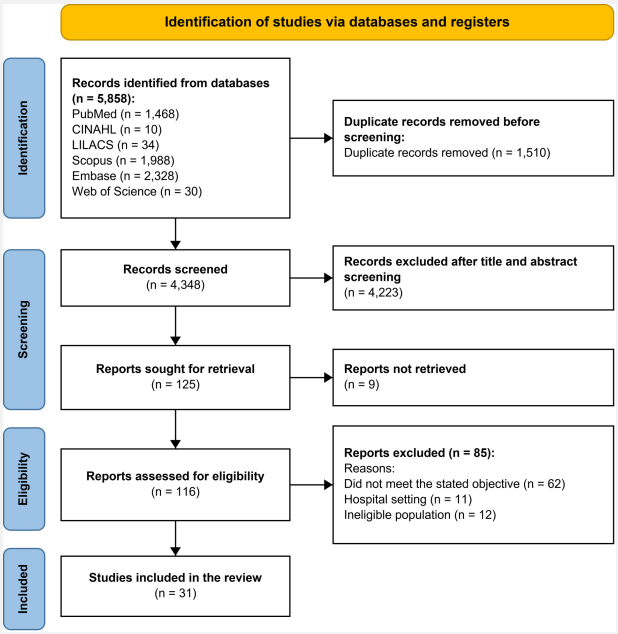
RESULTS

Based on the predefined criteria, a total of 5,858 records were identified in the databases. After the initial screening, 1,510 duplicate records were excluded, leaving 4,348 records for title and abstract screening. Following this assessment, 4,223 records were excluded, leaving 125 articles for full-text review. Ultimately, 31 studies addressed the review question and met the eligibility criteria. Each stage of the selection process is presented in Figure 1.

Table 2 presents the characteristics of the articles included in the review. The information presented includes authors, year of publication, country of origin, database, study design, objective, type of management action (expressive or instrumental), and main findings.

The studies used a variety of designs, with experimental studies being the most common (30.30%). Although the studies were conducted in several locations, Africa was the most frequently represented region (42.42%). The sample comprised publications issued between 1998 and 2025, with the highest proportion published in 2014 (15.15%), followed by 2020 and 2025 (12.12% each) and then 2012 and 2017 (9.09% each). In the remaining years, the frequency ranged from 3.03% to 6.06%. Regarding the types of management actions addressed in the articles, 78.79% were classified as instrumental and 21.21% as expressive.

Figure 1 – Flow diagram of the study selection process. Niterói, RJ, Brazil, 2026



Source: adapted from PRISMA, 2020.

Table 2 – Characteristics of the studies included in the scoping review. Niterói, RJ, Brazil, 2026

Study ID	Setting	Database/study design	Objective	Type of management action	Main findings
E1 – Dye *et al.*, 1998[17]	Sub-Saharan Africa, the Americas, Eastern Mediterranean, Western Europe, Eastern Europe, Southeast Asia, and Western Pacific	Scopus; mathematical and documentary modeling study	To assess the potential impact of the World Health Organization-recommended DOTS strategy on global TB control.	Instrumental	The study highlights the urgent need to improve TB case detection and cure rates, particularly in countries with a high disease burden, to maximize the impact of DOTS and substantially reduce the global burden of TB.
E2 – Shakya, Rao and Shrestha, 2005[18]	Nepal	PubMed; prospective cohort study	To investigate the management of hepatotoxicity induced by antituberculosis drugs and the procedure for reintroducing standard therapy with these medications.	Instrumental	All patients tolerated the antituberculosis drugs well after their reintroduction. No recurrence occurred.
E3 – Zaka-Ur-Rehman, Jamshaid and Chaudhry, 2008[19]	Pakistan	PubMed; experimental study	To assess the clinical and therapeutic value of four- and three-drug FDCs versus single-drug formulations in patients with pulmonary TB.	Instrumental	The adverse effects observed in the three groups strongly indicate that FDCs are safer for treating patients with TB.
E4 – Chhetri *et al.*, 2008[20]	Nepal	PubMed; retrospective cohort study	To investigate ADRs occurring during DOTS therapy and assess their causality, severity, and predisposing factors..	Instrumental	The study indicates a need for a system that adequately monitors ADRs caused by antituberculosis drugs.
E5 – Gabriel and Mercado, 2011[21]	Africa	Scopus; documentary study	To assess the efficiency and effectiveness of CB-DOTS, an alternative strategy considered as effective as facility-based DOTS.	Instrumental	Modified CB-DOTS is as effective as the DOTS strategy for TB control.

