



JURNAL AISYAH: JURNAL ILMU KESEHATAN

Online ISSN 2502-9495

Print ISSN 2502-4825

International Physics journal

Best Journal to publish paper quickly



Home (<https://aisyah.journalpress.id/index.php/jika/index>)
/ Jurnal Aisyah : Jurnal Ilmu Kesehatan
(<https://aisyah.journalpress.id/index.php/jika/index>)

Jurnal Aisyah : Jurnal Ilmu Kesehatan

About Journal

Announcements

Author Index



(</index.php/jika/about/submissions#onlineSubmission>)
Online
Submission

HOME

(</index.php/jika/index>)

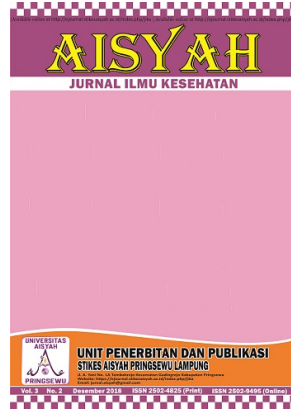
Focus & Scoupe

(</index.php/jika/about/editorialPolicies#focusAndScoupe>)

(<https://aisyah.journalpress.id/index.php/jika/search/authors>)

Title Index

(<https://aisyah.journalpress.id/index.php/jika/search/titles>)



Jurnal Aisyah: Jurnal Ilmu Kesehatan (JIKa), with registered number ISSN 2502-4825 (<http://u.lipi.go.id/1454312280>) (Print) and ISSN 2502-9495 (<http://u.lipi.go.id/1454309604>) (Online), is an international peer-reviewed journal published two times a year (March and September) 2024 by Universitas Aisyah Pringsewu (UAP) Lampung. JIKa is intended to be the journal for publishing

articles reporting the results of research in the Health Science field, especially Nursing and Midwifery, as well as with their development through an interdisciplinary and multidisciplinary approach. The submission process of the manuscript is open throughout the year. All submitted manuscripts will go through a blind peer review and editorial review before being granted with acceptance for publication.

Initially published in 2016, JIKa has been using Open Journal System requiring all writers to register in advance before they are allowed to upload the manuscript they write online. Afterwards, the editors, peer reviewers, and authors can monitor the manuscript processing.

Accepted and published papers will be freely accessed in this website and the following abstracting & indexing databases:

Author Guidelines

(</index.php/jika/about/submissions#authorGuidelines>)

Editorial Team

(</index.php/jika/about/editorialTeam>)

Reviewer

Acknowledgement

(</index.php/jika/about/displayMembership/3>)

Publication Ethics

(</index.php/jika/about/editorialPolicies#custom-0>)

Open Access Policies

(</index.php/jika/about/editorialPolicies#openAccessPolicy>)

Plagiarism Policies

(</index.php/jika/about/editorialPolicies#custom-1>)

Publishing System

(</index.php/jika/about/aboutThisPublishingSystem>)

Author Fees

(</index.php/jika/about/submissions#authorFees>)

Contact Us

(</index.php/jika/about/contact>)

User

Username

Password

- **Science and Technology Index (SINTA 2)**
(<https://sinta.kemdikbud.go.id/journals/detail?id=2241>) by
Ristekdikti of The Republic of Indonesia
- **Crossref Search** (<https://search.crossref.org/?q=2502-4825>)
- **GOOGLE Scholar** (<https://scholar.google.co.id/citations?hl=id&authuser=2&user=VFkGI2oAAAAJ>)
- **Public Knowledge Project (PKP) Index**
(<http://index.pkp.sfu.ca/index.php/browse/index/2026>)
- **Indonesian Publications Index (IPI)**
(<http://id.portalgaruda.org/?ref=browse&mod=viewjournal&journal=10445>)
- **Indonesia One Search** ([http://onsearch.id/Search/Results?filter\[\]=repold:IOS4527](http://onsearch.id/Search/Results?filter[]=repold:IOS4527))
- **BASE Bielefeld search engine.** (<http://www.base-search.net/Search/Results?lookfor=dccoll%3Aftstikesaplojs+url%3Ajika&refid=dclink>)
- **Dimension** (https://app.dimensions.ai/discover/publication?and_facet_source_title=jour.1319199)
- **GARUDA**
(<https://garuda.kemdikbud.go.id/journal/view/19803>)
- **OpenAire** (<https://explore.openaire.eu/search/dataprovider?datasourceId=doajarticles::673a0b296deabb3ec86b5e3e9d1031e1>)

The Journal Also has been list in:

- **LOCKSS Archiving System** (</index.php/jika/gateway/lockss>)
- **EBSCO Information Service**
(<http://atoz.ebsco.com/Titles/SearchResults/8623?SearchType=Contains&Find=2502-9495&GetResourcesBy=QuickSearch&resourceTypeName=journalsOnly&resourceType=1&radioButtonChanged=>)
- **ROAD ISSN** (<https://portal.issn.org/resource/ISSN/2502-9495>)

☐ Remember me

Login

Template



(<https://docs.google.com/document/d/1czW6MIOYzj1cYaM4biSmBntfO5/edit?usp=sharing&oid=112894158721370090552&rtpof=>

OAI Address

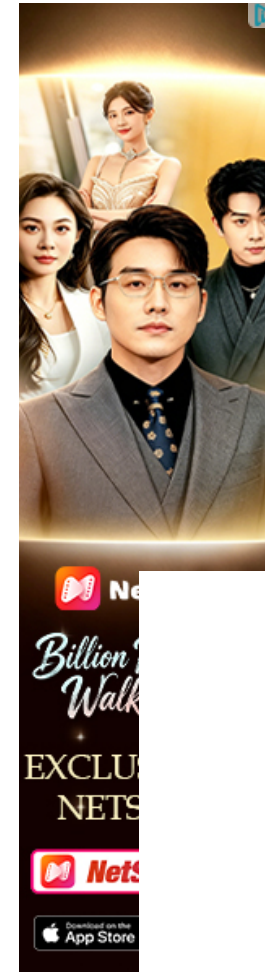
Jurnal Aisyah : Jurnal Ilmu Kesehatan has OAI address :
<https://www.aisyah.journalpress.id/index.php/jika/oai>
 (/index.php/jika/oai)

Before submission,

- You have to make sure that your paper is prepared using the **JIKA paper TEMPLATE** (https://drive.google.com/file/d/1FNm6zm-uMlcJ6jzSrRin4XO0Sr5_jktF/view), has been carefully proofread and polished, and conformed to the **author guidelines**. (</index.php/jika/about/submissions#authorGuidelines>)
- If the manuscript submitted is not appropriate with the guidelines or written in a different format, it will **BE REJECTED** by the editors before further reviewed. The editors will only accept the manuscripts which meet the assigned format.

Online Submissions

- Already have a Username/Password for Jurnal Aisyah: Jurnal Ilmu Kesehatan (JIKa)? **GO TO LOGIN** (</index.php/jika/login>)
- Need a Username/Password? **GO TO REGISTRATION** (</index.php/jika/user/register>)
- Registration and login are required to submit items online and to check the status of current submissions.
- If you have any questions about the Journal, please do not hesitate to contact us via Phone: +62 896-1262-6394 or email at jurnal.aisyah1@gmail.com



Tutorial Submit
Article

(<http://bit.ly/TutorialSubmit>)

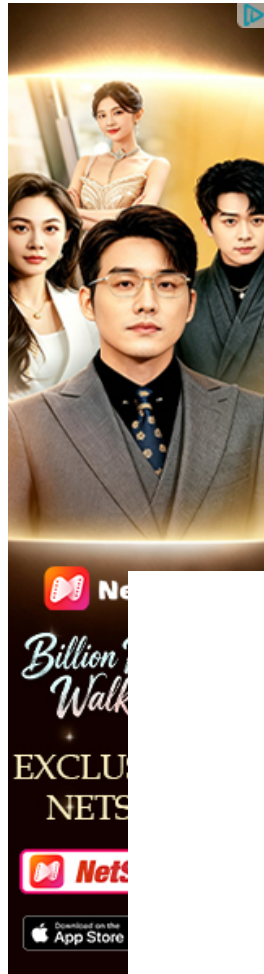


(<http://bit.ly/PerbaikanNaskah>)



Statements
Letter

(<http://bit.ly/StatementLetter>)



Tools



(<https://www.mendeley.com/download-mendeley-desktop?>

switchedFrom=)



(<https://www.grammarly.com/>)



(https://crosscheck.ithenticate.com/en_us/login)

affiliate





Keywords

Adolescent

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Adolescent>)

Adolescents

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Adolescents>)

Anxiety

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Anxiety>)

Attitude

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Attitude>)

COVID-19

(<https://aisyah.journalpress.id/index.php/jika/search?subject=COVID-19>)

Covid-19

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Covid-19>)

Education

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Education>)

Hospital

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Hospital>)

Keperawatan

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Keperawatan>)

Knowledge

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Knowledge>)

Nurse

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Nurse>)

Nurses

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Nurses>)

Pengetahuan

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Pengetahuan>)

Perawat

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Perawat>)

Pregnant Women

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Pregnant%20Women>)

Stunting

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Stunting>)

anxiety

(<https://aisyah.journalpress.id/index.php/jika/search?subject=anxiety>)

hemodialysis

(<https://aisyah.journalpress.id/index.php/jika/search?subject=hemodialysis>)

subject=hemodialysis)
 hospital
 (<https://aisyah.journalpress.id/index.php/jika/search?subject=hospital>)
 knowledge
 (<https://aisyah.journalpress.id/index.php/jika/search?subject=knowledge>)
 stunting
 (<https://aisyah.journalpress.id/index.php/jika/search?subject=stunting>)

Journal Visitors



(<https://info.flagcounter.com/N7wi>)



(<https://www.statcounter.com/>)

view statistic

(<http://statcounter.com/p11239911/?guest=1>)

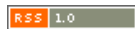
Current Issue



(<https://aisyah.journalpress.id/index.php/jika/gateway/plugin/WebFeedGatewayPlugin/atom>)



(<https://aisyah.journalpress.id/index.php/jika/gateway/plugin/WebFeedGatewayPlugin/rss2>)



(<https://aisyah.journalpress.id/index.php/jika/gateway/plugin/WebFeedGatewayPlugin/rss>)

Policies	Submissions	Other	Share
Focus and Scope (https://aisyah.journalpress.id/index.php/jika/about/editorialPolicies#focusAndScope)	Online Submissions (https://aisyah.journalpress.id/index.php/jika/about/onlineSubmissions)	Journal Sponsorship (https://aisyah.journalpress.id/index.php/jika/about/journalSponsorship)	Post Share 0
Section Policies (https://aisyah.journalpress.id/index.php/jika/about/sectionPolicies)	Author Guidelines (https://aisyah.journalpress.id/index.php/jika/about/authorGuidelines)		
Peer Review Process (https://aisyah.journalpress.id/index.php/jika/about/siteMap)	Copyright Notice (https://aisyah.journalpress.id/index.php/jika/about/copyrightNotice)	History (https://aisyah.journalpress.id/index.php/jika/about/history)	
Publication Frequency (https://aisyah.journalpress.id/index.php/jika/about/publicationFrequency)	Privacy Statement (https://aisyah.journalpress.id/index.php/jika/about/privacyStatement)	Site Map (https://aisyah.journalpress.id/index.php/jika/about/siteMap)	
Open Access Policy (https://aisyah.journalpress.id/index.php/jika/about/editorialPolicies#openAccessPolicy)	Author Fees (https://aisyah.journalpress.id/index.php/jika/about/authorFees)	Publishing System (https://aisyah.journalpress.id/index.php/jika/about/thisPublishingSystem)	



Published By:

Universitas Aisyah Pringsewu (UAP) Lampung
Jalan A. Yani 1A Tambahrejo Gadingrejo Kab. Pringsewu
Kode Pos: 35372, Phone: 0729 7081587
Email: jurnal.aisyah1@gmail.com
Phone: +62 896-1262-6394

ISSN Online : 2502-9495 (<http://u.lipi.go.id/1454309604>)

ISSN Printed : 2502-4825 (<http://u.lipi.go.id/1454312280>)



JURNAL AISYAH: JURNAL ILMU KESEHATAN

Online ISSN 2502-9495

Print ISSN 2502-4825

International Physics journal

Best Journal to publish paper quickly



Home (<https://aisyah.journalpress.id/index.php/jika/index>)

/ About the Journal

(<https://aisyah.journalpress.id/index.php/jika/about>)

/ Editorial Team

(<https://aisyah.journalpress.id/index.php/jika/about/editorialTeam>)



([/index.php/jika/about/submissions#onlineSubmission](https://aisyah.journalpress.id/index.php/jika/about/submissions#onlineSubmission))

Online

Submission

International Physics journal

Best Journal to publish paper quickly iosrjournals.org

- H Hardono, (Scopus ID: 57202799750) STIKES Aisyah Pringsewu Lampung, Indonesia

Editorial Board

- Teofilo B. Damoco, Union Christian College - Philippine, Philippines
- Teorida Laia, Faculty of Nursing, Universitas Sumatera Utara, Indonesia
- Zulkifli Zulkifli, Universitas Aisyah Pringsewu
- Diah Wahyuni, (Scopus ID: 57193196845) Universitas Negeri Jember, Indonesia
- Rehab A Rayan, High Institute of Public Health, Alexandria University, Egypt
- Rishi Dutt Avasthi, All India Institute of Medical Sciences, Jodhpur, India
- Nopi Nur Khasanah, Prodi S1 Ilmu Keperawatan Universitas Islam Sultan Agung Semarang, Indonesia
- Dian Arif Wahyudi, (Scopus ID: 57216693632) Program Studi S1 Ilmu Keperawatan Universitas Aisyah Pringsewu, Indonesia
- Fera Meliyanti, Program Studi S-1 Kesehatan Masyarakat STIKES Al-Ma'arif Baturaja, Indonesia
- Nova Fajri, Fakultas Keperawatan Universitas Syiah Kuala, Indonesia
- Aprilia Triaristina, (Scopus ID: 57216691922) Universitas Lampung, Indonesia



Focus & Scoupe

(/index.php/jika/about/editorialPolicies#focusAndS

Author Guidelines

(/index.php/jika/about/submissions#authorGuidelines)

Editorial Team

(/index.php/jika/about/editorialTeam)

Reviewer

Acknowledgement

(/index.php/jika/about/displayMembership/3)

Publication Ethics

(/index.php/jika/about/editorialPolicies#custom-0)

Open Access Policies

(/index.php/jika/about/editorialPolicies#openAccessPolic

Plagiarism Policies

(/index.php/jika/about/editorialPolicies#custom-1)

Publishing System

(/index.php/jika/about/aboutThisPublishingSystem)

Author Fees

(/index.php/jika/about/submissions#authorFees)

User

Username

Password

☐ Remember me

Login





Template



usp=sharing&ouid=112894158721370090552&rtpof=true&sd=true)



(<http://bit.ly/TutorialSubmit>)





REVISION
GUIDELINES

(<http://bit.ly/PerbaikanNaskah>)



Statements
Letter

(<http://bit.ly/StatementLetter>)

Tools



MENDELEY

(<https://www.mendeley.com/download-mendeley-desktop?switchedFrom=>)



grammarly

(<https://www.grammarly.com/>)

SCREENED BY



iThenticate
Professional Plagiarism Prevention

(https://crosscheck.ithenticate.com/en_us/login)

affiliate





We are





Keywords

Adolescent

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Adolescent>)

Adolescents

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Adolescents>)

Anxiety

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Anxiety>)

Attitude

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Attitude>)

COVID-19

(<https://aisyah.journalpress.id/index.php/jika/search?subject=COVID-19>)

Covid-19

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Covid-19>)

Hospital

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Hospital>)

Keperawatan

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Keperawatan>)

Knowledge

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Knowledge>)

Nurse

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Nurse>)

Nurses

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Nurses>)

Pengetahuan

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Pengetahuan>)

Perawat

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Perawat>)

Pregnant Women

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Pregnant%20Women>)



(<https://aisyah.journalpress.id/index.php/jika/search?subject=anxiety>)
hemodialysis
(<https://aisyah.journalpress.id/index.php/jika/search?subject=hemodialysis>)
hospital
(<https://aisyah.journalpress.id/index.php/jika/search?subject=hospital>)
knowledge
(<https://aisyah.journalpress.id/index.php/jika/search?subject=knowledge>)
stunting
(<https://aisyah.journalpress.id/index.php/jika/search?subject=stunting>)



Journal
Visitors







(<https://info.flagcounter.com/N7wi>)





(<https://www.statcounter.com/>)





Policies

Focus and Scope

(<https://aisyah.journalpress.id/index.php/jika/about/editorialPolicies#focusAndScope>)

Section Policies

(<https://aisyah.journalpress.id/index.php/jika/about/editorialPolicies#sectionPolicies>)

Peer Review

(<https://aisyah.journalpress.id/index.php/jika/about/editorialPolicies#peerReviewProcess>)

Publication

(<https://aisyah.journalpress.id/index.php/jika/about/editorialPolicies#publicationFrequency>)

Frequency

(<https://aisyah.journalpress.id/index.php/jika/about/editorialPolicies#publicationFrequency>)

Open Access Policy

(<https://aisyah.journalpress.id/index.php/jika/about/editorialPolicies#openAccessPolicy>)

Submissions

Online Submissions

(<https://aisyah.journalpress.id/index.php/jika/about/onlineSubmissions>)

Author Guidelines

(<https://aisyah.journalpress.id/index.php/jika/about/authorGuidelines>)

Copyright Notice

(<https://aisyah.journalpress.id/index.php/jika/about/submissions#copyrightNotice>)

Privacy Statement

(<https://aisyah.journalpress.id/index.php/jika/about/submissions#privacyStatement>)

Author Fees

(<https://aisyah.journalpress.id/index.php/jika/about/authorFees>)

Other

Journal

(<https://aisyah.journalpress.id/index.php/jika/about/journalSponsorship>)

Site Map

(<https://aisyah.journalpress.id/index.php/jika/about/siteMap>)

Abstracts

(<https://aisyah.journalpress.id/index.php/jika/about/abstracts>)

Publishing System

(<https://aisyah.journalpress.id/index.php/jika/about/thisPublishingSystem>)

Share

Post

([https://aisyah.journalpress.id/index.php/jika/about/thisPublishingSystem](#))