Study ID	Setting	Database/study design	Objective	Type of management action	Main findings
E6 – Awaisu *et al*., 2011[22]	Malaysia	Scopus; experimental study	To assess the impact of adding smoking-cessation interventions to TB treatment.	Instrumental	The study confirmed the potential benefits of combining smoking cessation with DOTS to improve TB treatment outcomes.
E7 – Wu *et al*., 2012[23]	China	PubMed; retrospective cohort study	To assess the effects of scheduled liver-function monitoring on the detection of asymptomatic liver injury and TB treatment outcomes.	Instrumental	Scheduled monitoring effectively identified asymptomatic liver injury, reduced hospitalization rates, and improved adherence to antituberculosis treatment.
E8 – Lv *et al*., 2013[24]	China	PubMed; prospective cohort study	To determine the incidence and prognosis of ADRs resulting from DOTS and assess their impact on TB treatment in China.	Instrumental	The study demonstrated that 15.08% of patients with TB receiving DOTS experienced one or more ADRs.
E9 – Otu, 2013[25]	Nigeria (West Africa)	Embase; literature review	To conduct a structured literature review assessing whether DOTS remains an effective strategy for TB control in developing countries.	Instrumental	Although DOTS remains essential, it must be improved and adapted – evolving into DOTS-Plus – to address contemporary challenges such as HIV coinfection and the limitations of direct supervision.
E10 – Kisambu, Nuwaha and Sekandi, 2014[26]	Uganda (East-Central Africa)	PubMed; cross-sectional study	To estimate levels of adherence to antituberculosis medications and associated risk factors in a pastoral community practicing transhumance in northeastern Uganda.	Instrumental	Independent predictors of medication adherence were perceived drug-related adverse effects, medication shortages, and failure to complete the DOT card. Adherence among pastoralists was suboptimal because of the poor institutionalization of the DOTS strategy.
E11 – Ibrahim *et al*., 2014[27]	Nigeria (West Africa)	PubMed; cross-sectional study	To investigate healthcare professionals' knowledge of the management of patients with TB, including their perceptions of the reasons for patient nonadherence, to develop strategies for improving the quality of TB control services in the state.	Expressive	Refresher training is recommended for healthcare professionals, including training in interpersonal communication and treatment-adherence counseling for all patients.
E12 – Bediang *et al*., 2014[28]	Cameroon (Central Africa)	Scopus; experimental study	To assess the effect of SMS reminders on the cure rate among patients with smear-positive pulmonary TB, as measured by sputum-smear microscopy after 6 months.	Instrumental	Although DOTS has significantly improved TB control, its implementation remains difficult in developing countries. This study has the potential to support the DOTS strategy in achieving its expected outcomes. SMS reminders constitute a relatively new intervention that is increasingly being used in health systems.
E13 – Das *et al*., 2014[29]	India	PubMed; retrospective cohort study	To describe the experiences of a Médecins Sans Frontières TB program in the border region between Andhra Pradesh and Chhattisgarh, India, from January to December 2012.	Instrumental	Complete TB treatment can be delivered using intermittent DOT or daily SAT. National TB programs should incorporate SAT strategies into TB treatment.
E14 – Sisay *et al*., 2014[30]	Ethiopia (East Africa)	Scopus; retrospective cohort study	To assess the impact of DOTS on TB case detection and treatment outcomes in Gambella Regional State, Ethiopia, from 2003 to 2012 and from 2002 to 2011, respectively.	Instrumental	The detection rate for smear-positive pulmonary TB increased, and the treatment success rate rose from 13% to 92%. Mean treatment loss-to-follow-up and failure rates were 4.2% and 0.3%, respectively.