Share 0

([https://aisyah.journalpress.id/index.php/jika/about/thisPublishingSystem](#))





Published By:

Universitas Aisyah Pringsewu (UAP) Lampung
Jalan A. Yani 1A Tambahrejo Gadingrejo Kab. Pringsewu
Kode Pos: 35372, Phone: 0729 7081587
Email: jurnal.aisyah1@gmail.com
Phone: +62 896-1262-6394

ISSN Online : 2502-9495 (<http://u.lipi.go.id/1454309604>)
ISSN Printed : 2502-4825 (<http://u.lipi.go.id/1454312280>)





JURNAL AISYAH: JURNAL ILMU KESEHATAN

Online ISSN 2502-9495

Print ISSN 2502-4825



Home (<https://aisyah.journalpress.id/index.php/jika/index>)
 / Archives
 (<https://aisyah.journalpress.id/index.php/jika/issue/archive>)
 / Vol 8, No 4
 (<https://aisyah.journalpress.id/index.php/jika/issue/view/35>)

Vol 8, No 4

Desember 2023

DOI: <https://doi.org/10.30604/jika.v8i4>
 (<https://doi.org/10.30604/jika.v8i4>)



(</index.php/jika/about/onlineSubmissions>)
 Online
 Submission

HOME

(</index.php/jika/index>)

Focus & Scoupe

(</index.php/jika/about/editorialPolicies#focusAndScope>)

Author Guidelines

(</index.php/jika/about/submissions#authorGuidelines>)

Ad removed. [Details](#)[title/view/2201/pdf\)](#)

Nurul Laily Qomariyah, Thinni Nurul Rochmah, Rizka Rosa DM
10.30604/jika.v8i4.2201
(<https://dx.doi.org/10.30604/jika.v8i4.2201>)

F-KiCo (Fetal-Kick Count) Innovation Needs Analysis for
Monitoring Fetal Well-Being and Maternal-Fetal Attachment
(<https://aisyah.journalpress.id/index.php/jika/article/view/2320>)
DOI : 10.30604/jika.v8i4.2201
(<http://dx.doi.org/10.30604/jika.v8i4.2201>)
Yuni - Purwati
10.30604/jika.v8i4.2320
(<https://dx.doi.org/10.30604/jika.v8i4.2320>)

VIBRATION MASSAGE CORSET (VMC) UNTUK MEMBANTU
PROSES INVOLUSI UTERI PADA IBU POST PARTUM
(<https://aisyah.journalpress.id/index.php/jika/article/view/2324>)
DOI : 10.30604/jika.v8i4.2320
(<http://dx.doi.org/10.30604/jika.v8i4.2320>)
kirana aulia putri
10.30604/jika.v8i4.2324
(<https://dx.doi.org/10.30604/jika.v8i4.2324>)

Potential of Cookies Coobisang with Biscuits "Milna" on The
Increasing Weight of Babies Aged 6-9 Months
(<https://aisyah.journalpress.id/index.php/jika/article/view/2331>)
DOI : 10.30604/jika.v8i4.2324
(<http://dx.doi.org/10.30604/jika.v8i4.2324>)
Novita Sari, Krisdiana Wijayanti, Arwani -
10.30604/jika.v8i4.2331
(<https://dx.doi.org/10.30604/jika.v8i4.2331>)

[/index.php/jika/about/displayMembership/3\)](/index.php/jika/about/displayMembership/3)[Publication Ethics](#)</index.php/jika/about/editorialPolicies#custom->

PDF (Bahasa Indonesia)

<https://aisyah.journalpress.id/index.php/jika/article/view/2320/pdf>
[Open Access Policies](#)[/index.php/jika/about/editorialPolicies#openAccessPolicy\)](/index.php/jika/about/editorialPolicies#openAccessPolicy)[Plagiarism Policies](#)[/index.php/jika/about/editorialPolicies#custom-1\)](/index.php/jika/about/editorialPolicies#custom-1)[Publishing System](#)PDF (Bahasa Indonesia) [/index.php/jika/about/aboutThisPublishingSystem\)](/index.php/jika/about/aboutThisPublishingSystem)<https://aisyah.journalpress.id/index.php/jika/article/view/2324/pdf>
[Author Fees](#)[/index.php/jika/about/submissions#authorFees\)](/index.php/jika/about/submissions#authorFees)[Contact Us](#)[/index.php/jika/about/contact\)](/index.php/jika/about/contact)

User

PDF (Bahasa Indonesia)

<https://aisyah.journalpress.id/index.php/jika/article/view/2331/pdf>

Username

Password

☐ Remember me[Login](#)

ticle/view/2205/pdf)

Dwi Windu Kinanti Arti, Divi Talitha Olivia Sandra, Ulfa Nurullita
10.30604/jika.v8i4.2205
(<https://dx.doi.org/10.30604/jika.v8i4.2205>)

Hospital Management Information Model Hot-Fit: A Systemic Evaluation At Hospital PDF (Bahasa Indonesia)
(<https://aisyah.journalpress.id/index.php/jika/article/view/2231/pdf>)
DOI : 10.30604/jika.v8i4.2205
(<http://dx.doi.org/10.30604/jika.v8i4.2205>)

USMAN AGUS DWIYANTO
10.30604/jika.v8i4.2231
(<https://dx.doi.org/10.30604/jika.v8i4.2231>)

Effectiveness of the Kundalini Method in Reducing Emesis Gravidarum in the 1st Trimester PDF (Bahasa Indonesia)
(<https://aisyah.journalpress.id/index.php/jika/article/view/2402/pdf>)
DOI : 10.30604/jika.v8i4.2231
(<http://dx.doi.org/10.30604/jika.v8i4.2231>)

Qatrunnada Naqiyyah Khusmitha, Atik Farokah, Herdian Fitria Widyanto Putri
10.30604/jika.v8i4.2402
(<https://dx.doi.org/10.30604/jika.v8i4.2402>)

Initiation of Nursing Service Development in the Outpatient Department Using Kotter's Change Theory
(<https://aisyah.journalpress.id/index.php/jika/article/view/2419>)
DOI : 10.30604/jika.v8i4.2402
(<http://dx.doi.org/10.30604/jika.v8i4.2402>)

Soni Roy Kurniawan Hulu, Hanny Handiyani, Hening Pujasari, Masfuri Masfuri
10.30604/jika.v8i4.2419
(<https://dx.doi.org/10.30604/jika.v8i4.2419>)

Template

PDF (Bahasa Indonesia) 
(<https://aisyah.journalpress.id/index.php/jika/article/view/2419/pdf>)
(<https://docs.google.com/document/d/1czW6MI0Yzj1cjpHOF-YaM4biSmBntfO5/edit?usp=sharing&ouid=112894158721370090552&rtpof=true&sd=tr>)

 Tutorial Submit Article
(<http://bit.ly/TutorialSubmit>)

ticle/view/2422/pdf)

10.30604/jika.v8i4.2422
(<https://dx.doi.org/10.30604/jika.v8i4.2422>)

(<http://bit.ly/StatementLetter>)

Herbal Tea of Torbangun Leaf and Exclusive Breastfeeding:
Related Factors and Impact on the Duration of Breastfeeding
(<https://aisyah.journalpress.id/index.php/jika/article/view/2432>)

PDF (Bahasa Indonesia)
(<https://aisyah.journalpress.id/index.php/jika/article/view/2432/pdf>)

DOI : 10.30604/jika.v8i4.2422
(<http://dx.doi.org/10.30604/jika.v8i4.2422>)

Sulastry Pakpahan, Hetty Panggabean

10.30604/jika.v8i4.2432
(<https://dx.doi.org/10.30604/jika.v8i4.2432>)



(<https://www.mendeley.com/download-mendeley-desktop?switchedFrom=>)

The Relationship between Knowledge Factors, Reproductive
Health Conditions and Age on Readiness to Have a Family in
Young Women

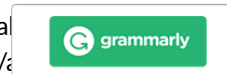
PDF (Ba
(<https://aisyah.journalpress.id/index.php/jika/article/view/2436/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2436>)

DOI : 10.30604/jika.v8i4.2432
(<http://dx.doi.org/10.30604/jika.v8i4.2432>)

Firda - Fibrila, M. - Ridwan, Herlina - Herlina

10.30604/jika.v8i4.2436
(<https://dx.doi.org/10.30604/jika.v8i4.2436>)



(<https://www.grammarly.com/>)



(https://crosscheck.ithenticate.com/en_us/login)

affiliate

PENGALAMAN MANAGEMENT IMPLEMENTASI TERAPI
KOMPLEMENTER DI LAYANAN PRAKTIK BIDAN BERSAMA
(<https://aisyah.journalpress.id/index.php/jika/article/view/2439>)

PDF (Ba
(<https://aisyah.journalpress.id/index.php/jika/article/view/2439/pdf>)

DOI : 10.30604/jika.v8i4.2436
(<http://dx.doi.org/10.30604/jika.v8i4.2436>)

MARCELIS STIA ANGGRAINI

10.30604/jika.v8i4.2439
(<https://dx.doi.org/10.30604/jika.v8i4.2439>)



ticle/view/2071/pdf)

Rd Halim, Diah Tri Utami, Oka Lesmana

10.30604/jika.v8i4.2071

(<https://dx.doi.org/10.30604/jika.v8i4.2071>)

Analysis of the financial management of the sukawarna public health center before and after becoming a regional public service agency

(<https://aisyah.journalpress.id/index.php/jika/article/view/2251>)

DOI : 10.30604/jika.v8i4.2071

("http://dx.doi.org/10.30604/jika.v8i4.2071")

Ayu Laili Rahmiyati

10.30604/jika.v8i4.2251

(<https://dx.doi.org/10.30604/jika.v8i4.2251>)

Evaluation of the benefits of stem cell therapy in healing

Anterior Cruciate Ligament (ACL) injuries

(<https://aisyah.journalpress.id/index.php/jika/article/view/2210>)

DOI : 10.30604/jika.v8i4.2251

("http://dx.doi.org/10.30604/jika.v8i4.2251")

Adrian Khu

10.30604/jika.v8i4.2210

(<https://dx.doi.org/10.30604/jika.v8i4.2210>)

Effect of the Self-monitoring of Calendar Documentation on the Transmission Control and Treatment Outcomes

(<https://aisyah.journalpress.id/index.php/jika/article/view/2368>)

DOI : 10.30604/jika.v8i4.2210

("http://dx.doi.org/10.30604/jika.v8i4.2210")

Bahtera Bindavid Purba, Evawany Yuanita Aritonang

10.30604/jika.v8i4.2368

(<https://dx.doi.org/10.30604/jika.v8i4.2368>)

Adolescent

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Adolescent>)

Adolescents

PDF (Bahasa Indonesia)
(<https://aisyah.journalpress.id/index.php/jika/article/view/2251/pdf>)
(<https://aisyah.journalpress.id/index.php/jika/search?subject=Adolescents>)

Anxiety

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Anxiety>)

Attitude

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Attitude>)

PDF (Bahasa Indonesia)

COVID-19

(<https://aisyah.journalpress.id/index.php/jika/article/view/2210/pdf>)
(<https://aisyah.journalpress.id/index.php/jika/search?subject=COVID-19>)

Covid-19

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Covid-19>)

Education

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Education>)
(<https://aisyah.journalpress.id/index.php/jika/article/view/2368/pdf>)

Hospital

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Hospital>)

Keperawatan

(<https://aisyah.journalpress.id/index.php/jika/search?subject=Keperawatan>)

Knowledge

p/jika/search?
ticle/view/2508/pdf)

p/jika/search?

Fioni Fioni, Liena Liena, Lusyana Siregar, Ermi Girsang
10.30604/jika.v8i4.2508
(<https://dx.doi.org/10.30604/jika.v8i4.2508>)

The Potential of Tamarillo (*Solanum betaceum*) Peel as an
Antioxidant by Radical Scavenging DPPH and Antiaging by
Collagenase Inhibition
(<https://aisyah.journalpress.id/index.php/jika/article/view/2504>)
DOI : 10.30604/jika.v8i4.2508
("http://dx.doi.org/10.30604/jika.v8i4.2508")
Liena Liena, Fioni Fioni, Lidya Siregar, Ermi Girsang
10.30604/jika.v8i4.2504
(<https://dx.doi.org/10.30604/jika.v8i4.2504>)

EFFECTS OF BIRTHBALL RELAXATION ALTERNATIVES AND
AROMA THERAPY ON THE PROGRESS AND SATISFACTION
OF LABOR IN THE DISTRICT NORTH TAPANULI IN 2023
(<https://aisyah.journalpress.id/index.php/jika/article/view/2448>)
DOI : 10.30604/jika.v8i4.2504
("http://dx.doi.org/10.30604/jika.v8i4.2504")
juana linda simbolon
10.30604/jika.v8i4.2448
(<https://dx.doi.org/10.30604/jika.v8i4.2448>)

Nurses
(<https://aisyah.journalpress.id/index.php/jika/search?subject=Nurses>)

Pengetahuan

PDF (Bahasa Indonesia)
(<https://aisyah.journalpress.id/index.php/jika/article/view/2504/pdf>)
subject=Pengetahuan)

Perawat
(<https://aisyah.journalpress.id/index.php/jika/search?subject=Perawat>)

Pregnant Women
(<https://aisyah.journalpress.id/index.php/jika/search?subject=Pregnant%20Women>)

Stunting

PDF (Bahasa Indonesia)
(<https://aisyah.journalpress.id/index.php/jika/article/view/2448/pdf>)
subject=Stunting)

anxiety
(<https://aisyah.journalpress.id/index.php/jika/search?subject=anxiety>)

hemodialysis
(<https://aisyah.journalpress.id/index.php/jika/search?subject=hemodialysis>)

hospital
(<https://aisyah.journalpress.id/index.php/jika/search?subject=hospital>)

knowledge
(<https://aisyah.journalpress.id/index.php/jika/search?subject=knowledge>)

stunting



p/jika/search?
ticle/view/2449/pdf)

("http://dx.doi.org/10.30604/jika.v8i4.2448")

Tiur Romatua Sitohang

10.30604/jika.v8i4.2449

(https://dx.doi.org/10.30604/jika.v8i4.2449)

THE EFFECTIVENESS OF TELEMEDICINE ON THE
IMPLEMENTATION MOTHER'S HYPNOBREASTFEEDING
POSTPARTUM COVID-19 IN NORTH TAPANULI DISTRICT
(https://aisyah.journalpress.id/index.php/jika/article/view/2459)

DOI : 10.30604/jika.v8i4.2449

("http://dx.doi.org/10.30604/jika.v8i4.2449")

Hetty W.A Panggabean

10.30604/jika.v8i4.2459

(https://dx.doi.org/10.30604/jika.v8i4.2459)

QUALITATIVE STUDY : COPING OF THE MOTHERS AFTER
SPONTANEOUS ABORTIONS
(https://aisyah.journalpress.id/index.php/jika/article/view/2372)

DOI : 10.30604/jika.v8i4.2459

("http://dx.doi.org/10.30604/jika.v8i4.2459")

Enthyn Anaway Bintang Dwy Kartika, Cesa Septiana Pratiwi,
Mamnu'ah Mamnu'ah

10.30604/jika.v8i4.2372

(https://dx.doi.org/10.30604/jika.v8i4.2372)

MANAGEMENT OF RISK FACTORS FOR PRE-ECLAMPSIA

(https://aisyah.journalpress.id/index.php/jika/article/view/2395) (https://aisyah.journalpress.id/index.php/jika/article/view/2395/pdf)

DOI : 10.30604/jika.v8i4.2372

("http://dx.doi.org/10.30604/jika.v8i4.2372")

Anita Anita, Aprina Aprina, Titi Astuti

10.30604/jika.v8i4.2395

(https://dx.doi.org/10.30604/jika.v8i4.2395)

PDF (Bahasa In

(https://aisyah.j...php/jika/article/view/2459/pdf)

PDF (Bahasa In

(https://aisyah.j...php/jika/article/view/2372/pdf)



Journal

Visitors

PDF (Bahasa Indonesia)

ticle/view/2466/pdf)

(["http://dx.doi.org/10.30604/jika.v8i4.2395"](http://dx.doi.org/10.30604/jika.v8i4.2395))
Shelfi Dwi Retnani Putri Santoso, Uly Agustine, Sri Mugianti,
Wanto Paju
10.30604/jika.v8i4.2466
(<https://dx.doi.org/10.30604/jika.v8i4.2466>)

The Role of Parents in Shaping Early Childhood Adherence in
Implementation of the Health Protocol in Daily Activity
(<https://aisyah.journalpress.id/index.php/jika/article/view/2376>)
DOI : 10.30604/jika.v8i4.2466
(["http://dx.doi.org/10.30604/jika.v8i4.2466"](http://dx.doi.org/10.30604/jika.v8i4.2466))
Yoga Tri Wijayanti
10.30604/jika.v8i4.2376
(<https://dx.doi.org/10.30604/jika.v8i4.2376>)

Identification of Variables Influencing the Mental Health of
Pregnant Women
(<https://aisyah.journalpress.id/index.php/jika/article/view/2365>)
DOI : 10.30604/jika.v8i4.2376
(["http://dx.doi.org/10.30604/jika.v8i4.2376"](http://dx.doi.org/10.30604/jika.v8i4.2376))
Catur Setyorini, Ismarwati Ismarwati, Mamnuah Mamnuah
10.30604/jika.v8i4.2365
(<https://dx.doi.org/10.30604/jika.v8i4.2365>)



PDF (Ba
(<https://aisyah.journalpress.id/index.php/jika/article/view/2376/pdf>)

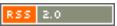


(<https://www.statcounter.com/>)
view statistic
(<http://statcounter.com/p11239911/?guest=1>)

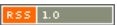
PDF (Bahasa Indonesia)
(<https://aisyah.journalpress.id/index.php/jika/article/view/2365/pdf>)



(<https://aisyah.journalpress.id/index.php/jika/gateway/plugin/Web>



(<https://aisyah.journalpress.id/index.php/jika/gateway/plugin/Web>



(<https://aisyah.journalpress.id/index.php/jika/gateway/plugin/Web>

[ticle/view/2488/pdf\)](#)

DOI : 10.30604/jika.v8i4.2365

("http://dx.doi.org/10.30604/jika.v8i4.2365")

Dessy Nur Safitri

10.30604/jika.v8i4.2488

(https://dx.doi.org/10.30604/jika.v8i4.2488)

A QUALITATIVE STUDY OF HEALTH SERVICES COSTING IN PDF (Bahasa Indonesia)

INDONESIA

(https://aisyah.journalpress.id/index.php/jika/article/view/2502/pdf)

(https://aisyah.journalpress.id/index.php/jika/article/view/2502)

DOI : 10.30604/jika.v8i4.2488

("http://dx.doi.org/10.30604/jika.v8i4.2488")

Agus Munandar

10.30604/jika.v8i4.2502

(https://dx.doi.org/10.30604/jika.v8i4.2502)

A Non-Randomized Controlled Trial of Prevention Guidance of PDF (Bahasa Indonesia)

Common Physiological Symptoms in Pregnancy for Self-Efficacy (https://aisyah.journalpress.id/index.php/jika/article/view/2516/pdf)

in Pregnant Women

(https://aisyah.journalpress.id/index.php/jika/article/view/2516)

DOI : 10.30604/jika.v8i4.2502

("http://dx.doi.org/10.30604/jika.v8i4.2502")

Fransisca Retno Asih, Renita Rizkya Danti, Nuristy Brillian

Ainindyahsari Winarna

10.30604/jika.v8i4.2516

(https://dx.doi.org/10.30604/jika.v8i4.2516)

[ticle/view/2530/pdf\)](#)

Esi Afriyanti, Bobby Febri Krisdianto, Chichi Hafifa Transyah

10.30604/jika.v8i4.2530

(<https://dx.doi.org/10.30604/jika.v8i4.2530>)

Pengaruh good corporate governance terhadap kinerja
karyawan di Rumah Sakit Akademis Jaury Jusuf Putera,
Makassar

PDF (Bahasa Indonesia)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2460/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2460>)

DOI : 10.30604/jika.v8i4.2530

("http://dx.doi.org/10.30604/jika.v8i4.2530")

Arni Rizqiani Rusydi, Arman Arman, Fyrdha Faradyba Hamzah

10.30604/jika.v8i4.2460

(<https://dx.doi.org/10.30604/jika.v8i4.2460>)

INVIVO STUDY OF AQUEOUS EXTRACT OF SNAKE FRUIT
SEEDS IN FEMALE RATS WITH ANEMIA

PDF (Bahasa Indonesia)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2533/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2533>)

DOI : 10.30604/jika.v8i4.2460

("http://dx.doi.org/10.30604/jika.v8i4.2460")

Hani Fara Ayu Febyawati, Dono Indarto, Selfi Handayani

10.30604/jika.v8i4.2533

(<https://dx.doi.org/10.30604/jika.v8i4.2533>)

Oxytocin Massage Through Bakera Culture Approach As A
Method To Increase Milk Production

PDF (Bahasa Indonesia)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2552/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2552>)

DOI : 10.30604/jika.v8i4.2533

("http://dx.doi.org/10.30604/jika.v8i4.2533")

irne wida desiyanti, Lisa Ardiningtyas, Meinita Wulansari

10.30604/jika.v8i4.2552

(<https://dx.doi.org/10.30604/jika.v8i4.2552>)

ticle/view/2560/pdf)

lis Tri Utami, Vitria Komala Sari, Wahyuni Wahyuni, Rika
Agustina

10.30604/jika.v8i4.2560
(<https://dx.doi.org/10.30604/jika.v8i4.2560>)

Family Support And Exclusive Breastfeeding Among Working Mothers At The Hospital PDF (Bahasa Indonesia)
(<https://aisyah.journalpress.id/index.php/jika/article/view/2819/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2819>)

DOI : 10.30604/jika.v8i4.2560

("http://dx.doi.org/10.30604/jika.v8i4.2560")

Faizatul Ummah, Sulistyaningsih Sulistyaningsih, Luluk Rosida

10.30604/jika.v8i4.2819
(<https://dx.doi.org/10.30604/jika.v8i4.2819>)

Systematic Literature Review Articles

THE INFLUENCE OF THE BABY-FRIENDLY HOSPITAL INITIATIVE ON BREASTFEEDING OUTCOMES PDF (Bahasa Indonesia)
(<https://aisyah.journalpress.id/index.php/jika/article/view/2176/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2176>)

DOI : 10.30604/jika.v8i4.2819

("http://dx.doi.org/10.30604/jika.v8i4.2819")

Egha Handriani, Titih Huriah

10.30604/jika.v8i4.2176
(<https://dx.doi.org/10.30604/jika.v8i4.2176>)

ticle/view/2248/pdf)

Fathia Fakhri Inayati Said, Nofita Dewi Kok Mesa, Crystin
Evangelin Watunglawar, Dwi Astuti Astuti, Fenska Narly
Makulaina

10.30604/jika.v8i4.2248

(<https://dx.doi.org/10.30604/jika.v8i4.2248>)

EFFECTIVENESS OF FINGER GRIP RELAXATION TECHNIQUE PDF (Bahasa Indonesia)

ON PAIN IN POST SECTIO CAESAREA : A LITERATURE

(<https://aisyah.journalpress.id/index.php/jika/article/view/2319/pdf>)

REVIEW

(<https://aisyah.journalpress.id/index.php/jika/article/view/2319>)

DOI : 10.30604/jika.v8i4.2248

("http://dx.doi.org/10.30604/jika.v8i4.2248")

Sukmawati Sukmawati, Furkon Nurhakim, Lilis Mamuroh

10.30604/jika.v8i4.2319

(<https://dx.doi.org/10.30604/jika.v8i4.2319>)

M-Health Research Trends For Patients With Chronic illness : A PDF (Bahasa Indonesia)

Bibliometric Analysis

(<https://aisyah.journalpress.id/index.php/jika/article/view/2374/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2374>)

DOI : 10.30604/jika.v8i4.2319

("http://dx.doi.org/10.30604/jika.v8i4.2319")

Dwi Yuliangsih Putri Hanardi, Erna Rochmawati

10.30604/jika.v8i4.2374

(<https://dx.doi.org/10.30604/jika.v8i4.2374>)

ticle/view/2371/pdf)

Kurnia Budi Cahyani

10.30604/jika.v8i4.2371

(<https://dx.doi.org/10.30604/jika.v8i4.2371>)

Scoping Review of Breastfeeding Mothers' Efforts to Increase Breast Milk Production

PDF (Bahasa Indonesia)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2242/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2242>)

DOI : 10.30604/jika.v8i4.2371

("http://dx.doi.org/10.30604/jika.v8i4.2371")

Elly Yana S.ST

10.30604/jika.v8i4.2242

(<https://dx.doi.org/10.30604/jika.v8i4.2242>)

IMPACT OF ORAL HYGIENE INTERVENTIONS ON STROKE PATIENTS: RAPID REVIEW

PDF (Bahasa Indonesia)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2378/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2378>)

DOI : 10.30604/jika.v8i4.2242

("http://dx.doi.org/10.30604/jika.v8i4.2242")

Theresia Eriyani, Iwan Shalahuddin, Sandra Pebrianti, Indra Maulana

10.30604/jika.v8i4.2378

(<https://dx.doi.org/10.30604/jika.v8i4.2378>)

Impact of co-epidemic tuberculosis and diabetes mellitus on health-related quality of life: A review

PDF (Bahasa Indonesia)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2088/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2088>)

DOI : 10.30604/jika.v8i4.2378

("http://dx.doi.org/10.30604/jika.v8i4.2378")

Machrumnizar Machrumnizar, Nana Muyana, Adang Bachtiar, Rina Kurniasri Kusumaratna, Jipri Suyanto

10.30604/jika.v8i4.2088

(<https://dx.doi.org/10.30604/jika.v8i4.2088>)

ticle/view/2396/pdf)

Suryani Suryani, Imas Rafiyah

10.30604/jika.v8i4.2396

(<https://dx.doi.org/10.30604/jika.v8i4.2396>)

The effectiveness of tepid water sponge on reducing body temperature in children with hyperthermia: A meta-analysis

PDF (Bahasa Indonesia)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2102/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2102>)

DOI : 10.30604/jika.v8i4.2396

("http://dx.doi.org/10.30604/jika.v8i4.2396")

Aris Widiyanto, Tri Yuniarti, Mustain Mustain, Santy Irene Putri,

Ayu Anulus, Joko Tri Atmojo

10.30604/jika.v8i4.2102

(<https://dx.doi.org/10.30604/jika.v8i4.2102>)

Fostering path to a just culture in healthcare organizations: Influential factors and challenges

PDF (Bahasa Indonesia)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2413/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2413>)

DOI : 10.30604/jika.v8i4.2102

("http://dx.doi.org/10.30604/jika.v8i4.2102")

Tjindrawati Ongko, Djazuly Chalidyanto

10.30604/jika.v8i4.2413

(<https://dx.doi.org/10.30604/jika.v8i4.2413>)

The Effectiveness of Galactagogue Content on Breast Milk Production: A Scoping Review

PDF (Bahasa Indonesia)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2381/pdf>)

(<https://aisyah.journalpress.id/index.php/jika/article/view/2381>)

DOI : 10.30604/jika.v8i4.2413

("http://dx.doi.org/10.30604/jika.v8i4.2413")

deliana br karo, Mufdlilah Mufdlilah

10.30604/jika.v8i4.2381

(<https://dx.doi.org/10.30604/jika.v8i4.2381>)

ticle/view/2484/pdf)

Lilis Mamuroh, Furkon Nurhakim, Sukmawati Sukmawati
10.30604/jika.v8i4.2484
(<https://dx.doi.org/10.30604/jika.v8i4.2484>)

Policies	Submissions	Other	Share
Focus and Scope (https://aisyah.journalpress.id/index.php/jika/about/editorialPolicies#focusAndScope)	Online Submissions (https://aisyah.journalpress.id/index.php/jika/about/onlineSubmissions)	Journal Sponsorship (https://aisyah.journalpress.id/index.php/jika/about/journalSponsorship)	Post Share 0
Section Policies (https://aisyah.journalpress.id/index.php/jika/about/sectionPolicies)	Author Guidelines (https://aisyah.journalpress.id/index.php/jika/about/authorGuidelines)	History (https://aisyah.journalpress.id/index.php/jika/about/history)	
Peer Review Process (https://aisyah.journalpress.id/index.php/jika/about/peerReviewProcess)	Copyright Notice (https://aisyah.journalpress.id/index.php/jika/about/submissions#copyrightNotice)	Site Map (https://aisyah.journalpress.id/index.php/jika/about/siteMap)	
Publication Frequency (https://aisyah.journalpress.id/index.php/jika/about/publicationFrequency)	Privacy Statement (https://aisyah.journalpress.id/index.php/jika/about/submissions#privacyStatement)	Publishing System (https://aisyah.journalpress.id/index.php/jika/about/publicationFrequency)	
Open Access Policy (https://aisyah.journalpress.id/index.php/jika/about/editorialPolicies#openAccessPolicy)			



Published By:
Universitas Aisyah Pringsewu (UAP) Lampung
Jalan A. Yani 1A Tambahrejo Gadingrejo Kab. Pringsewu
Kode Pos: 35372, Phone: 0729 7081587
Email: jurnal.aisyah1@gmail.com
Phone: +62 896-1262-6394

ISSN Online : 2502-9495 (<http://u.lipi.go.id/1454309604>)





Impact of co-epidemic tuberculosis and diabetes mellitus on health-related quality of life: A review

**Machrumnizar^{1,4*}, Nana Muyana², Adang Bachtiar³, Rina Kurniasri Kusumaratna⁵,
Jipri Suyanto⁶**

¹ Doctoral Program, Faculty of Public Health, University of Indonesia, Indonesia

² Department of Health Promotion, Politeknik Kesehatan Kementerian Kesehatan Jakarta III, Indonesia

³ Department of Health Administration and Policy, Faculty of Public Health, University of Indonesia, Indonesia

⁴ Department of Parasitology, Faculty of Medicine, University of Trisakti, Indonesia

⁵ Department of public health, faculty of medicine, University of Trisakti, Indonesia

⁶ Faculty of health science, Dehasen University, Indonesia

ABSTRACT

The high comorbidity rate between diabetes mellitus and tuberculosis has a significant impact on the patient's health-related quality of life and eradication of tuberculosis program outcomes, especially in lower-middle-income countries that bear a "double disease burden". This review outlines the health-related quality of life of tuberculosis patients with diabetes. The search, selection, and article collection procedures were unmethodical. The retrieved articles were open-access and full-text in English. Health-related quality of life includes physical, psychological, social, and environmental domains. Health-related quality of life in diabetes, tuberculosis, and tuberculosis-diabetes comorbid patients experienced negative changes in all domains. Commonly used health-related quality-of-life measures can be generic or disease-specific. This review also highlights the importance of collaborative tuberculosis and diabetes management supported by the community, health workers, and stakeholders. Finally, this collaborative management support will enhance patient health-related quality of life and contribute to the accomplishment of the tuberculosis elimination program.

Keywords: tuberculosis, diabetes, health-related quality of life, instrument, co-epidemic

Corresponding author: Machrumnizar

Doctoral Program, Faculty of Public Health, University of Indonesia, Indonesia

Department of Parasitology, Faculty of Medicine, University of Trisakti, Indonesia

Email: machrumnizar_md@trisakti.ac.id

INTRODUCTION

The increasing prevalence of diabetes mellitus has resulted in a double burden of tuberculosis and diabetes in low- to middle-income countries. The global incidence of more than one million cases of both comorbidities is estimated with 15% of tuberculosis cases linked to diabetes (W. Jiang et al., 2022; Ong et al., 2023). The World Health Organization (WHO), the International Diabetes Federation (IDF), and the International Union Against Tuberculosis and Lung Disease (IUATLD) have encouraged integrated healthcare programs in these countries due to the epidemiological link between the two diseases (Organization, 2011, 2022, 2023).

Tuberculosis and diabetes can negatively impact a patient's health-related quality of life (HRQoL), especially concerning medication. These diseases often lead to lower HRQoL and disease symptoms, exacerbated by stigma and discrimination. The term "health-related quality of life" is becoming popular as an alternative to "quality of life" which has a broader meaning. HRQoL is a comprehensive assessment of a person's physical, mental, and social well-being, including their daily function. Understanding disease's impact is vital and improves patients' overall quality of life by assessing awareness of their psychological and physical well-being (Al-Azayzih, Kanaan, & Altawalbeh, 2023; Dou et al., 2023; Sitlinger & Zafar, 2018).

Previous studies concluded that patients with active tuberculosis have been found to have worse HRQoL when weighed against latent tuberculosis or historically treated TB, untreated individuals, or healthy controls. The research showed that there were marked impairments in general well-being and HRQoL in every dimension (Adebayo, Adejumo, & Odusanya, 2023; Kastien-Hilka, Rosenkranz, Sinanovic, Bennett, & Schwenkglenks, 2017; Saleem, A. Malik, Ghulam, Ahmed, & Hussain, 2018). Several cross-sectional studies prove diabetes affects the HRQoL of patients in the physical and environmental domains showing the lowest HRQoL compared to the psychosocial domain. There is a strong correlation between low HRQoL scores and being elderly, single, and unemployed (Abegaz & Ali, 2023; Aschalew, Yitayal, & Minyihun, 2020; Fuentes-Merlos, Orozco-Beltrán, Quesada Rico, & Reina, 2021; Galán, León, Guerrero-Martín, Jurado, & Durán-Gómez, 2021; Wonde, Ayene, Moges, & Bazezew, 2022).

The mortality rate due to TB is greater in DM patients compared to other comorbid factors. However, studies assessing HRQoL in TB patients with concomitant diabetes mellitus are relatively rare and mostly published separately, between HRQoL-TB and HRQoL-DM (Edwards et al., 2020; Gautam et al., 2021; G. Xu, Hu, Lian, & Li, 2023). This brief narrative review emphasizes covering HRQoL in patients with type 2 diabetes and tuberculosis without other comorbidities, and HRQoL tools are commonly utilized for evaluating HRQoL in patients with TB and DM.

METHODS

We conducted searches between June and September 2023 using the keywords "tuberculosis" OR "lung AND tuberculosis" OR "lung AND tuberculosis"; "diabetes" OR "diabetes AND mellitus" OR "diabetes AND mellitus AND types AND 2"; "health AND related AND quality AND life" OR "quality AND life". The electronic databases PubMed, Scopus, and Google Scholar are used to collect all data. Subsequently, we revised the search in December 2023 by checking the bibliography of related publications for important citations.

The procedure for searching and selecting is not methodical. The publications included in this review are limited to articles available in English and full text. Furthermore, articles discussing DM that refer to type-1 DM or have comorbidities other than diabetes mellitus will be excluded.

RESULTS OF STUDY

Health-related quality of life in diabetes mellitus

The results of research on chronic diseases focus on assessing the effectiveness of patients in response to therapy and clinical care, taking into account objective aspects (physiological indicators) and subjective aspects (mental well-being, self-management of disease burden, and social functioning and roles, as well as physical functioning) (Chen et al., 2022; Correia et al., 2023). These subjective aspects are important because diabetes mellitus is largely an autonomic condition, and self-management impacts almost every area of daily life. Assessing population health outcomes using health-related quality of life (HRQOL) is an important tool, emphasizing individual general well-being and life satisfaction. Aspects of HRQOL are increasingly hampered by diabetes and its consequences, medical interventions, and patient attitudes. Diabetic patients need to "strictly adhere to prescribed treatment" and make sustainable behavioral changes in their health. Diabetes and its effects on HRQOL affect not only the health of patients but also families and the general population (Gebremariam et al., 2022; Oluchi et al., 2021).