Study ID	Setting	Database/study design	Objective	Type of management action	Main findings
E15 – Snidal *et al*., 2015[31]	Uganda (East-Central Africa)	PubMed; observational study	To assess the impact of a comprehensive patient-support program on TB treatment outcomes, including eCompliance, a biometric medical-record system intended to increase patient adherence to treatment.	Instrumental	The eCompliance pilot project demonstrated the potential to improve follow-up among patients with TB in resource-limited rural areas. Its implementation may reduce the number of patients lost to follow-up.
E16 – Chu *et al*., 2015[32]	China	PubMed; experimental study	To assess the clinical effectiveness and safety of bicyclol combined with glucurolactone for preventing DILI among patients with TB and underlying liver disease.	Instrumental	Adding bicyclol to standard hepatoprotective agents may effectively and safely prevent antituberculosis drug-induced liver injury among patients with underlying liver disease and help simplify antituberculosis treatment.
E17 – Amagon, Awodele and Akindele, 2017[33]	Nigeria (West Africa)	PubMed; experimental study	To assess the modulation of antituberculosis drug-induced toxicity by methionine and vitamin B complex in patients.	Instrumental	Methionine and vitamin B complex modulated hepatic, renal, hematological, and antioxidant indices as well as adverse effects, among patients receiving antituberculosis drugs.
E18 – Lopes *et al*., 2017[34]	Brazil	PubMed; case-control study	To describe and assess the impact of pharmaceutical care provided to patients undergoing treatment for TB.	Expressive	A rational decision-making process concerning drug therapy should be carefully documented, evaluated, improved, and implemented during the follow-up of patients receiving long-term medication.
E19 – Tanani *et al*., 2017[35]	Morocco (North Africa)	PubMed; observational study	To demonstrate the value of integrating pharmacovigilance into the Moroccan Tuberculosis Control Program.	Instrumental	Integrating pharmacovigilance is crucial to the success of any public health program involving medication use.
E20 – Mansour *et al*., 2018[36]	Kenya (East Africa)	PubMed; retrospective cohort study	To determine whether nutritional support is associated with a reduced risk of loss to follow-up among patients with TB in Kenya.	Instrumental	Nutritional support – particularly nutritional education and counseling and/or fortified foods – was associated with a reduced risk of loss to follow-up.
E21 – Park *et al*., 2019[37]	Morocco (North Africa)	PubMed; experimental study	To investigate the effectiveness of a MEMS as a tailored intervention to promote treatment adherence in Morocco.	Instrumental	MEMS increased the TB treatment success rate and reduced loss to follow-up among patients with infectious TB in a rural area of Morocco, particularly during the intensive phase.
E22 – Mwansa-Kambafwile *et al*., 2020[38]	South Africa	PubMed; exploratory study	To explore the reasons for initial loss to follow-up from TB treatment from the perspectives of TB program managers and WBOT managers, with particular emphasis on the potential role of WBOTs in reducing early loss to follow-up.	Expressive	Staff turnover, poor communication with patients, and inadequate counseling contribute to early loss to follow-up from TB treatment. It is also essential to involve WBOTs in patient follow-up rather than limiting their role to referring people with suspected TB and those already receiving treatment.
E23 – Moodley *et al*., 2020[39]	South Africa	PubMed; exploratory study	To explore healthcare professionals' and patients' perspectives on gaps in TB-related messaging that influence treatment discontinuation.	Expressive	Limited employment opportunities, fear of disclosing the diagnosis, and stigma contributed to treatment discontinuation. The TB-related messages received by patients were inadequate. Physicians' inability to establish trusting relationships or identify sources of social support represented a challenge to adherence.