In people with diabetes, demographic characteristics are independent drivers of HRQoL. Gender is known to be the most significant indicator of HRQoL, whereby women have worse HRQoL and most significant especially in the physical and psychological domains (Alsayed Hassan, Helaluddin, Chahestani, Mohamed, & Islam, 2022; Barua, Faruque, Chowdhury, Banik, & Ali, 2021; Chantzaras & Yfantopoulos, 2022; Homady et al., 2023; Natarajan & Mokoboto-Zwane,

2022; Tran Kien, Phuong Hoa, Minh Duc, & Wens, 2021). The majority of studies assessing HRQoL in people with DM report that age, particularly aging, is substantially correlated with poorer HRQoL (Gupta, Kapoor, & Sood, 2021; Teli, Thato, & Rias, 2023; Zare, Ameri, Madadzadeh, & Reza Aghaei, 2020). Patients with diabetes may experience decreased HRQoL due to poor glucose management and the consequences of the disease (Pham et al., 2020; Teli et al., 2023; Tusa, Geremew, & Tefera, 2020). Marital status, monthly income, and education are among the factors that are significant predictors of HRQoL. People with unmarried DM, poor economic status, and having lower levels of education were significantly associated with poorer HRQoL (Alsayed Hassan et al., 2022; Barua et al., 2021; Chantzaras & Yfantopoulos, 2022; Gebremariam et al., 2022; Homady et al., 2023; Natarajan & Mokoboto-Zwane, 2022; Shamshirgaran, Ataei, Alamdari, Safaeian, & Aminisani, 2016). Research in Bangladesh and Nepal reported that the residence of a person with DM was a significant factor influencing HRQoL, whereas people with DM living in rural areas had better HRQoL (Barua et al., 2021; S. R. Mishra, Sharma, Bhandari, Bhochhibhoya, & Thapa, 2015). Research in Malaysia found religiosity affects HRQoL well in people with DM (Chew, Mohd-Sidik, & Shariff-Ghazali, 2015).

Health-related quality of life in tuberculosis

Tuberculosis is still a major public health problem worldwide although effective therapies have long been available (Oktamianti et al., 2021). TB management generally prioritizes the treatment of microbiology and pays less attention to the impact on the HRQoL in patient. In fact, the duration of TB treatment is generally long and several factors (such as physical, psychological, financial, and social) have the potential to reduce the patient's HRQoL which in turn can affect the success of TB patient treatment (Motta et al., 2023; Pandia, Syafiuddin, Bachtar, & Rochadi, 2019; Pradipta et al., 2021).

HRQoL is a predictor of patient-reported outcomes (PRO) that refers to the multidimensional nature of health directly from the patient's point of view. Many studies have been conducted that attempt to assess HRQoL experienced by people infected with tuberculosis (Yadav et al., 2021). HRQoL in TB patients before starting treatment was reported to be significantly worse than at the end of treatment for all health domains (Jaber & Ibrahim, 2019). DR/MDR-TB patients are also reported to have poor HRQoL especially in the domain of physical and psychological health (C.-T. Li, Chu, Reiher, Kienene, & Chien, 2017; Ozoh et al., 2021).

Social and demographic factors of TB patients, such as age, smoking habits, place of residence, marital status, and length of illness, significantly affect all domains of HRQoL i.e. physical, psychological, social, and environmental (Sartika, Insani, & Abdullah, 2019; Yasobant et al., 2022). Age over 45 years and smokers reported having worse HRQoL in the physical domain (Chikaodinaka, 2018; Kakhki & Masjedi, 2015). Female patients even have twice the risk of developing depression due to biological responses, self-concept, and coping mechanisms (Solmi et al., 2022). Marital status affects the poor HRQoL of TB patients at the beginning of treatment. The patient's HRQoL significantly improved during treatment probably due to the care and emotional support provided by the patient's partner and family (Chikaodinaka, 2018; Jaber & Ibrahim, 2019; Kuchukhidze et al., 2021). Various studies demonstrate that long duration of TB treatment decreases patients' HRQoL in the physical and psychological domains (Ahmad et al., 2016; Araia et al., 2021). Education is one of the significant factors affecting patient HRQoL, where TB patients with higher education show good HRQoL in the psychological and environmental domains (Kakhki & Masjedi, 2015; Sartika et al., 2019). Interestingly, religiosity had a positive impact on HRQoL in TB patients (Grill, Wang, Cheng, & Lyon, 2020; Panzini et al., 2017). This suggests that there is a significant link between mental health and a person's religious nature. In addition, the stigma faced by TB patients includes the social domain, in addition to the physical domain, which is most significant in influencing the HRQoL of TB patients (Alene et al., 2018; Roba et al., 2018; Yadav et al., 2021). Tuberculosis significantly affects the patient's HRQoL, even after treatment, especially in the domains of physical and psychological health. However, HRQoL in the social and environmental domains has also changed due to tuberculosis.

Health-related quality of life in tuberculosis and diabetes co-epidemic

People living with DM are particularly susceptible to the harmful effects of tuberculosis. Diabetes populations are extra vulnerable to getting *M. tuberculosis* infection, and untreated latent TB can reactivate more easily (Ahmed, Omer, Osman, & Ahmed-Abakur, 2017; Hayashi & Chandramohan, 2018; Shayo & Shayo, 2021). Population aging, urbanization, changes in diet and physical activity, and other lifestyle factors are causing obesity rates to rise, which in turn fuels a global rise in DM prevalence (Aras, Tchang, & Pape, 2021; Jarzebski et al., 2021). Diabetes affected 537 million people in 2021 and anticipates reaching 783 million by 2045. Since 90% of people with DM have type 2 DM (T2DM) and 80% live in lower-middle-income countries, it is estimated that in the next thirty years, the number of DM cases will increase most sharply in areas with high TB incidence rates (Lam, Lepe, Wild, & Jackson, 2021; Magliano & Boyko, 2021).

Diabetes jeopardizes the fight against TB because it increases the chances of developing TB threefold and produces unfavorable outcomes, such as unsuccessful therapies and death. Among TB patients, DM has a rather high prevalence, especially in countries where TB and DM occur together (Oliveira Hashiguchi et al., 2023; Siddiqui, Khayyam, Siddiqui, Sarin, & Sharma, 2017). The frequency of TB patients with diabetes in a case-control study in Indonesia was reported at 13 percent (Izhar, Butar, Hidayati, & Ruwayda, 2021). A Thai study reported 16 percent of people had diabetes of which 70 percent were diagnosed before a TB diagnosis (Oo et al., 2020). Referring to India's epidemiological approach, DM had a significant association with 24.2 percent of previously treated TB and 23.1 percent of new TB patients (Hirayama

et al., 2021), added to studies from Pakistan at 26.1 percent (Aftab et al., 2017), and South Korea at 23.8 percent (Yoon et al., 2017).

Tuberculosis patients with comorbid diabetes mellitus (TB – DM) have HRQoL disorders that affect the physical, psychological, social health and environmental domains that have been associated with age, social class, physiological fulfillment, and relationships to society. Assessing HRQoL in comorbid TB – DM patients can assist in the assessment of variables that impact unknown comorbid features. Previous research points to the fact that TB-DM significantly affects patients' quality of life, both their mental and physical health (Oluchi et al., 2021; Yasobant et al., 2022).

Poor HRQoL, in the social and psychological domains, is significantly associated with old age in DM-TB patients (Zare et al., 2020). The aging process has a significant negative influence on HRQoL through several variables such as degenerative changes, inadequate adherence to medication, inability to change lifestyle, disability for usual tasks, receding ability to labor, and fatigue (Etzeberria, Urdaneta, & Galdona, 2019). Decreased immunity and T cell function caused by aging may contribute to low HRQoL scores (Althoff, Smit, Reiss, & Justice, 2016). Furthermore, there was a negative link established between HRQoL and poorer social and family life in comorbid TB-DM patients aged 41 to 60 years (Siddiqui et al., 2017).

HRQoL in comorbid TB-DM patients is substantially predicted by education, alcohol consumption, profession, social and financial position (Al Amri et al., 2023; Alemu, Bitew, Diriba, & Gumi, 2021; Alturki, Al Amad, Mahyoub, Al Hanash, & Alhammadi, 2023). Previous research has also found a negative correlation between increases in total HRQoL and HbA1c (Al-Taie, Maftai, Kautzky-Willer, Krebs, & Stingl, 2020; Svedbo Engström et al., 2019). The results imply that keeping HbA1c within the target range may help TB-DM patients experience elevated HRQoL (Koesoemadinata et al., 2023). To improve HRQoL in comorbid TB-DM patients, it is imperative to undertake adequate collaborative management of TB-DM simultaneously with improved education (Isfandiari, Wahyuni, & Pranoto, 2022; R. Mishra et al., 2021). It is associated with increased self-confidence, a positive mindset that refers to illness, and better social standing.

Health-related quality of life measurements

HRQoL assessment tools might be either disease-specific or generic. Tools of different scales have been used in infectious and non-communicable disease patients. Certain tools evaluate the entirety of HRQoL, whereas others examine particular domains, including mental or physical dimensions. Several questionnaire tools are commonly used to assess HRQoL for TB, DM, and TB-DM patients.

Generic Tools

The SF-36 questionnaire is a Medical Outcomes Trust short-form questionnaire with 36 questions (Lins & Carvalho, 2016). SF-36 is used extensively to measure relevant general health status and falls into eight domains: physical function, physical role limitation, body pain, social functioning, mental health in general, emotional role limitation, vitality, and general health (Lins-Kusterer et al., 2019; Lins & Carvalho, 2016). The SF-12 is a developed HRQoL instrument and is a shortened version of the SF-36. Big surveys regarding the public and particular groups, including sizeable long-term investigations examining medical results, utilize the SF-12 (Gornet, Copay, Sorensen, & Schranck, 2018; Loosman et al., 2015). The Sickness Impact Profile (SIP) has two domains, physical and psychosocial, consisting of 136 items and grouped into 12 categories. SIP tools are used for self-administration or interviews (Coons, Rao, Keininger, & Hays, 2000). SF-6D is a preference-based scoring system that utilizes the six dimensions of SF-36. The eight dimensions of SF-36 are reduced to six by eliminating the perception of general health and incorporating role limitations due to physical and emotional problems. The six dimensions included were physical function, role limitation, soreness, social function, emotional wellness, and energy (Brazier et al., 2020; Elmallah et al., 2015; Mazari et al., 2016).

EuroQoL (EQ-5D) has important components that are simply developed but have good reliability and validity (N. J. Devlin, Shah, Feng, Mulhern, & Van Hout, 2018). The EQ-5D consists of two parts and designed for self-administration and can be used in public health surveys or combined with condition-specific tools for the assessment of specific conditions (N. Devlin, Pickard, & Busschbach, 2022). The first section has five domains, covering mobility, self-care, usual activities, pain/discomfort and anxiety/depression; and rated on three levels, namely "no problem," "specific problem" or "extreme problem". Part two self-assessment of perceived health status based on visual analogue scale (VAS) (N. Devlin et al., 2022; N. J. Devlin et al., 2018; Xie et al., 2023). The World Health Organization (WHO) QoL-BREF questionnaire instrument covers broader domains, including physical, psychological, social relationships and environmental capacity (Vu et al., 2022). WHO-QoL BREF consists of 26 items which are divided into 24 HRQoL assessment items for four domains and 2 items for assessing general HRQoL and general health (Abbasi-Ghahramanloo et al., 2020; Lodhi et al., 2019; Reba, Birhane, & Gutema, 2019).

Specific Tools

Specific HRQoL tools such as DR-12 are new specific tools for assessing HRQoL of TB patients consisting of 12 items, 7 of the 12 items include symptoms of TB (i.e. coughing up of sputum or blood, fever, dyspnea, chest discomfort, anorexia, and losing weight) and 5 items are related to social, psychological, and physical adaptability (Khan, Tangiisuran,

Imtiaz, & Zainal, 2017; Sun et al., 2018). When computing two domain rating and a total rating, every reaction alternative is offered on a 3-point scale, and each item receives equal weight (Aggarwal, 2019; R. Mishra et al., 2021). The St. John's George Respiratory Questionnaire (SGRQ) is a popular specialist tool for measuring HRQL for people suffering from chronic obstructive pulmonary disease (COPD) and other lung disorders. The overall rating can be calculated from three domain-specific ratings (symptoms, activity, and influence) (Kotanen et al., 2020; Rocha, Jácome, Martins, & Marques, 2021). St. George's Hospital School of Medicine in England created SGRQ and is currently adapted into many different languages (Capparelli et al., 2018; Prior et al., 2019; Rehman et al., 2020; Sherpa et al., 2015).

The Symptoms Checklist 90 (SCL-90) is a ninety items symptom inventory developed to assess an assortment of mental health issues and symptoms, involving nine parameters: somatization, obsessive-compulsive disorder (OCD), interpersonal sensibility, anxiousness, depressive symptoms, enmity, fearful anxiety, paranoid notions, and psychoticism (Sereda & Dembitskyi, 2016). The Social Support Rating Scale (SSRS) composed of ten items designed to assess the accessibility and utilization of self-perceived support from social services (Y. Li, Peng, & Tao, 2023; R. H. Xu, Shi, Xia, & Wang, 2022). The General Health Questionnaire 12 (GHQ-12) is a shortened version of GHQ-60, developed to screen for non-psychotic mental ailments among the broad community (Nouri, Feizi, Roohafza, Sadeghi, & Sarrafzadegan, 2021). The Brief Disability Questionnaire (BDQ), obtained using the Medical Outcomes Study (MOS) public health study brief form, served to determine the severity of mental and physical impairment among patients (Sezgin, Hocaoglu, & Guvendag-Guven, 2016; Topak, BALTALARLI, Gökhan, & ÖZDEL, 2022; Turan, Dayapoğlu, & Özer, 2021). The Beck Depression Inventory (Beck-DI) is a questionnaire of 21 items created to assess indicators of depression and severity (Elovanio et al., 2020; Peyrovian et al., 2019). The Center for Epidemiological Studies Depression Scale (CES-D) and the 5-item Mental Health Index (MHI-5) (Elovanio et al., 2020; Rivera-Riquelme, Piqueras, & Cuijpers, 2019) are an array of tools or inquiries applied to evaluate the physical state, psychologic history, mental wellness, support systems, and availability and utilization of healthcare facilities by vagrants diagnosed with tuberculosis (Henry, Grant, & Cropsey, 2018; L. Jiang et al., 2019; Vilagut, Forero, Barbaglia, & Alonso, 2016).

Collaboration in tuberculosis and diabetes management

Patients with diabetes have an increased incidence of acquiring tuberculosis (TB), and tuberculosis itself exacerbates the diabetic patient's glycemic management. Surveillance programs and services for infectious diseases (TB) and non-communicable diseases (DM) must be improved and accelerated to mitigate the possibility of DM sufferers contracting TB or TB patients experiencing infection reactivation. This program must involve all parties including community health centers, public health workers, the community, local government, Ministry of Health, and academics to improve HRQoL and reduce morbidity and mortality due to TB and DM comorbidities (Bachtar et al., 2009; Fazaludeen Koya et al., 2022; Nikoloski et al., 2021).

In the management of tuberculosis and diabetes, currently managed by community health centers more, but not many private primary care providers (PPCs) are involved yet. Currently, especially in urban areas, the majority use these facilities. Research in Yogyakarta recommends that private primary care providers, namely private clinics and private general practitioners, their potential role in implementing health promotion, two-way screening, patient referral, TB treatment, and data reporting should continue to be improved (Arini, Sugiyo, & Permana, 2022).

To ensure the implementation of bidirectional scheme in the management of TB and DM, WHO together with the International Union Against Tuberculosis and Lung Diseases (Union) formulated bidirectional collaborative strategy for TB and diabetes management and prevention. This strategy provides guidelines for countries in the world to form national collaborative TB and DM eradication programs at regional, district and regional/or local level by considering the national characteristics of each country to include representation of all relevant stakeholders. Therefore, these recommendations should be used by policymakers and implementers to control the TB-DM co-epidemic and complement existing national systems for the prevention and management of TB and DM. The framework focuses on TB and DM co-epidemic surveillance, monitoring, and evaluation of collaborative activities, and detecting and managing TB in DM patients, and vice versa, aiming to improve the overall health outcomes (Dlodlo et al., 2021; Organization, 2011, 2022).

CONCLUSION

Diabetes mellitus that has gone untreated, unnoticed, and mismanaged poses an infinitely bigger problem for tuberculosis treatment and prevention in countries with a higher rate of TB than previously anticipated. Chronically elevated glucose levels cause the immune system's response to function to be hyperactive and uncontrolled, boosting vulnerability to infections like tuberculosis. The link connecting tuberculosis and diabetes is appealing, and a paradigm for addressing the combined burden is required. Yet, neglecting or disparaging that connection could jeopardize years of advancement toward eradicating tuberculosis, leading to disastrous health and financial consequences. Furthermore, community and stakeholder support for collaboration in TB and diabetes management will enhance patient HRQoL and contribute to the accomplishment of the tuberculosis elimination program.

REFERENCES

- Abbasi-Ghahramanloo, A., Soltani-Kermanshahi, M., Mansori, K., Khazaei-Pool, M., Sohrabi, M., Baradaran, H. R., . . . Gholami, A. (2020). Comparison of SF-36 and WHOQoL-BREF in measuring quality of life in patients with type 2 diabetes. *International journal of general medicine*, 497-506.
- Abegaz, T. M., & Ali, A. A. (2023). *Health-Related Quality of Life and Healthcare Events in Patients with Monotherapy of Anti-Diabetes Medications*. Paper presented at the Healthcare.
- Adebayo, B. I., Adejumo, O. A., & Odusanya, O. O. (2023). Health-related quality of life among adults newly diagnosed with pulmonary tuberculosis in Lagos State, Nigeria: a prospective study. *Quality of life research*, 1-12.
- Aftab, H., Ambreen, A., Jamil, M., Garred, P., Petersen, J. H., Nielsen, S. D., . . . Christensen, D. L. (2017). High prevalence of diabetes and anthropometric heterogeneity among tuberculosis patients in Pakistan. *Tropical medicine & international health*, 22(4), 465-473.
- Aggarwal, A. N. (2019). Quality of life with tuberculosis. *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, 17, 100121.
- Ahmad, N., Javaid, A., Syed Sulaiman, S. A., Basit, A., Afridi, A. K., Jaber, A. A. S., & Khan, A. H. (2016). Effects of multidrug resistant tuberculosis treatment on patients' health related quality of life: results from a follow up study. *PloS one*, 11(7), e0159560.
- Ahmed, M., Omer, I., Osman, S. M., & Ahmed-Abakur, E. H. (2017). Association between pulmonary tuberculosis and Type 2 diabetes in Sudanese patients. *The International Journal of Mycobacteriology*, 6(1), 97-101.
- Al-Azayzih, A., Kanaan, R. J., & Altawalbeh, S. M. (2023). Assessment of Drug-Related Problems and Health-Related Quality of Life Domains in Elderly Patients with Type 2 Diabetes Mellitus. *Therapeutics and Clinical Risk Management*, 913-928.
- Al-Taie, N., Maftai, D., Kautzky-Willer, A., Krebs, M., & Stingl, H. (2020). Assessing the quality of life among patients with diabetes in Austria and the correlation between glycemic control and the quality of life. *Primary care diabetes*, 14(2), 133-138.
- Al Amri, S., Singh, J., Al Balushi, L., Al Ghafri, T., Al Balushi, M. N., Al Marbouai, H., . . . Al Mujaini, S. M. (2023). Prevalence and Associated Factors of Diabetes Mellitus Type 2 Among Tuberculosis Patients in Muscat, Oman, 2017–2020. *Oman Medical Journal*, 38(4), e526.
- Alemu, A., Bitew, Z. W., Diriba, G., & Gumi, B. (2021). Co-occurrence of tuberculosis and diabetes mellitus, and associated risk factors, in Ethiopia: a systematic review and meta-analysis. *IJID Regions*, 1, 82-91.
- Alene, K. A., Clements, A. C., McBryde, E. S., Jaramillo, E., Lönnroth, K., Shaweno, D., . . . Viney, K. (2018). Mental health disorders, social stressors, and health-related quality of life in patients with multidrug-resistant tuberculosis: a systematic review and meta-analysis. *Journal of Infection*, 77(5), 357-367.
- Alsayed Hassan, D., Helaluddin, F., Chahestani, O. H., Mohamed, O., & Islam, N. (2022). *Diabetes self-management and health-related quality of life among primary care patients with diabetes in Qatar: A cross-sectional study*. Paper presented at the Healthcare.
- Althoff, K. N., Smit, M., Reiss, P., & Justice, A. C. (2016). HIV and ageing: improving quantity and quality of life. *Current Opinion in HIV and AIDS*, 11(5), 527.
- Alturki, S., Al Amad, M., Mahyoub, E., Al Hanash, N., & Alhammadi, A. (2023). Prevalence of Diabetes Mellitus among Patients with Tuberculosis and Its Associated Factors in Sana'a, Yemen, 2021. *Epidemiologia*, 4(2), 202-211.
- Araia, Z. Z., Mesfin, A. B., Mebrahtu, A. H., Tewelde, A. G., Tewelde, A. T., & Ngusbrhan Kidane, S. (2021). Health-related quality of life in tuberculosis patients in Eritrea: comparison among drug-susceptible and rifampicin/multidrug-resistant tuberculosis patients. *Patient Related Outcome Measures*, 205-212.
- Aras, M., Tchang, B. G., & Pape, J. (2021). Obesity and diabetes. *Nursing Clinics*, 56(4), 527-541.
- Arini, M., Sugiyono, D., & Permana, I. (2022). Challenges, opportunities, and potential roles of the private primary care providers in tuberculosis and diabetes mellitus collaborative care and control: a qualitative study. *BMC health services research*, 22(1), 215. doi:10.1186/s12913-022-07612-3
- Aschalew, A. Y., Yitayal, M., & Minyihun, A. (2020). Health-related quality of life and associated factors among patients with diabetes mellitus at the University of Gondar referral hospital. *Health and quality of life outcomes*, 18(1), 1-8.
- Bachtiar, A., Miko, T., Machmud, R., Mehta, F., Chadha, V., Yudarini, P., . . . Jitendra, R. (2009). High risk of tuberculous infection in North Sulawesi Province of Indonesia. *The International journal of tuberculosis and lung disease*, 13(12), 1513-1518.
- Barua, L., Faruque, M., Chowdhury, H. A., Banik, P. C., & Ali, L. (2021). Health-related quality of life and its predictors among the type 2 diabetes population of Bangladesh: A nation-wide cross-sectional study. *Journal of diabetes investigation*, 12(2), 277-285.

- Brazier, J. E., Mulhern, B. J., Bjorner, J. B., Gandek, B., Rowen, D., Alonso, J., . . . Group, S.-D. I. P. (2020). Developing a new version of the SF-6D health state classification system from the SF-36v2: SF-6Dv2. *Medical care*, 58(6), 557-565.
- Capparelli, I., Fernandez, M., Otero, M. S., Steimberg, J., Brassesco, M., Campobasso, A., . . . Rabinovich, R. A. (2018). Translation to Spanish and validation of the specific Saint George's Questionnaire for idiopathic pulmonary fibrosis. *Archivos de Bronconeumología (English Edition)*, 54(2), 68-73.
- Chantzaras, A., & Yfantopoulos, J. (2022). Association between medication adherence and health-related quality of life of patients with diabetes. *Hormones*, 21(4), 691-705.
- Chen, W., Howard, K., Gorham, G., O'Bryan, C. M., Coffey, P., Balasubramanya, B., . . . Cass, A. (2022). Design, effectiveness, and economic outcomes of contemporary chronic disease clinical decision support systems: a systematic review and meta-analysis. *Journal of the American Medical Informatics Association*, 29(10), 1757-1772.
- Chew, B.-H., Mohd-Sidik, S., & Shariff-Ghazali, S. (2015). Negative effects of diabetes-related distress on health-related quality of life: an evaluation among the adult patients with type 2 diabetes mellitus in three primary healthcare clinics in Malaysia. *Health and quality of life outcomes*, 13(1), 1-16.
- Chikaodinaka, A. A. (2018). Health-Related Quality of Life (HRQoL) scores vary with treatment and may identify potential defaulters during treatment of tuberculosis. *Malawi Medical Journal*, 30(4), 283-290.
- Coons, S. J., Rao, S., Keininger, D. L., & Hays, R. D. (2000). A comparative review of generic quality-of-life tools. *Pharmacoeconomics*, 17, 13-35.
- Correia, J. C., Waqas, A., Assal, J.-P., Davies, M. J., Somers, F., Golay, A., & Pataky, Z. (2023). Effectiveness of therapeutic patient education interventions for chronic diseases: A systematic review and meta-analyses of randomized controlled trials. *Frontiers in Medicine*, 9. doi:10.3389/fmed.2022.996528
- Devlin, N., Pickard, S., & Busschbach, J. (2022). The Development of the EQ-5D-5L and its Value Sets. *Value sets for eq-5d-5l: a compendium, comparative review & user guide*, 1-12.
- Devlin, N. J., Shah, K. K., Feng, Y., Mulhern, B., & Van Hout, B. (2018). Valuing health-related quality of life: An EQ-5 D-5 L value set for England. *Health economics*, 27(1), 7-22.
- Dlodlo, R., Brigden, G., Heldal, E., Allwood, B., Chiang, C., Fujiwara, P., . . . Koura, K. (2021). Management of Tuberculosis: a Guide to Essential Practice. Paris, France: International Union Against Tuberculosis and Lung Disease, 2019. theunion.org/sites/default/files/2020-08/TheUnion_Orange_2019.pdf.
- Dou, L., Shi, Z., Cuomu, Z., Zhuoga, C., Li, C., Dawa, Z., & Li, S. (2023). Health-related quality of life and its changes of the Tibetan population in China: based on the 2013 and 2018 National Health Services Surveys. *BMJ open*, 13(11), e072854.
- Edwards, T., White, L., Lee, N., Castro, M., Saludar, N., Faguer, B., . . . Solon, J. (2020). Effects of comorbidities on quality of life in Filipino people with tuberculosis. *The International journal of tuberculosis and lung disease*, 24(7), 712-719.
- Elmallah, R. K., Cherian, J. J., Jauregui, J. J., Bhowmik-Stoker, M., Beaver, W. B., & Mont, M. A. (2015). Determining health-related quality-of-life outcomes using the SF-6D preference-based measure in patients following total knee arthroplasty. *The Journal of Arthroplasty*, 30(7), 1150-1153.
- Elovainio, M., Hakulinen, C., Pulkki-Råback, L., Aalto, A.-M., Virtanen, M., Partonen, T., & Suvisaari, J. (2020). General Health Questionnaire (GHQ-12), Beck Depression Inventory (BDI-6), and Mental Health Index (MHI-5): psychometric and predictive properties in a Finnish population-based sample. *Psychiatry research*, 289, 112973.
- Etzeberria, I., Urdaneta, E., & Galdona, N. (2019). Factors associated with health-related quality of life (HRQoL): differential patterns depending on age. *Quality of life research*, 28, 2221-2231.
- Fazaludeen Koya, S., Lordson, J., Khan, S., Kumar, B., Grace, C., Nayar, K. R., . . . Pillai, A. M. (2022). Tuberculosis and diabetes in India: stakeholder perspectives on health system challenges and opportunities for integrated care. *Journal of Epidemiology and Global Health*, 12(1), 104-112.
- Fuentes-Merlos, Á., Orozco-Beltrán, D., Quesada Rico, J. A., & Reina, R. (2021). Quality-Of-Life determinants in people with diabetes mellitus in Europe. *International journal of environmental research and public health*, 18(13), 6929.
- Galán, I. G., León, M. C. C., Guerrero-Martín, J., Jurado, C. F. L., & Durán-Gómez, N. (2021). Health-related quality of life in diabetes mellitus patients in primary health care. *Enfermería Clínica (English Edition)*, 31(5), 313-322.
- Gautam, S., Shrestha, N., Mahato, S., Nguyen, T. P., Mishra, S. R., & Berg-Beckhoff, G. (2021). Diabetes among tuberculosis patients and its impact on tuberculosis treatment in South Asia: a systematic review and meta-analysis. *Scientific Reports*, 11(1), 2113.
- Gebremariam, G. T., Biratu, S., Alemayehu, M., Welie, A. G., Beyene, K., Sander, B., & Gebretekle, G. B. (2022). Health-related quality of life of patients with type 2 diabetes mellitus at a tertiary care hospital in Ethiopia. *PLoS one*, 17(2), e0264199.

- Gornet, M. F., Copay, A. G., Sorensen, K. M., & Schranck, F. W. (2018). Assessment of health-related quality of life in spine treatment: conversion from SF-36 to VR-12. *The Spine Journal*, 18(7), 1292-1297.
- Grill, K. B., Wang, J., Cheng, Y. I., & Lyon, M. E. (2020). The role of religiousness and spirituality in health-related quality of life of persons living with HIV: A latent class analysis. *Psychology of religion and spirituality*, 12(4), 494.
- Gupta, J., Kapoor, D., & Sood, V. (2021). Quality of life and its determinants in patients with diabetes mellitus from two health institutions of sub-himalayan region of India. *Indian journal of endocrinology and metabolism*, 25(3), 211.
- Hayashi, S., & Chandramohan, D. (2018). Risk of active tuberculosis among people with diabetes mellitus: systematic review and meta-analysis. *Tropical medicine & international health*, 23(10), 1058-1070.
- Henry, S. K., Grant, M. M., & Cropsey, K. L. (2018). Determining the optimal clinical cutoff on the CES-D for depression in a community corrections sample. *Journal of affective disorders*, 234, 270-275.
- Hirayama, T., Gopali, R. S., Maharjan, B., Shibasaki, K., Shrestha, A., Thapa, A., . . . Nakano, T. (2021). Prevalence of Diabetes in Tuberculosis Patients in Kathmandu Valley, Nepal. *Japanese Journal of Infectious Diseases*, 74(6), 507-510.
- Homady, A., Albasheer, O., Bajawi, A., Hamdi, S., Awaf, A., Madkhali, T., . . . Somaili, M. (2023). Health-related Quality of Life among Type 2 Diabetes Patients in Southern Province of Saudi Arabia using WHOQOL-BREF: A Cross-section Study. *Current Diabetes Reviews*, 19(7), 55-64.
- Isfandiari, M. A., Wahyuni, C. U., & Pranoto, A. (2022). *Tuberculosis Predictive Index for Type 2 Diabetes Mellitus Patients Based on Biological, Social, Housing Environment, and Psychological Well-Being Factors*. Paper presented at the Healthcare.
- Izhar, M. D., Butar, M. B., Hidayati, F., & Ruwayda, R. (2021). Predictors and health-related quality of life with short form-36 for multidrug-resistant tuberculosis patients in Jambi, Indonesia: A case-control study. *Clinical Epidemiology and Global Health*, 12, 100872.
- Jaber, A. A. S., & Ibrahim, B. (2019). Health-related quality of life of patients with multidrug-resistant tuberculosis in Yemen: prospective study. *Health and quality of life outcomes*, 17(1), 1-14.
- Jarzebski, M. P., Elmqvist, T., Gasparatos, A., Fukushi, K., Eckersten, S., Haase, D., . . . Takeuchi, K. (2021). Ageing and population shrinking: Implications for sustainability in the urban century. *Npj Urban Sustainability*, 1(1), 17.
- Jiang, L., Wang, Y., Zhang, Y., Li, R., Wu, H., Li, C., . . . Tao, Q. (2019). The reliability and validity of the center for epidemiologic studies depression scale (CES-D) for Chinese university students. *Frontiers in Psychiatry*, 10, 315.
- Jiang, W., Trimawartinah, Rahman, F. M., Wibowo, A., Sanjaya, A., Silitonga, P. I. I., . . . Long, Q. (2022). The co-management of tuberculosis-diabetes co-morbidities in Indonesia under the National Tuberculosis Control Program: results from a cross-sectional study from 2017 to 2019. *BMC Public Health*, 22(1), 689.
- Kakhki, A. D., & Masjedi, M. R. (2015). Factors associated with health-related quality of life in tuberculosis patients referred to the national research institute of tuberculosis and lung disease in Tehran. *Tuberculosis and respiratory diseases*, 78(4), 309.
- Kastien-Hilka, T., Rosenkranz, B., Sinanovic, E., Bennett, B., & Schwenkglenks, M. (2017). Health-related quality of life in South African patients with pulmonary tuberculosis. *PLoS one*, 12(4), e0174605.
- Khan, S., Tangiisuran, B., Imtiaz, A., & Zainal, H. (2017). Health status and quality of life in tuberculosis: systematic review of study design, tools, measuring properties and outcomes. *Health Science Journal*, 11(1), 1.
- Koesoemadinata, R., McAllister, S., Soetedjo, N., Santoso, P., Dewi, N., Permana, H., . . . Dockrell, H. (2023). Diabetes characteristics and long-term management needs in diabetic TB patients. *The International journal of tuberculosis and lung disease*, 27(2), 113-120.
- Kotani, P., Kainu, A., Brander, P., Bergman, P., Lehtomäki, A., & Kreivi, H. R. (2020). Validation of the Finnish severe respiratory insufficiency questionnaire. *The Clinical Respiratory Journal*, 14(7), 659-666.
- Kuchukhidze, G., Baliashvili, D., Adamashvili, N., Kasradze, A., Kempker, R. R., & Magee, M. J. (2021). *Long-Term Mortality and Active Tuberculosis Disease Among Patients Who Were Lost to Follow-Up During Second-Line Tuberculosis Treatment in 2011–2014: Population-Based Study in the Country of Georgia*. Paper presented at the Open Forum Infectious Diseases.
- Lam, A. A., Lepe, A., Wild, S. H., & Jackson, C. (2021). Diabetes comorbidities in low-and middle-income countries: an umbrella review. *Journal of global health*, 11.
- Li, C.-T., Chu, K.-H., Reiher, B., Kienene, T., & Chien, L.-Y. (2017). Evaluation of health-related quality of life in patients with tuberculosis who completed treatment in Kiribati. *Journal of international medical research*, 45(2), 610-620.
- Li, Y., Peng, J., & Tao, Y. (2023). Relationship between social support, coping strategy against COVID-19, and anxiety among home-quarantined Chinese university students: A path analysis modeling approach. *Current Psychology*, 42(13), 10629-10644.

- Lins-Kusterer, L., Valdelamar, J., Aguiar, C. V. N., Menezes, M. S., Netto, E. M., & Brites, C. (2019). Validity and reliability of the 36-Item Short Form Health Survey questionnaire version 2 among people living with HIV in Brazil. *The Brazilian Journal of Infectious Diseases*, 23(5), 313-321.
- Lins, L., & Carvalho, F. M. (2016). SF-36 total score as a single measure of health-related quality of life: Scoping review. *SAGE Open Medicine*, 4, 2050312116671725.
- Lodhi, F. S., Montazeri, A., Nedjat, S., Mahmoodi, M., Farooq, U., Yaseri, M., . . . Holakouie-Naieni, K. (2019). Assessing the quality of life among Pakistani general population and their associated factors by using the World Health Organization's quality of life instrument (WHOQOL-BREF): a population based cross-sectional study. *Health and quality of life outcomes*, 17, 1-17.
- Loosman, W. L., Hoekstra, T., van Dijk, S., Terwee, C. B., Honig, A., Siegert, C. E., & Dekker, F. W. (2015). Short-Form 12 or Short-Form 36 to measure quality-of-life changes in dialysis patients? *Nephrology Dialysis Transplantation*, 30(7), 1170-1176.
- Magliano, D., & Boyko, E. (2021). IDF Diabetes Atlas 10th edition scientific committee. *IDF DIABETES ATLAS [Internet]. 10th ed. Brussels: International Diabetes Federation*.
- Mazari, F. A. K., Shahin, Y., Khan, J. A., Samuel, N., Carradice, D., McCollum, P. T., & Chetter, I. C. (2016). Comparison of use of Short Form-36 domain scores and patient responses for derivation of preference-based SF6D index to calculate quality-adjusted life years in patients with intermittent claudication. *Annals of vascular surgery*, 34, 164-170.
- Mishra, R., Krishan, S., Siddiqui, A. N., Kapur, P., Khayyam, K. U., Rai, P. K., & Sharma, M. (2021). Impact of metformin therapy on health-related quality of life outcomes in tuberculosis patients with diabetes mellitus in India: A prospective study. *International Journal of Clinical Practice*, 75(4), e13864.
- Mishra, S. R., Sharma, A., Bhandari, P. M., Bhochhibhoya, S., & Thapa, K. (2015). Depression and health-related quality of life among patients with type 2 diabetes mellitus: a cross-sectional study in Nepal. *PloS one*, 10(11), e0141385.
- Motta, I., Boeree, M., Chesov, D., Dheda, K., Günther, G., Horsburgh, C. R., . . . Guglielmetti, L. (2023). Recent advances in the treatment of tuberculosis. *Clinical Microbiology and Infection*. doi:<https://doi.org/10.1016/j.cmi.2023.07.013>
- Natarajan, J., & Mokoboto-Zwane, S. (2022). Health-related quality of life and domain-specific associated factors among patients with Type2 diabetes mellitus in south India. *Review of Diabetic Studies*, 18(1), 34-41.
- Nikoloski, Z., Alqunaibet, A. M., Alfawaz, R. A., Almudarra, S. S., Herbst, C. H., El-Saharty, S., . . . Algwizani, A. (2021). Covid-19 and non-communicable diseases: evidence from a systematic literature review. *BMC Public Health*, 21(1), 1068.
- Nouri, F., Feizi, A., Roohafza, H., Sadeghi, M., & Sarrafzadegan, N. (2021). How different domains of quality of life are associated with latent dimensions of mental health measured by GHQ-12. *Health and quality of life outcomes*, 19, 1-16.
- Oktamianti, P., Bachtiar, A., Sutoto, S., Trihandini, I., Prasetyo, S., Achadi, A., & Efendi, F. (2021). Tuberculosis control within Indonesia's hospital accreditation. *Journal of Public Health Research*, 10(3), jphr. 2021.1979.
- Oliveira Hashiguchi, L., Cox, S. E., Edwards, T., Castro, M. C., Khan, M., & Liverani, M. (2023). How can tuberculosis services better support patients with a diabetes co-morbidity? A mixed methods study in the Philippines. *BMC health services research*, 23(1), 1027.
- Oluchi, S. E., Manaf, R. A., Ismail, S., Kadir Shahar, H., Mahmud, A., & Udeani, T. K. (2021). Health related quality of life measurements for diabetes: a systematic review. *International journal of environmental research and public health*, 18(17), 9245.
- Ong, K. L., Stafford, L. K., McLaughlin, S. A., Boyko, E. J., Vollset, S. E., Smith, A. E., . . . Hagins, H. (2023). Global, regional, and national burden of diabetes from 1990 to 2021, with projections of prevalence to 2050: a systematic analysis for the Global Burden of Disease Study 2021. *The Lancet*.
- Oo, M. M., Tassanakijpanich, N., Phyu, M. H., Safira, N., Kandel, S., Chumchuen, K., . . . Bilmumad, B. (2020). Coverage of tuberculosis and diabetes mellitus screening among household contacts of tuberculosis patients: a household-based cross-sectional survey from Southern Thailand. *BMC Public Health*, 20(1), 1-10.
- Organization, W. H. (2011). *Collaborative framework for care and control of tuberculosis and diabetes* (9241502258). Retrieved from
- Organization, W. H. (2022). Framework for collaborative action on tuberculosis and comorbidities.
- Organization, W. H. (2023). Assessing national capacity for the prevention and control of noncommunicable diseases: report of the 2021 global survey.
- Ozoh, O., Ojo, O., Dania, M., Dede, S., Adegboyega, O., Irurhe, N., . . . Adeyeye, O. (2021). Impact of post-tuberculosis lung disease on health-related quality of life in patients from two tertiary hospitals in Lagos, Nigeria. *African Journal of Thoracic and Critical Care Medicine*, 27(2), 46-52.