Study ID	Setting	Database/study design	Objective	Type of management action	Main findings
E24 – Guo *et al*., 2020[40]	China	PubMed; experimental study	To assess the clinical and cost-related benefits of VOT compared with DOT.	Instrumental	VOT enabled meaningful direct observation of patients with TB through mobile devices and was highly acceptable to both patients and healthcare professionals. It also saved time and was cost-effective.
E25 – Chen *et al*., 2020[41]	China	PubMed; cross-sectional study	To assess treatment adherence among patients newly diagnosed with TB in Dalian, northeastern China, and determine the effects of family, social, and national public-policy factors on treatment adherence.	Expressive	Patients whose family members frequently supervised medication use and provided emotional support showed greater adherence, as did those with a good physician–patient relationship, greater knowledge of TB, and a strong perceived need for policy support.
E26 – Mahapatra *et al*., 2024[42]	India	PubMed; experimental study	To determine the effect of locally available food supplements on treatment outcomes and health-related quality of life among patients with pulmonary TB initiating antituberculosis treatment in Odisha, India.	Instrumental	Improvements in patients' nutritional status may be considered a predictor of treatment success. Early nutritional supplementation has a positive effect on nutritional status.
E27 – Oh *et al*., 2024[43]	Malaysia	PubMed; phenomenological study	To explore the barriers, challenges, coping strategies, and facilitators associated with TB treatment interruption to understand the treatment journey toward successful outcomes.	Expressive	Improved patient education, combined with tailored interventions addressing psychosocial and economic barriers, is crucial to ensuring TB treatment completion.
E28 – Baral *et al*., 2025[44]	India	PubMed; prospective cohort study	To assess the effect of probiotic supplementation on multiple dimensions of TB treatment, including clinical, humanistic, and safety outcomes.	Instrumental	Probiotic supplementation had a favorable effect on systemic inflammation and significantly reduced the incidence of adverse reactions to antituberculosis drugs, particularly gastrointestinal adverse effects.
E29 – Xie *et al*., 2025[45]	China	PubMed; literature review	To systematically retrieve, appraise, and synthesize the best available evidence on medication adherence and TB management among adults, providing an evidence base for optimizing clinical practice.	Expressive	The main strategies include strengthening individualized, patient-centered care; expanding digital health technologies; optimizing adverse-reaction protocols; and integrating social-support resources.
E30 – Ananda *et al*., 2025[46]	India	Embase; retrospective cohort study	To develop a web-based application supporting the personalized treatment of patients with TB according to their clinical condition.	Instrumental	The web-based application represents a step toward precision medicine and is expected to help identify adverse effects and potential incompatibilities between medications while paving the way for further research.
E31 – Ariyanti *et al*., 2025[47]	Indonesia	Scopus; cross-sectional study	To investigate the influence of health-system responsiveness on TB treatment adherence among patients receiving care at public primary healthcare facilities in Indonesia.	Expressive	Nonmedical dimensions – particularly those related to attention, autonomy, and the quality of the physical environment – should be considered and improved to increase medication adherence among people with TB.

Source: prepared by the authors, 2026.

ADRs: adverse drug reactions; CB-DOTS: community-based directly observed treatment, short-course; DILI: drug-induced liver injury; DOT: directly observed therapy; DOTS: directly observed treatment, short-course; FDCs: fixed-dose

combinations; MEMS: Medication Event Monitoring System; SAT: self-administered therapy; SMS: short message service; TB: tuberculosis; VOT: video-observed therapy; WBOTs: ward-based outreach teams; WHO: World Health Organization.

DISCUSSION

Reducing TB treatment loss to follow-up among adults requires the implementation of integrated care management actions that consider not only the clinical aspects of the disease but also the social, organizational, and behavioral factors that influence treatment adherence. Isolated interventions have a limited impact, highlighting the need for interventions structured around multidimensional models of care[17, 21,24,19].

The studies analyzed primarily emphasized four major dimensions of care management: the organization of health services[17,21,23-25,29,30,34,37,38,40,45,47]; supervision of treatment adherence[17,21,23,24,25,26,30,45]; management of adverse drug reactions[18-20,24,26,32,33,35,42,44,45]; and social support for patients within their social contexts[36,39,41,43].

Regarding the organization of health services, a paradigm shift can be observed in TB management, from a predominantly biomedical model centered on epidemiological surveillance to a patient-centered approach. This model entails recognizing patients' individual needs, cultural values, and socioeconomic circumstances, thereby supporting the development of individualized treatment plans and stronger relationships between patients and healthcare professionals[24,29,30,40].

Research also indicates that approaches based on effective communication, health education, and counseling throughout treatment significantly improve patients' understanding of the disease and therapeutic regimen, thereby reducing treatment discontinuation behaviors[27,29,37]. Tailoring communication, strengthening relationships between healthcare professionals and patients, and training healthcare teams to address cultural differences are strategies that help increase patients' trust in health services[39,45].

Furthermore, improvements in the quality and accessibility of services – particularly shorter waiting times, easier access to healthcare facilities, and effective interprofessional communication – are associated with higher rates of medication adherence[22,29].

Another dimension identified in the studies was the supervision of medication adherence. Directly observed therapy (DOT) was one of the most frequently used interventions among vulnerable populations and patients receiving complex therapeutic regimens. It is intended to ensure regular medication use by enabling continuous patient follow-up and the early identification of treatment-related difficulties, such as adverse effects and social barriers[23,24,26,30,45]. In this context, systematic supervision by healthcare professionals helps prevent treatment failure and reduce loss to follow-up by strengthening clinical monitoring and patient support throughout treatment[21].