- Pandia, P., Syafiuddin, T., Bachtiar, A., & Rochadi, K. (2019). The relationship between concordance behaviour with treatment compliance and quality of life of patients with pulmonary tuberculosis in medan. *Open Access Macedonian Journal of Medical Sciences*, 7(9), 1536.
- Panzini, R. G., Mosqueiro, B. P., Zimpel, R. R., Bandeira, D. R., Rocha, N. S., & Fleck, M. P. (2017). Quality-of-life and spirituality. *International Review of Psychiatry*, 29(3), 263-282.
- Peyrovian, B., Rosenblat, J. D., Pan, Z., Iacobucci, M., Brietzke, E., & McIntyre, R. S. (2019). The glycine site of NMDA receptors: a target for cognitive enhancement in psychiatric disorders. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 92, 387-404.
- Pham, T. B., Nguyen, T. T., Truong, H. T., Trinh, C. H., Du, H. N. T., Ngo, T. T., & Nguyen, L. H. (2020). Effects of diabetic complications on health-related quality of life impairment in Vietnamese patients with type 2 diabetes. *Journal of diabetes research*, 2020.
- Pradipta, I. S., Idrus, L. R., Probandari, A., Lestari, B. W., Diantini, A., Alffenaar, J.-W. C., & Hak, E. (2021). Barriers and strategies to successful tuberculosis treatment in a high-burden tuberculosis setting: a qualitative study from the patient's perspective. *BMC Public Health*, 21(1), 1903. doi:10.1186/s12889-021-12005-y
- Prior, T. S., Hoyer, N., Shaker, S. B., Davidsen, J. R., Yorke, J., Hilberg, O., & Bendstrup, E. (2019). Validation of the IPF-specific version of St. George's Respiratory Questionnaire. *Respiratory research*, 20, 1-10.
- Reba, K., Birhane, B. W., & Gutema, H. (2019). Validity and reliability of the Amharic version of the World Health Organization's quality of life questionnaire (WHOQOL-BREF) in patients with diagnosed type 2 diabetes in Felege Hiwot referral hospital, Ethiopia. *Journal of diabetes research*, 2019.
- Rehman, A. u., Hassali, M. A. A., Harun, S. N., Abbas, S., Muneswarao, J., Ali, I. A. B. H., & Hussain, R. (2020). Validation and clinical interpretation of the St George's respiratory questionnaire for COPD (SGRQ-C) after adaptation to Malaysian language and culture, in patients with COPD. *Health and quality of life outcomes*, 18, 1-12.
- Rivera-Riquelme, M., Piqueras, J. A., & Cuijpers, P. (2019). The Revised Mental Health Inventory-5 (MHI-5) as an ultra-brief screening measure of bidimensional mental health in children and adolescents. *Psychiatry research*, 274, 247-253.
- Roba, A. A., Dasa, T. T., Weldegebreal, F., Asfaw, A., Mitiku, H., Teklemariam, Z., . . . Befikadu, H. (2018). Tuberculosis patients are physically challenged and socially isolated: A mixed methods case-control study of Health Related Quality of Life in Eastern Ethiopia. *PloS one*, 13(10), e0204697.
- Rocha, V., Jácome, C., Martins, V., & Marques, A. (2021). Are in person and telephone interviews equivalent modes of administrating the CAT, the FACIT-FS and the SGRQ in people with COPD? *Frontiers in Rehabilitation Sciences*, 64.
- Saleem, S., A. Malik, A., Ghulam, A., Ahmed, J., & Hussain, H. (2018). Health-related quality of life among pulmonary tuberculosis patients in Pakistan. *Quality of life research*, 27, 3137-3143.
- Sartika, I., Insani, W. N., & Abdulah, R. (2019). Assessment of health-related quality of life among tuberculosis patients in a public primary care facility in Indonesia. *Journal of global infectious diseases*, 11(3), 102.
- Sereda, Y., & Dembitskyi, S. (2016). Validity assessment of the symptom checklist SCL-90-R and shortened versions for the general population in Ukraine. *BMC psychiatry*, 16(1), 1-11.
- Sezgin, H., Hocaoglu, C., & Guvendag-Guven, E. S. (2016). Disability, psychiatric symptoms, and quality of life in infertile women: a cross-sectional study in Turkey. *Shanghai archives of psychiatry*, 28(2), 86.
- Shamshirgaran, S. M., Ataei, J., Alamdari, M. I., Safaeian, A., & Aminisani, N. (2016). Predictors of health-related quality of life among people with type II diabetes Mellitus in Ardabil, Northwest of Iran, 2014. *Primary care diabetes*, 10(4), 244-250.
- Shayo, F. K., & Shayo, S. C. (2021). Readiness of healthcare facilities with tuberculosis services to manage diabetes mellitus in Tanzania: A nationwide analysis for evidence-informed policy-making in high burden settings. *PloS one*, 16(7), e0254349.
- Sherpa, C. T., LeClerq, S. L., Singh, S., Naithani, N., Pangeni, R., Karki, A., . . . Tielsch, J. M. (2015). Validation of the St. George's respiratory questionnaire in Nepal. *Chronic Obstructive Pulmonary Diseases: Journal of the COPD Foundation*, 2(4), 281.
- Siddiqui, A. N., Khayyam, K. U., Siddiqui, N., Sarin, R., & Sharma, M. (2017). Diabetes prevalence and its impact on health-related quality of life in tuberculosis patients. *Tropical medicine & international health*, 22(11), 1394-1404.
- Sitlinger, A., & Zafar, S. Y. (2018). Health-related quality of life: the impact on morbidity and mortality. *Surgical Oncology Clinics*, 27(4), 675-684.
- Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., . . . Kim, J. H. (2022). Age at onset of mental disorders worldwide: large-scale meta-analysis of 192 epidemiological studies. *Molecular psychiatry*, 27(1), 281-295.

- Sun, Y., Yang, Z., Wan, C., Xu, C., Chen, L., Xu, L., . . . Yan, F. (2018). Development and validation of the pulmonary tuberculosis scale of the system of Quality of Life Tools for Chronic Diseases (QLICD-PT). *Health and quality of life outcomes*, 16, 1-10.
- Svedbo Engström, M., Leksell, J., Johansson, U.-B., Borg, S., Palaszewski, B., Franzén, S., . . . Eeg-Olofsson, K. (2019). Health-related quality of life and glycaemic control among adults with type 1 and type 2 diabetes—a nationwide cross-sectional study. *Health and quality of life outcomes*, 17(1), 1-11.
- Teli, M., Thato, R., & Rias, Y. A. (2023). Predicting factors of health-related quality of life among adults with type 2 diabetes: a systematic review. *SAGE Open Nursing*, 9, 23779608231185921.
- Topak, O. Z., BALTARLI, A., Gökhan, Ö., & ÖZDEL, O. (2022). Is it important to give patients verbal-visual information about the operation to improve their psychological functions in coronary artery bypass graft surgery? *Pamukkale Medical Journal*, 15(3), 555-562.
- Tran Kien, N., Phuong Hoa, N., Minh Duc, D., & Wens, J. (2021). Health-related quality of life and associated factors among patients with type II diabetes mellitus: A study in the family medicine center (FMC) of Agricultural General Hospital in Hanoi, Vietnam. *Health Psychology Open*, 8(1), 2055102921996172.
- Turan, G. B., Dayapoğlu, N., & Özer, Z. (2021). Evaluation of care burden and caregiving preparedness in caregivers of patients with epilepsy: A sample in eastern Turkey. *Epilepsy & Behavior*, 124, 108370.
- Tusa, B. S., Geremew, B. M., & Tefera, M. A. (2020). Heath related quality of life and associated factors among adults with and without diabetes in Adama city East Shewa, Ethiopia 2019; using generalized structural equation modeling. *Health and quality of life outcomes*, 18(1), 1-13.
- Vilagut, G., Forero, C. G., Barbaglia, G., & Alonso, J. (2016). Screening for depression in the general population with the Center for Epidemiologic Studies Depression (CES-D): a systematic review with meta-analysis. *PloS one*, 11(5), e0155431.
- Vu, L. G., Nguyen, L. H., Nguyen, C. T., Vu, G. T., Latkin, C. A., Ho, R., & Ho, C. S. (2022). Quality of life in Vietnamese young adults: A validation analysis of the World Health Organization's quality of life (WHOQOL-BREF) instrument. *Frontiers in Psychiatry*, 13, 968771.
- Wonde, T. E., Ayene, T. R., Moges, N. A., & Bazezew, Y. (2022). Health-related quality of life and associated factors among type 2 diabetic adult patients in Debre Markos Referral Hospital, Northwest Ethiopia. *Heliyon*, 8(8).
- Xie, S., Li, M., Wang, D., Hong, T., Guo, W., & Wu, J. (2023). Comparison of the measurement properties of the EQ-5D-5L and SF-6Dv2 among overweight and obesity populations in China. *Health and quality of life outcomes*, 21(1), 118.
- Xu, G., Hu, X., Lian, Y., & Li, X. (2023). Diabetes mellitus affects the treatment outcomes of drug-resistant tuberculosis: a systematic review and meta-analysis. *BMC Infectious Diseases*, 23(1), 813. doi:10.1186/s12879-023-08765-0
- Xu, R. H., Shi, L.-S.-B., Xia, Y., & Wang, D. (2022). Associations among eHealth literacy, social support, individual resilience, and emotional status in primary care providers during the outbreak of the SARS-CoV-2 Delta variant. *Digital Health*, 8, 20552076221089789.
- Yadav, R. K., Kaphle, H. P., Yadav, D. K., Marahatta, S. B., Shah, N. P., Baral, S., . . . Ojha, R. (2021). Health related quality of life and associated factors with medication adherence among tuberculosis patients in selected districts of Gandaki Province of Nepal. *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, 23, 100235.
- Yasobant, S., Nazli Khatib, M., Syed, Z. Q., Gaidhane, A. M., Shah, H., Narkhede, K., . . . Puwar, T. (2022). Health-Related Quality of Life (HRQoL) of patients with tuberculosis: A review. *Infectious Disease Reports*, 14(4), 509-524.
- Yoon, Y. S., Jung, J.-W., Jeon, E. J., Seo, H., Ryu, Y. J., Yim, J.-J., . . . Lee, B. J. (2017). The effect of diabetes control status on treatment response in pulmonary tuberculosis: a prospective study. *Thorax*, 72(3), 263-270.
- Zare, F., Ameri, H., Madadzadeh, F., & Reza Aghaei, M. (2020). Health-related quality of life and its associated factors in patients with type 2 diabetes mellitus. *SAGE Open Medicine*, 8, 2050312120965314.

Machrumnizar FK

Jurnal Aisyah_TB-DM HRQoL

 Impact of Co-epidemic TB-DM

Document Details

Submission ID

trn:oid::3618:143495525

Submission Date

Jun 18, 2026, 4:49 PM GMT+7

Download Date

Jun 18, 2026, 4:53 PM GMT+7

File Name

Jurnal Aisyah_TB-DM HRQoL.pdf

File Size

284.4 KB

12 Pages**8,515 Words****49,320 Characters**

11% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Filtered from the Report

- Bibliography
- Quoted Text
- Cited Text
- Small Matches (less than 8 words)

Match Groups

-  **37 Not Cited or Quoted 11%**
Matches with neither in-text citation nor quotation marks
-  **0 Missing Quotations 0%**
Matches that are still very similar to source material
-  **0 Missing Citation 0%**
Matches that have quotation marks, but no in-text citation
-  **0 Cited and Quoted 0%**
Matches with in-text citation present, but no quotation marks

Top Sources

- 0%  Internet sources
- 11%  Publications
- 0%  Submitted works (Student Papers)

Integrity Flags

0 Integrity Flags for Review

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

Match Groups

- 37 Not Cited or Quoted 11%**
Matches with neither in-text citation nor quotation marks
- 0 Missing Quotations 0%**
Matches that are still very similar to source material
- 0 Missing Citation 0%**
Matches that have quotation marks, but no in-text citation
- 0 Cited and Quoted 0%**
Matches with in-text citation present, but no quotation marks

Top Sources

- 0% Internet sources**
- 11% Publications**
- 0% Submitted works (Student Papers)**

Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	Publication	Liena Liena, Fioni Fioni, Lidya Siregar, Ermi Girsang. "The Potential of Tamarillo (S...	2%
2	Publication	Gunnar Németh. "Health related quality of life outcome instruments", European ...	1%
3	Publication	Fioni Fioni, Liena Liena, Lusya Siregar, Ermi Girsang. "The antioxidant and anti-...	<1%
4	Publication	Haerani Haerani, Ridwan Amiruddin, Ansariadi Ansariadi, A. Arsunan Arsin, Suria...	<1%
5	Publication	Rita Suhuyini Salifu, Mbuzeleni Hlongwa, Khumbulani Hlongwana. "Implementati...	<1%
6	Publication	Maria Regina Rachmawati, Angela B. M. Tulaar, Suzana Immanuel, A. Purba et al. ...	<1%
7	Publication	Kastien-Hilka, Tanja, Bernd Rosenkranz, Bryan Bennett, Edina Sinanovic, and Mat...	<1%
8	Publication	Richard R. Rubin, Mark Peyrot. "Quality of life and diabetes", Diabetes/Metabolis...	<1%
9	Publication	Kefyalew Addis Alene, Archie C A Clements, Emma S McBryde, Ernesto Jaramillo e...	<1%
10	Publication	Xiaohui Qiu, Shuyue Chen, Jiangjie Tang, Qiuyang Chen, Shenghui Liao, Jianda Zh...	<1%

11	Publication	Sara Carrillo de Albornoz, Gang Chen. "Relationship between health-related quali...	<1%
12	Publication	Hemant Deepak Shewade, Kathiresan Jeyashree, Preetam Mahajan, Amar N. Sha...	<1%
13	Publication	Jihyon Pahn, Youngran Yang, Sun Hee Kim. "Factors Influencing Self-Managemen...	<1%
14	Publication	Qiuzhen Wang, Aiguo Ma, Evert G. Schouten, Frans J. Kok. "A double burden of tu...	<1%
15	Publication	"Healing Beyond Blood Sugar", Springer Science and Business Media LLC, 2026	<1%
16	Publication	Clifford Afoakwah, Paul Kuwornu, Isaac Koomson, David Brain, Qing Xia, Steven ...	<1%
17	Publication	Eric Tornu, Louisa Quarcoopome. "Correlates of quality of life among persons livi...	<1%
18	Publication	Gia Merlo, Christopher P. Fagundes. "Lifestyle Psychiatry - Through the Lens of Be...	<1%
19	Publication	Nerkez Opacin, Katherine Johnson, Nicholas Hill, Alba Morato, Ian Seal, Jill Litt, Sa...	<1%
20	Publication	Ruben Silva-Tinoco, Lilia Castillo-Martínez, Ana Galindez-Fuentes, Alejandro Avalo...	<1%
21	Publication	Suresh Rama Chandran, Gilbert Soh Keng Keat, Nur Nasyitah Binte Mohamed Sali...	<1%
22	Publication	Jorge-Eduardo Martínez-Pérez, José-María Abellán-Perpiñán, Fernando-Ignacio Sá...	<1%
23	Publication	Liena Sofiana, Sri Achadi Nugraheni. "Quality of Life Determinant Factors in Tube...	<1%
24	Publication	Mohamed Omar, amal Bakr, Dina Sobeh, Mariam Shehab. "HEALTH RELATED QUA...	<1%

25

Publication

Nafees Ahmad, Arshad Javaid, Syed Azhar Syed Sulaiman, Anila Basit, Afsar Khan ...

<1%



Impact of co-epidemic tuberculosis and diabetes mellitus on health-related quality of life: A review

Machrumnizar^{1,4*}, Nana Muyana², Adang Bachtiar³, Rina Kurniasri Kusumaratna⁵, Jipri Suyanto⁶

¹ Doctoral Program, Faculty of Public Health, University of Indonesia, Indonesia

² Department of Health Promotion, Politeknik Kesehatan Kementerian Kesehatan Jakarta III, Indonesia

³ Department of Health Administration and Policy, Faculty of Public Health, University of Indonesia, Indonesia

⁴ Department of Parasitology, Faculty of Medicine, University of Trisakti, Indonesia

⁵ Department of public health, faculty of medicine, University of Trisakti, Indonesia

⁶ Faculty of health science, Dehasen University, Indonesia

ABSTRACT

The high comorbidity rate between diabetes mellitus and tuberculosis has a significant impact on the patient's health-related quality of life and eradication of tuberculosis program outcomes, especially in lower-middle-income countries that bear a "double disease burden". This review outlines the health-related quality of life of tuberculosis patients with diabetes. The search, selection, and article collection procedures were unmethodical. The retrieved articles were open-access and full-text in English. Health-related quality of life includes physical, psychological, social, and environmental domains. Health-related quality of life in diabetes, tuberculosis, and tuberculosis-diabetes comorbid patients experienced negative changes in all domains. Commonly used health-related quality-of-life measures can be generic or disease-specific. This review also highlights the importance of collaborative tuberculosis and diabetes management supported by the community, health workers, and stakeholders. Finally, this collaborative management support will enhance patient health-related quality of life and contribute to the accomplishment of the tuberculosis elimination program.

Keywords: tuberculosis, diabetes, health-related quality of life, instrument, co-epidemic

Corresponding author: Machrumnizar

Doctoral Program, Faculty of Public Health, University of Indonesia, Indonesia

Department of Parasitology, Faculty of Medicine, University of Trisakti, Indonesia

Email: machrumnizar_md@trisakti.ac.id

INTRODUCTION

14

The increasing prevalence of diabetes mellitus has resulted in a double burden of tuberculosis and diabetes in low- to middle-income countries. The global incidence of more than one million cases of both comorbidities is estimated with 15% of tuberculosis cases linked to diabetes (W. Jiang et al., 2022; Ong et al., 2023). The World Health Organization (WHO), the International Diabetes Federation (IDF), and the International Union Against Tuberculosis and Lung Disease (IUATLD) have encouraged integrated healthcare programs in these countries due to the epidemiological link between the two diseases (Organization, 2011, 2022, 2023).

16

Tuberculosis and diabetes can negatively impact a patient's health-related quality of life (HRQoL), especially concerning medication. These diseases often lead to lower HRQoL and disease symptoms, exacerbated by stigma and discrimination. The term "health-related quality of life" is becoming popular as an alternative to "quality of life" which has a broader meaning. HRQoL is a comprehensive assessment of a person's physical, mental, and social well-being, including their daily function. Understanding disease's impact is vital and improves patients' overall quality of life by assessing awareness of their psychological and physical well-being (Al-Azayzih, Kanaan, & Altawalbeh, 2023; Dou et al., 2023; Sitlinger & Zafar, 2018).

19

Previous studies concluded that patients with active tuberculosis have been found to have worse HRQoL when weighed against latent tuberculosis or historically treated TB, untreated individuals, or healthy controls. The research showed that there were marked impairments in general well-being and HRQoL in every dimension (Adebayo, Adejumo, & Odusanya, 2023; Kastien-Hilka, Rosenkranz, Sinanovic, Bennett, & Schwenkglenks, 2017; Saleem, A. Malik, Ghulam, Ahmed, & Hussain, 2018). Several cross-sectional studies prove diabetes affects the HRQoL of patients in the physical and environmental domains showing the lowest HRQoL compared to the psychosocial domain. There is a strong correlation between low HRQoL scores and being elderly, single, and unemployed (Abegaz & Ali, 2023; Aschalew, Yitayal, & Minyihun, 2020; Fuentes-Merlos, Orozco-Beltrán, Quesada Rico, & Reina, 2021; Galán, León, Guerrero-Martín, Jurado, & Durán-Gómez, 2021; Wonde, Ayene, Moges, & Bazezew, 2022).

8

The mortality rate due to TB is greater in DM patients compared to other comorbid factors. However, studies assessing HRQoL in TB patients with concomitant diabetes mellitus are relatively rare and mostly published separately, between HRQoL-TB and HRQoL-DM (Edwards et al., 2020; Gautam et al., 2021; G. Xu, Hu, Lian, & Li, 2023). This brief narrative review emphasizes covering HRQoL in patients with type 2 diabetes and tuberculosis without other comorbidities, and HRQoL tools are commonly utilized for evaluating HRQoL in patients with TB and DM.

METHODS

We conducted searches between June and September 2023 using the keywords "tuberculosis" OR "lung AND tuberculosis" OR "lung AND tuberculosis"; "diabetes" OR "diabetes AND mellitus" OR "diabetes AND mellitus AND types AND 2"; "health AND related AND quality AND life" OR "quality AND life". The electronic databases PubMed, Scopus, and Google Scholar are used to collect all data. Subsequently, we revised the search in December 2023 by checking the bibliography of related publications for important citations.

The procedure for searching and selecting is not methodical. The publications included in this review are limited to articles available in English and full text. Furthermore, articles discussing DM that refer to type-1 DM or have comorbidities other than diabetes mellitus will be excluded.

RESULTS OF STUDY

Health-related quality of life in diabetes mellitus

21

The results of research on chronic diseases focus on assessing the effectiveness of patients in response to therapy and clinical care, taking into account objective aspects (physiological indicators) and subjective aspects (mental well-being, self-management of disease burden, and social functioning and roles, as well as physical functioning) (Chen et al., 2022; Correia et al., 2023). These subjective aspects are important because diabetes mellitus is largely an autonomic condition, and self-management impacts almost every area of daily life. Assessing population health outcomes using health-related quality of life (HRQOL) is an important tool, emphasizing individual general well-being and life satisfaction. Aspects of HRQOL are increasingly hampered by diabetes and its consequences, medical interventions, and patient attitudes. Diabetic patients need to "strictly adhere to prescribed treatment" and make sustainable behavioral changes in their health. Diabetes and its effects on HRQOL affect not only the health of patients but also families and the general population (Gebremariam et al., 2022; Oluchi et al., 2021).

In people with diabetes, demographic characteristics are independent drivers of HRQoL. Gender is known to be the most significant indicator of HRQoL, whereby women have worse HRQoL and most significant especially in the physical and psychological domains (Alsayed Hassan, Helaluddin, Chahestani, Mohamed, & Islam, 2022; Barua, Faruque, Chowdhury, Banik, & Ali, 2021; Chantzaras & Yfantopoulos, 2022; Homady et al., 2023; Natarajan & Mokoboto-Zwane,

2022; Tran Kien, Phuong Hoa, Minh Duc, & Wens, 2021). The majority of studies assessing HRQoL in people with DM report that age, particularly aging, is substantially correlated with poorer HRQoL (Gupta, Kapoor, & Sood, 2021; Teli, Thato, & Rias, 2023; Zare, Ameri, Madadzadeh, & Reza Aghaei, 2020). Patients with diabetes may experience decreased HRQoL due to poor glucose management and the consequences of the disease (Pham et al., 2020; Teli et al., 2023; Tusa, Geremew, & Tefera, 2020). Marital status, monthly income, and education are among the factors that are significant predictors of HRQoL. People with unmarried DM, poor economic status, and having lower levels of education were significantly associated with poorer HRQoL (Alsayed Hassan et al., 2022; Barua et al., 2021; Chantzaras & Yfantopoulos, 2022; Gebremariam et al., 2022; Homady et al., 2023; Natarajan & Mokoboto-Zwane, 2022; Shamshirgaran, Ataei, Alamdari, Safaeian, & Aminisani, 2016). Research in Bangladesh and Nepal reported that the residence of a person with DM was a significant factor influencing HRQoL, whereas people with DM living in rural areas had better HRQoL (Barua et al., 2021; S. R. Mishra, Sharma, Bhandari, Bhochhibhoya, & Thapa, 2015). Research in Malaysia found religiosity affects HRQoL well in people with DM (Chew, Mohd-Sidik, & Shariff-Ghazali, 2015).

Health-related quality of life in tuberculosis

Tuberculosis is still a major public health problem worldwide although effective therapies have long been available (Oktamianti et al., 2021). TB management generally prioritizes the treatment of microbiology and pays less attention to the impact on the HRQoL in patient. In fact, the duration of TB treatment is generally long and several factors (such as physical, psychological, financial, and social) have the potential to reduce the patient's HRQoL which in turn can affect the success of TB patient treatment (Motta et al., 2023; Pandia, Syafiuddin, Bachtiar, & Rochadi, 2019; Pradipta et al., 2021).

7 HRQoL is a predictor of patient-reported outcomes (PRO) that refers to the multidimensional nature of health directly from the patient's point of view. Many studies have been conducted that attempt to assess HRQoL experienced by people infected with tuberculosis (Yadav et al., 2021). HRQoL in TB patients before starting treatment was reported to be significantly worse than at the end of treatment for all health domains (Jaber & Ibrahim, 2019). DR/MDR-TB patients are also reported to have poor HRQoL especially in the domain of physical and psychological health (C.-T. Li, Chu, Reiher, Kienene, & Chien, 2017; Ozoh et al., 2021).

25 Social and demographic factors of TB patients, such as age, smoking habits, place of residence, marital status, and length of illness, significantly affect all domains of HRQoL i.e. physical, psychological, social, and environmental (Sartika, Insani, & Abdullah, 2019; Yasobant et al., 2022). Age over 45 years and smokers reported having worse HRQoL in the physical domain (Chikaodinaka, 2018; Kakhki & Masjedi, 2015). Female patients even have twice the risk of developing depression due to biological responses, self-concept, and coping mechanisms (Solmi et al., 2022). Marital status affects the poor HRQoL of TB patients at the beginning of treatment. The patient's HRQoL significantly improved during treatment probably due to the care and emotional support provided by the patient's partner and family (Chikaodinaka, 2018; Jaber & Ibrahim, 2019; Kuchukhidze et al., 2021). Various studies demonstrate that long duration of TB treatment decreases patients' HRQoL in the physical and psychological domains (Ahmad et al., 2016; Araia et al., 2021). Education is one of the significant factors affecting patient HRQoL, where TB patients with higher education show good HRQoL in the psychological and environmental domains (Kakhki & Masjedi, 2015; Sartika et al., 2019). Interestingly, religiosity had a positive impact on HRQoL in TB patients (Grill, Wang, Cheng, & Lyon, 2020; Panzini et al., 2017). This suggests that there is a significant link between mental health and a person's religious nature. In addition, the stigma faced by TB patients includes the social domain, in addition to the physical domain, which is most significant in influencing the HRQoL of TB patients (Alene et al., 2018; Roba et al., 2018; Yadav et al., 2021). Tuberculosis significantly affects the patient's HRQoL, even after treatment, especially in the domains of physical and psychological health. However, HRQoL in the social and environmental domains has also changed due to tuberculosis.

Health-related quality of life in tuberculosis and diabetes co-epidemic

15 People living with DM are particularly susceptible to the harmful effects of tuberculosis. Diabetes populations are extra vulnerable to getting *M. tuberculosis* infection, and untreated latent TB can reactivate more easily (Ahmed, Omer, Osman, & Ahmed-Abakur, 2017; Hayashi & Chandramohan, 2018; Shayo & Shayo, 2021). Population aging, urbanization, changes in diet and physical activity, and other lifestyle factors are causing obesity rates to rise, which in turn fuels a global rise in DM prevalence (Aras, Tchang, & Pape, 2021; Jarzebski et al., 2021). Diabetes affected 537 million people in 2021 and anticipates reaching 783 million by 2045. Since 90% of people with DM have type 2 DM (T2DM) and 80% live in lower-middle-income countries, it is estimated that in the next thirty years, the number of DM cases will increase most sharply in areas with high TB incidence rates (Lam, Lepe, Wild, & Jackson, 2021; Magliano & Boyko, 2021).

17 Diabetes jeopardizes the fight against TB because it increases the chances of developing TB threefold and produces unfavorable outcomes, such as unsuccessful therapies and death. Among TB patients, DM has a rather high prevalence, especially in countries where TB and DM occur together (Oliveira Hashiguchi et al., 2023; Siddiqui, Khayyam, Siddiqui, Sarin, & Sharma, 2017). The frequency of TB patients with diabetes in a case-control study in Indonesia was reported at 13 percent (Izhar, Butar, Hidayati, & Ruwayda, 2021). A Thai study reported 16 percent of people had diabetes of which 70 percent were diagnosed before a TB diagnosis (Oo et al., 2020). Referring to India's epidemiological approach, DM had a significant association with 24.2 percent of previously treated TB and 23.1 percent of new TB patients (Hirayama

et al., 2021), added to studies from Pakistan at 26.1 percent (Aftab et al., 2017), and South Korea at 23.8 percent (Yoon et al., 2017).

Tuberculosis patients with comorbid diabetes mellitus (TB – DM) have HRQoL disorders that affect the physical, psychological, social health and environmental domains that have been associated with age, social class, physiological fulfillment, and relationships to society. Assessing HRQoL in comorbid TB – DM patients can assist in the assessment of variables that impact unknown comorbid features. Previous research points to the fact that TB-DM significantly affects patients' quality of life, both their mental and physical health (Oluchi et al., 2021; Yasobant et al., 2022).

Poor HRQoL, in the social and psychological domains, is significantly associated with old age in DM-TB patients (Zare et al., 2020). The aging process has a significant negative influence on HRQoL through several variables such as degenerative changes, inadequate adherence to medication, inability to change lifestyle, disability for usual tasks, receding ability to labor, and fatigue (Etzeberria, Urdaneta, & Galdona, 2019). Decreased immunity and T cell function caused by aging may contribute to low HRQoL scores (Althoff, Smit, Reiss, & Justice, 2016). Furthermore, there was a negative link established between HRQoL and poorer social and family life in comorbid TB-DM patients aged 41 to 60 years (Siddiqui et al., 2017).

HRQoL in comorbid TB-DM patients is substantially predicted by education, alcohol consumption, profession, social and financial position (Al Amri et al., 2023; Alemu, Bitew, Diriba, & Gumi, 2021; Alturki, Al Amad, Mahyoub, Al Hanash, & Alhammedi, 2023). Previous research has also found a negative correlation between increases in total HRQoL and HbA1c (Al-Taie, Maftai, Kautzky-Willer, Krebs, & Stingl, 2020; Svedbo Engström et al., 2019). The results imply that keeping HbA1c within the target range may help TB-DM patients experience elevated HRQoL (Koesoemadinata et al., 2023). To improve HRQoL in comorbid TB-DM patients, it is imperative to undertake adequate collaborative management of TB-DM simultaneously with improved education (Isfandiari, Wahyuni, & Pranoto, 2022; R. Mishra et al., 2021). It is associated with increased self-confidence, a positive mindset that refers to illness, and better social standing.

24

Health-related quality of life measurements

HRQoL assessment tools might be either disease-specific or generic. Tools of different scales have been used in infectious and non-communicable disease patients. Certain tools evaluate the entirety of HRQoL, whereas others examine particular domains, including mental or physical dimensions. Several questionnaire tools are commonly used to assess HRQoL for TB, DM, and TB-DM patients.

Generic Tools

The SF-36 questionnaire is a Medical Outcomes Trust short-form questionnaire with 36 questions (Lins & Carvalho, 2016). SF-36 is used extensively to measure relevant general health status and falls into eight domains: physical function, physical role limitation, body pain, social functioning, mental health in general, emotional role limitation, vitality, and general health (Lins-Kusterer et al., 2019; Lins & Carvalho, 2016). The SF-12 is a developed HRQoL instrument and is a shortened version of the SF-36. Big surveys regarding the public and particular groups, including sizeable long-term investigations examining medical results, utilize the SF-12 (Gornet, Copay, Sorensen, & Schranck, 2018; Loosman et al., 2015). The Sickness Impact Profile (SIP) has two domains, physical and psychosocial, consisting of 136 items and grouped into 12 categories. SIP tools are used for self-administration or interviews (Coons, Rao, Keininger, & Hays, 2000). SF-6D is a preference-based scoring system that utilizes the six dimensions of SF-36. The eight dimensions of SF-36 are reduced to six by eliminating the perception of general health and incorporating role limitations due to physical and emotional problems. The six dimensions included were physical function, role limitation, soreness, social function, emotional wellness, and energy (Brazier et al., 2020; Elmallah et al., 2015; Mazari et al., 2016).

EuroQoL (EQ-5D) has important components that are simply developed but have good reliability and validity (N. J. Devlin, Shah, Feng, Mulhern, & Van Hout, 2018). The EQ-5D consists of two parts and designed for self-administration and can be used in public health surveys or combined with condition-specific tools for the assessment of specific conditions (N. Devlin, Pickard, & Busschbach, 2022). The first section has five domains, covering mobility, self-care, usual activities, pain/discomfort and anxiety/depression; and rated on three levels, namely "no problem," "specific problem" or "extreme problem". Part two self-assessment of perceived health status based on visual analogue scale (VAS) (N. Devlin et al., 2022; N. J. Devlin et al., 2018; Xie et al., 2023). The World Health Organization (WHO) QoL-BREF questionnaire instrument covers broader domains, including physical, psychological, social relationships and environmental capacity (Vu et al., 2022). WHO-QoL BREF consists of 26 items which are divided into 24 HRQoL assessment items for four domains and 2 items for assessing general HRQoL and general health (Abbasi-Ghahramanloo et al., 2020; Lodhi et al., 2019; Reba, Birhane, & Gutema, 2019).