The findings of this review are consistent with evidence synthesized in systematic reviews indicating that reducing TB treatment loss to follow-up depends on implementing multifaceted, patient-centered strategies. The systematic review and meta-analysis by Alipanah *et al.*[48] demonstrated that combined interventions, such as DOT, health education, psychosocial support, incentives, and social enablers, have greater potential to improve treatment adherence than isolated interventions. Care management should therefore integrate clinical, organizational, and social actions to promote treatment continuity and reduce rates of loss to follow-up[48].

However, the authors highlighted the operational limitations of DOT, including shortages of healthcare professionals, transportation costs for patients, and logistical difficulties within health services. These factors may hinder its implementation in resource-limited settings[23-25, 40,45].

In this context, digital health technologies have emerged as promising tools for complementing traditional supervision strategies. These technologies include mobile applications, electronic pillboxes, electronic reminder systems, and video-based systems for treatment observation. Such tools enable remote treatment monitoring, expand the coverage of therapeutic follow-up, and reduce barriers related to distance and the availability of healthcare professionals[28,31,37,38,40,45,46].

The findings concerning digital technologies are consistent with recent systematic reviews demonstrating the potential of these tools to strengthen the longitudinal follow-up of patients with TB. Resources such as video-observed therapy (VOT), text messages (SMS), mobile applications, and electronic monitoring devices can improve treatment adherence, facilitate communication between patients and healthcare professionals, and optimize medication administration monitoring. These strategies therefore represent important tools for supporting care management, particularly in settings where access to health services is limited[49].

Nevertheless, the authors emphasized that implementing these technologies in low- and middle-income countries continues to present challenges, particularly regarding access to mobile devices, technological infrastructure, and the financial sustainability of interventions[22, 29, 37,45].

The management of adverse drug reactions also emerged as an essential component of care management because prolonged and complex therapeutic regimens are frequently associated with adverse effects that may compromise treatment continuity. In this context, systematic clinical follow-up, combined with the early identification and appropriate management of adverse reactions, helps improve treatment tolerability and prevent treatment interruption[18,19,32,33,42,44].

The involvement of multidisciplinary teams – including physicians, nurses, and pharmacists – supports the adjustment of therapeutic regimens, patient education, and mitigation of the effects of adverse events on treatment continuity. Active management of adverse drug reactions therefore not only improves treatment safety but also promotes adherence and reduces treatment loss to follow-up[27,34,36,39,43].

Another aspect highlighted was the importance of the early management of adverse drug reactions as a component of care management. Although most systematic reviews emphasize adherence-related strategies, there is broad agreement that continuous monitoring of adverse

events, combined with health education and multidisciplinary follow-up, reduces barriers to treatment continuity. Accordingly, the clinical management of adverse effects should be understood not only as a therapeutic intervention but also as a care management strategy capable of supporting professional decision-making, preventing treatment interruptions, and improving patient safety[50].

In addition to clinical and organizational aspects, the authors highlighted the importance of social support in achieving treatment success, particularly support from families, communities, and institutions[30,34]. Interventions such as psychological support, support groups, financial assistance, food support, and transportation subsidies were associated with higher treatment adherence rates because they mitigated the effects of the social vulnerabilities that frequently affect patients with TB in developing countries. These initiatives are particularly important in such countries, where socioeconomic circumstances, social stigma, and difficulties accessing health services constitute major barriers to treatment continuity[17,21,36,41,43].

Although the included studies were conducted across different sociocultural contexts and healthcare systems, they converged on the importance of strengthening the DOTS strategy and its adaptations as a cornerstone of TB care management. These strategies supported expanded case detection, increased cure rates, improved treatment adherence, and reduced loss to follow-up, demonstrating that organized and systematic follow-up is essential to treatment success.

Similarly, actions addressing the monitoring of adverse reactions, prevention of hepatotoxicity, and pharmacovigilance demonstrated that managing patient safety contributes to treatment continuity by enabling the early identification and timely management of events that could otherwise lead to treatment interruption.

Furthermore, the use of health technologies, such as digital monitoring and communication tools, strengthened longitudinal follow-up, enhanced patient–provider relationships, and promoted treatment adherence. Another relevant aspect concerns the influence of social, educational, and nutritional determinants, which reinforces the need for comprehensive, person-centered care management.

These findings demonstrate that reducing treatment loss to follow-up depends on coordinating organizational, clinical, and relational actions, moving beyond exclusively biomedical approaches and strengthening interdisciplinary practices capable of addressing the multiple needs of people affected by TB.

The convergence between the studies included in this review and the evidence generated by systematic reviews and meta-analyses reinforces the need to understand TB care management from a broad perspective that integrates service coordination, clinical follow-up, social support, health education, and the incorporation of technologies. This approach supports the development of more effective, patient-centered models of care aligned with international recommendations for TB control, thereby increasing the potential to reduce treatment loss to follow-up and improve clinical outcomes.

Overall, the studies demonstrate that reducing TB treatment loss to follow-up depends on coordinating integrated care management strategies capable of simultaneously addressing the clinical, organizational, and social factors that influence treatment adherence. They also emphasize that the success of care management strategies depends on integration across different levels of care and the involvement of multidisciplinary teams comprising physicians, nurses, pharmacists, and community health workers[40,45,47].

Coordination among services, combined with the organization of care pathways and continuous patient follow-up, promotes continuity of care and increases the likelihood of treatment success. The literature therefore indicates that reducing TB treatment loss to follow-up requires integrated care models capable of coordinating clinical, educational, social, and technological interventions, particularly in contexts of greater social vulnerability[17,37,40].

This study has some limitations that should be considered when interpreting its findings. The inclusion of research conducted in different countries and sociocultural contexts may limit the generalizability of the findings to specific healthcare systems. In addition, the predominance of management actions classified as instrumental among the studies analyzed may have restricted the identification of practices related to the subjective dimensions of care. Because this was a scoping review, the methodological quality of the included studies was not critically appraised, limiting assessment of the quality of the evidence identified.

Despite these limitations, this study makes relevant contributions to healthcare by systematically synthesizing and mapping healthcare management actions associated with reduced TB treatment loss to follow-up, thereby helping organize the body of knowledge in this field. Furthermore, the findings identify strategic dimensions of care management that may be implemented and provide healthcare managers and professionals with evidence to support the planning of interventions that promote treatment adherence and continuity of care in settings characterized by greater vulnerability.

CONTRIBUTIONS TO PRACTICE

Analysis of the studies identified eight dimensions of care management associated with reducing TB treatment loss to follow-up: i) organization of health services; ii) health education; iii) supervision of treatment adherence; iv) digital technologies for follow-up; v) management of adverse drug reactions; vi) social support; vii) comprehensive multidisciplinary care; and viii) care for vulnerable populations. Because they recurred across the studies, these dimensions formed the basis for developing the recommendations.

All the recommendations presented were derived from the synthesis of evidence mapped in this scoping review and are intended to support professional practice and inform the planning of care management actions.

The first dimension concerns the organization of health services and highlights the importance of patient-centered care, stronger communication among teams, expanded access to services, and healthcare professional training[17,21,23-25,29,30,34,37,38,40,45,47].

The second dimension is health education, which includes ongoing counseling, guidance concerning the dis-

ease and its treatment, clear communication, and encouragement of patients' active participation throughout the treatment process[27,29,37,39,45].

The third dimension concerns the supervision of treatment adherence, including strengthening DOT, monitoring the difficulties experienced by patients, and systematically assessing adherence to enable the early identification of the risk of loss to follow-up[17,21,24-26,30,45].

The fourth dimension highlights the role of digital technologies, including applications, electronic messages, video-observed therapy, and other tools that support follow-up and communication between health services and patients[28,31,37,38,40,45,46].

The fifth dimension encompasses the management of adverse drug reactions, demonstrating that the early identification and appropriate treatment of adverse events reduce treatment interruptions and help patients remain in treatment[18-20,24,26,32,33,35,42,44,45].

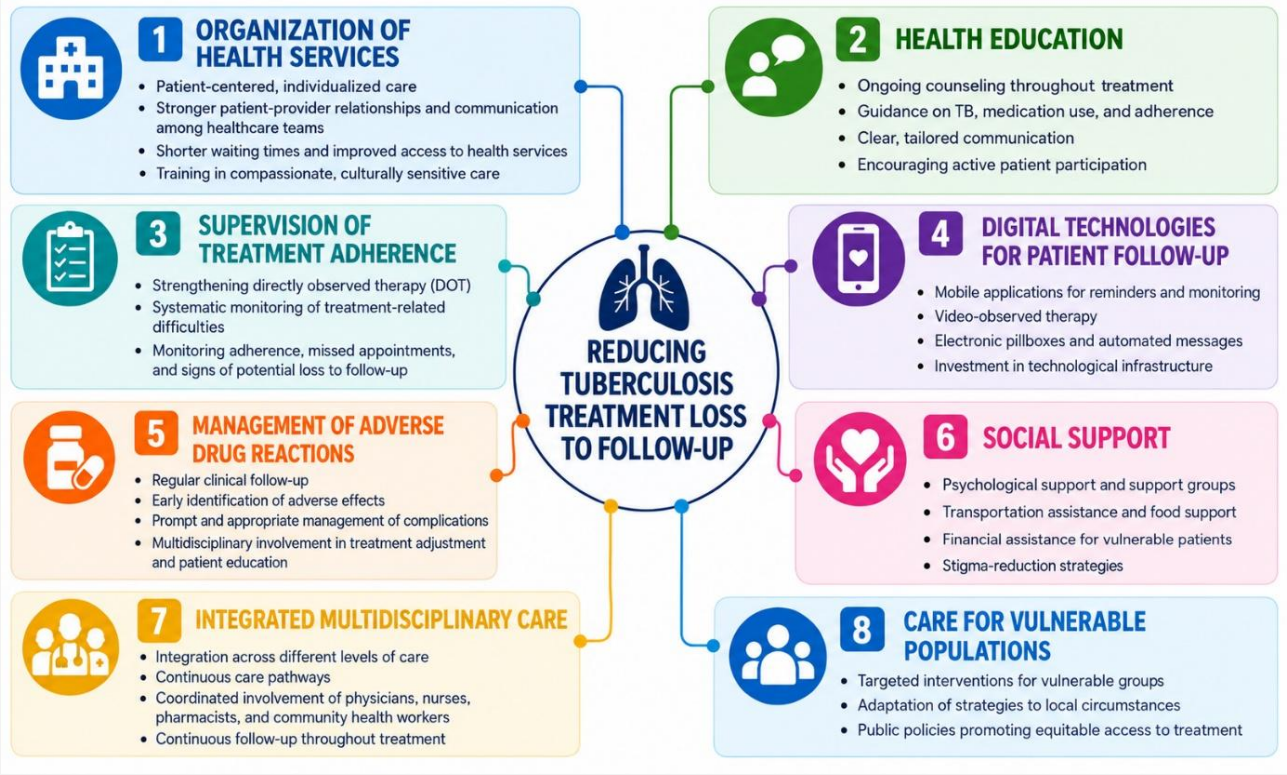
The sixth dimension concerns social support and emphasizes the importance of psychological support, transportation and food assistance, financial assistance for patients experiencing vulnerability, and strategies for reducing TB-related stigma[36,39,41,43].

The seventh dimension concerns integrated multidisciplinary care and emphasizes the need for coordinated action among different healthcare professionals and levels of care to ensure continuity and comprehensiveness of care[27,34,36,39,43].

The eighth dimension highlights care for vulnerable populations through the adaptation of strategies to the specific needs of each group and the strengthening of public policies that promote greater equity in access to treatment[22,29,43].

Figure 2 therefore demonstrates that reducing treatment loss to follow-up does not depend on a single intervention but on integrating these eight dimensions of care management. This was the principal finding of the review, demonstrating that combining care-related, managerial, and organizational actions is essential to promote adherence, ensure treatment continuity, and improve health outcomes.

Figure 2 – Dimensions of care management associated with reducing tuberculosis treatment loss to follow-up. Niterói, RJ, Brazil, 2026



Source: prepared by the authors, 2026.

CONCLUSION

The evidence demonstrated that strengthening health service organization, the DOTS strategy, health education, clinical monitoring, and pharmacovigilance – together with digital technologies, social support, and multidisciplinary care – constitutes a promising approach to promoting treatment adherence, increasing cure and treatment success rates, reducing treatment discontinuation and loss to follow-up, and improving continuity of care. These findings can inform the planning and implementation of person-centered management interventions, thereby strengthening care management and contributing to the achievement of TB control targets.

Overall, the recommendations presented in this study demonstrate that isolated strategies have a limited impact and that integrated care models combining clinical, educational, social, and technological interventions are more

effective.

However, the effectiveness of these strategies depends on resource availability, the organization of health systems, and the sociocultural characteristics of the contexts in which they are implemented. This reinforces the need to adapt interventions to local circumstances.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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All authors are responsible for the writing and critical review of the intellectual content, for the final published version, and for all ethical, legal, and scientific aspects related to the accuracy and integrity of the study.

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