Specific Tools

Specific HRQoL tools such as DR-12 are new specific tools for assessing HRQoL of TB patients consisting of 12 items, 7 of the 12 items include symptoms of TB (i.e. coughing up of sputum or blood, fever, dyspnea, chest discomfort, anorexia, and losing weight) and 5 items are related to social, psychological, and physical adaptability (Khan, Tangiisuran,

Imtiaz, & Zainal, 2017; Sun et al., 2018). When computing two domain rating and a total rating, every reaction alternative is offered on a 3-point scale, and each item receives equal weight (Aggarwal, 2019; R. Mishra et al., 2021). The St. John's George Respiratory Questionnaire (SGRQ) is a popular specialist tool for measuring HRQL for people suffering from chronic obstructive pulmonary disease (COPD) and other lung disorders. The overall rating can be calculated from three domain-specific ratings (symptoms, activity, and influence) (Kotanen et al., 2020; Rocha, Jácome, Martins, & Marques, 2021). St. George's Hospital School of Medicine in England created SGRQ and is currently adapted into many different languages (Capparelli et al., 2018; Prior et al., 2019; Rehman et al., 2020; Sherpa et al., 2015).

The Symptoms Checklist 90 (SCL-90) is a ninety items symptom inventory developed to assess an assortment of mental health issues and symptoms, involving nine parameters: somatization, obsessive-compulsive disorder (OCD), interpersonal sensibility, anxiousness, depressive symptoms, enmity, fearful anxiety, paranoid notions, and psychoticism (Sereda & Dembitskyi, 2016). The Social Support Rating Scale (SSRS) composed of ten items designed to assess the accessibility and utilization of self-perceived support from social services (Y. Li, Peng, & Tao, 2023; R. H. Xu, Shi, Xia, & Wang, 2022). The General Health Questionnaire 12 (GHQ-12) is a shortened version of GHQ-60, developed to screen for non-psychotic mental ailments among the broad community (Nouri, Feizi, Roohafza, Sadeghi, & Sarrafzadegan, 2021). The Brief Disability Questionnaire (BDQ), obtained using the Medical Outcomes Study (MOS) public health study brief form, served to determine the severity of mental and physical impairment among patients (Sezgin, Hocaoglu, & Guvendag-Guven, 2016; Topak, BALTARLI, Gökhan, & ÖZDEL, 2022; Turan, Dayapoğlu, & Özer, 2021). The Beck Depression Inventory (Beck-DI) is a questionnaire of 21 items created to assess indicators of depression and severity (Elovanio et al., 2020; Peyrovian et al., 2019). The Center for Epidemiological Studies Depression Scale (CES-D) and the 5-item Mental Health Index (MHI-5) (Elovanio et al., 2020; Rivera-Riquelme, Piqueras, & Cuijpers, 2019) are an array of tools or inquiries applied to evaluate the physical state, psychologic history, mental wellness, support systems, and availability and utilization of healthcare facilities by vagrants diagnosed with tuberculosis (Henry, Grant, & Cropsey, 2018; L. Jiang et al., 2019; Vilagut, Forero, Barbaglia, & Alonso, 2016).

Collaboration in tuberculosis and diabetes management

Patients with diabetes have an increased incidence of acquiring tuberculosis (TB), and tuberculosis itself exacerbates the diabetic patient's glycemic management. Surveillance programs and services for infectious diseases (TB) and non-communicable diseases (DM) must be improved and accelerated to mitigate the possibility of DM sufferers contracting TB or TB patients experiencing infection reactivation. This program must involve all parties including community health centers, public health workers, the community, local government, Ministry of Health, and academics to improve HRQoL and reduce morbidity and mortality due to TB and DM comorbidities (Bachtar et al., 2009; Fazaludeen Koya et al., 2022; Nikoloski et al., 2021).

In the management of tuberculosis and diabetes, currently managed by community health centers more, but not many private primary care providers (PPCs) are involved yet. Currently, especially in urban areas, the majority use these facilities. Research in Yogyakarta recommends that private primary care providers, namely private clinics and private general practitioners, their potential role in implementing health promotion, two-way screening, patient referral, TB treatment, and data reporting should continue to be improved (Arini, Sugiyo, & Permana, 2022).

To ensure the implementation of bidirectional scheme in the management of TB and DM, WHO together with the International Union Against Tuberculosis and Lung Diseases (Union) formulated bidirectional collaborative strategy for TB and diabetes management and prevention. This strategy provides guidelines for countries in the world to form national collaborative TB and DM eradication programs at regional, district and regional/or local level by considering the national characteristics of each country to include representation of all relevant stakeholders. Therefore, these recommendations should be used by policymakers and implementers to control the TB-DM co-epidemic and complement existing national systems for the prevention and management of TB and DM. The framework focuses on TB and DM co-epidemic surveillance, monitoring, and evaluation of collaborative activities, and detecting and managing TB in DM patients, and vice versa, aiming to improve the overall health outcomes (Dlodlo et al., 2021; Organization, 2011, 2022).

CONCLUSION

Diabetes mellitus that has gone untreated, unnoticed, and mismanaged poses an infinitely bigger problem for tuberculosis treatment and prevention in countries with a higher rate of TB than previously anticipated. Chronically elevated glucose levels cause the immune system's response to function to be hyperactive and uncontrolled, boosting vulnerability to infections like tuberculosis. The link connecting tuberculosis and diabetes is appealing, and a paradigm for addressing the combined burden is required. Yet, neglecting or disparaging that connection could jeopardize years of advancement toward eradicating tuberculosis, leading to disastrous health and financial consequences. Furthermore, community and stakeholder support for collaboration in TB and diabetes management will enhance patient HRQoL and contribute to the accomplishment of the tuberculosis elimination program.

REFERENCES

- Abbasi-Ghahramanloo, A., Soltani-Kermanshahi, M., Mansori, K., Khazaei-Pool, M., Sohrabi, M., Baradaran, H. R., . . . Gholami, A. (2020). Comparison of SF-36 and WHOQoL-BREF in measuring quality of life in patients with type 2 diabetes. *International journal of general medicine*, 497-506.
- Abegaz, T. M., & Ali, A. A. (2023). *Health-Related Quality of Life and Healthcare Events in Patients with Monotherapy of Anti-Diabetes Medications*. Paper presented at the Healthcare.
- Adebayo, B. I., Adejumo, O. A., & Odusanya, O. O. (2023). Health-related quality of life among adults newly diagnosed with pulmonary tuberculosis in Lagos State, Nigeria: a prospective study. *Quality of life research*, 1-12.
- Aftab, H., Ambreen, A., Jamil, M., Garred, P., Petersen, J. H., Nielsen, S. D., . . . Christensen, D. L. (2017). High prevalence of diabetes and anthropometric heterogeneity among tuberculosis patients in Pakistan. *Tropical medicine & international health*, 22(4), 465-473.
- Aggarwal, A. N. (2019). Quality of life with tuberculosis. *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, 17, 100121.
- Ahmad, N., Javaid, A., Syed Sulaiman, S. A., Basit, A., Afridi, A. K., Jaber, A. A. S., & Khan, A. H. (2016). Effects of multidrug resistant tuberculosis treatment on patients' health related quality of life: results from a follow up study. *PloS one*, 11(7), e0159560.
- Ahmed, M., Omer, I., Osman, S. M., & Ahmed-Abakur, E. H. (2017). Association between pulmonary tuberculosis and Type 2 diabetes in Sudanese patients. *The International Journal of Mycobacteriology*, 6(1), 97-101.
- Al-Azayzih, A., Kanaan, R. J., & Altawalbeh, S. M. (2023). Assessment of Drug-Related Problems and Health-Related Quality of Life Domains in Elderly Patients with Type 2 Diabetes Mellitus. *Therapeutics and Clinical Risk Management*, 913-928.
- Al-Taie, N., Maftai, D., Kautzky-Willer, A., Krebs, M., & Stingl, H. (2020). Assessing the quality of life among patients with diabetes in Austria and the correlation between glycemic control and the quality of life. *Primary care diabetes*, 14(2), 133-138.
- Al Amri, S., Singh, J., Al Balushi, L., Al Ghafri, T., Al Balushi, M. N., Al Marbouai, H., . . . Al Mujaini, S. M. (2023). Prevalence and Associated Factors of Diabetes Mellitus Type 2 Among Tuberculosis Patients in Muscat, Oman, 2017–2020. *Oman Medical Journal*, 38(4), e526.
- Alemu, A., Bitew, Z. W., Diriba, G., & Gumi, B. (2021). Co-occurrence of tuberculosis and diabetes mellitus, and associated risk factors, in Ethiopia: a systematic review and meta-analysis. *IJID Regions*, 1, 82-91.
- Alene, K. A., Clements, A. C., McBryde, E. S., Jaramillo, E., Lönnroth, K., Shaweno, D., . . . Viney, K. (2018). Mental health disorders, social stressors, and health-related quality of life in patients with multidrug-resistant tuberculosis: a systematic review and meta-analysis. *Journal of Infection*, 77(5), 357-367.
- Alsayed Hassan, D., Helaluddin, F., Chahestani, O. H., Mohamed, O., & Islam, N. (2022). *Diabetes self-management and health-related quality of life among primary care patients with diabetes in Qatar: A cross-sectional study*. Paper presented at the Healthcare.
- Althoff, K. N., Smit, M., Reiss, P., & Justice, A. C. (2016). HIV and ageing: improving quantity and quality of life. *Current Opinion in HIV and AIDS*, 11(5), 527.
- Alturki, S., Al Amad, M., Mahyoub, E., Al Hanash, N., & Alhammadi, A. (2023). Prevalence of Diabetes Mellitus among Patients with Tuberculosis and Its Associated Factors in Sana'a, Yemen, 2021. *Epidemiologia*, 4(2), 202-211.
- Araia, Z. Z., Mesfin, A. B., Mebrahtu, A. H., Tewelde, A. G., Tewelde, A. T., & Ngusbrhan Kidane, S. (2021). Health-related quality of life in tuberculosis patients in Eritrea: comparison among drug-susceptible and rifampicin/multidrug-resistant tuberculosis patients. *Patient Related Outcome Measures*, 205-212.
- Aras, M., Tchang, B. G., & Pape, J. (2021). Obesity and diabetes. *Nursing Clinics*, 56(4), 527-541.
- Arini, M., Sugiyono, D., & Permana, I. (2022). Challenges, opportunities, and potential roles of the private primary care providers in tuberculosis and diabetes mellitus collaborative care and control: a qualitative study. *BMC health services research*, 22(1), 215. doi:10.1186/s12913-022-07612-3
- Aschalew, A. Y., Yitayal, M., & Minyihun, A. (2020). Health-related quality of life and associated factors among patients with diabetes mellitus at the University of Gondar referral hospital. *Health and quality of life outcomes*, 18(1), 1-8.
- Bachtar, A., Miko, T., Machmud, R., Mehta, F., Chadha, V., Yudarini, P., . . . Jitendra, R. (2009). High risk of tuberculous infection in North Sulawesi Province of Indonesia. *The International journal of tuberculosis and lung disease*, 13(12), 1513-1518.
- Barua, L., Faruque, M., Chowdhury, H. A., Banik, P. C., & Ali, L. (2021). Health-related quality of life and its predictors among the type 2 diabetes population of Bangladesh: A nation-wide cross-sectional study. *Journal of diabetes investigation*, 12(2), 277-285.

- Brazier, J. E., Mulhern, B. J., Bjorner, J. B., Gandek, B., Rowen, D., Alonso, J., . . . Group, S.-D. I. P. (2020). Developing a new version of the SF-6D health state classification system from the SF-36v2: SF-6Dv2. *Medical care*, 58(6), 557-565.
- Capparelli, I., Fernandez, M., Otero, M. S., Steimberg, J., Brassesco, M., Campobasso, A., . . . Rabinovich, R. A. (2018). Translation to Spanish and validation of the specific Saint George's Questionnaire for idiopathic pulmonary fibrosis. *Archivos de Bronconeumología (English Edition)*, 54(2), 68-73.
- Chantzaras, A., & Yfantopoulos, J. (2022). Association between medication adherence and health-related quality of life of patients with diabetes. *Hormones*, 21(4), 691-705.
- Chen, W., Howard, K., Gorham, G., O'Bryan, C. M., Coffey, P., Balasubramanya, B., . . . Cass, A. (2022). Design, effectiveness, and economic outcomes of contemporary chronic disease clinical decision support systems: a systematic review and meta-analysis. *Journal of the American Medical Informatics Association*, 29(10), 1757-1772.
- Chew, B.-H., Mohd-Sidik, S., & Shariff-Ghazali, S. (2015). Negative effects of diabetes-related distress on health-related quality of life: an evaluation among the adult patients with type 2 diabetes mellitus in three primary healthcare clinics in Malaysia. *Health and quality of life outcomes*, 13(1), 1-16.
- Chikaodinaka, A. A. (2018). Health-Related Quality of Life (HRQoL) scores vary with treatment and may identify potential defaulters during treatment of tuberculosis. *Malawi Medical Journal*, 30(4), 283-290.
- Coons, S. J., Rao, S., Keininger, D. L., & Hays, R. D. (2000). A comparative review of generic quality-of-life tools. *Pharmacoeconomics*, 17, 13-35.
- Correia, J. C., Waqas, A., Assal, J.-P., Davies, M. J., Somers, F., Golay, A., & Pataky, Z. (2023). Effectiveness of therapeutic patient education interventions for chronic diseases: A systematic review and meta-analyses of randomized controlled trials. *Frontiers in Medicine*, 9. doi:10.3389/fmed.2022.996528
- Devlin, N., Pickard, S., & Busschbach, J. (2022). The Development of the EQ-5D-5L and its Value Sets. *Value sets for eq-5d-5l: a compendium, comparative review & user guide*, 1-12.
- Devlin, N. J., Shah, K. K., Feng, Y., Mulhern, B., & Van Hout, B. (2018). Valuing health-related quality of life: An EQ-5 D-5 L value set for England. *Health economics*, 27(1), 7-22.
- Dlodlo, R., Brigden, G., Heldal, E., Allwood, B., Chiang, C., Fujiwara, P., . . . Koura, K. (2021). Management of Tuberculosis: a Guide to Essential Practice. Paris, France: International Union Against Tuberculosis and Lung Disease, 2019. theunion.org/sites/default/files/2020-08/TheUnion_Orange_2019.pdf.
- Dou, L., Shi, Z., Cuomu, Z., Zhuoga, C., Li, C., Dawa, Z., & Li, S. (2023). Health-related quality of life and its changes of the Tibetan population in China: based on the 2013 and 2018 National Health Services Surveys. *BMJ open*, 13(11), e072854.
- Edwards, T., White, L., Lee, N., Castro, M., Saludar, N., Faguer, B., . . . Solon, J. (2020). Effects of comorbidities on quality of life in Filipino people with tuberculosis. *The International journal of tuberculosis and lung disease*, 24(7), 712-719.
- Elmallah, R. K., Cherian, J. J., Jauregui, J. J., Bhowmik-Stoker, M., Beaver, W. B., & Mont, M. A. (2015). Determining health-related quality-of-life outcomes using the SF-6D preference-based measure in patients following total knee arthroplasty. *The Journal of Arthroplasty*, 30(7), 1150-1153.
- Elovanio, M., Hakulinen, C., Pulkki-Råback, L., Aalto, A.-M., Virtanen, M., Partonen, T., & Suvisaari, J. (2020). General Health Questionnaire (GHQ-12), Beck Depression Inventory (BDI-6), and Mental Health Index (MHI-5): psychometric and predictive properties in a Finnish population-based sample. *Psychiatry research*, 289, 112973.
- Ettxeberria, I., Urdaneta, E., & Galdona, N. (2019). Factors associated with health-related quality of life (HRQoL): differential patterns depending on age. *Quality of life research*, 28, 2221-2231.
- Fazaludeen Koya, S., Lordson, J., Khan, S., Kumar, B., Grace, C., Nayar, K. R., . . . Pillai, A. M. (2022). Tuberculosis and diabetes in India: stakeholder perspectives on health system challenges and opportunities for integrated care. *Journal of Epidemiology and Global Health*, 12(1), 104-112.
- Fuentes-Merlos, Á., Orozco-Beltrán, D., Quesada Rico, J. A., & Reina, R. (2021). Quality-Of-Life determinants in people with diabetes mellitus in Europe. *International journal of environmental research and public health*, 18(13), 6929.
- Galán, I. G., León, M. C. C., Guerrero-Martín, J., Jurado, C. F. L., & Durán-Gómez, N. (2021). Health-related quality of life in diabetes mellitus patients in primary health care. *Enfermería Clínica (English Edition)*, 31(5), 313-322.
- Gautam, S., Shrestha, N., Mahato, S., Nguyen, T. P., Mishra, S. R., & Berg-Beckhoff, G. (2021). Diabetes among tuberculosis patients and its impact on tuberculosis treatment in South Asia: a systematic review and meta-analysis. *Scientific Reports*, 11(1), 2113.
- Gebremariam, G. T., Biratu, S., Alemayehu, M., Welie, A. G., Beyene, K., Sander, B., & Gebretekle, G. B. (2022). Health-related quality of life of patients with type 2 diabetes mellitus at a tertiary care hospital in Ethiopia. *PLoS one*, 17(2), e0264199.

- Gornet, M. F., Copay, A. G., Sorensen, K. M., & Schranck, F. W. (2018). Assessment of health-related quality of life in spine treatment: conversion from SF-36 to VR-12. *The Spine Journal*, 18(7), 1292-1297.
- Grill, K. B., Wang, J., Cheng, Y. I., & Lyon, M. E. (2020). The role of religiousness and spirituality in health-related quality of life of persons living with HIV: A latent class analysis. *Psychology of religion and spirituality*, 12(4), 494.
- Gupta, J., Kapoor, D., & Sood, V. (2021). Quality of life and its determinants in patients with diabetes mellitus from two health institutions of sub-himalayan region of India. *Indian journal of endocrinology and metabolism*, 25(3), 211.
- Hayashi, S., & Chandramohan, D. (2018). Risk of active tuberculosis among people with diabetes mellitus: systematic review and meta-analysis. *Tropical medicine & international health*, 23(10), 1058-1070.
- Henry, S. K., Grant, M. M., & Cropsey, K. L. (2018). Determining the optimal clinical cutoff on the CES-D for depression in a community corrections sample. *Journal of affective disorders*, 234, 270-275.
- Hirayama, T., Gopali, R. S., Maharjan, B., Shibasaki, K., Shrestha, A., Thapa, A., . . . Nakano, T. (2021). Prevalence of Diabetes in Tuberculosis Patients in Kathmandu Valley, Nepal. *Japanese Journal of Infectious Diseases*, 74(6), 507-510.
- Homady, A., Albasheer, O., Bajawi, A., Hamdi, S., Awaf, A., Madkhali, T., . . . Somaili, M. (2023). Health-related Quality of Life among Type 2 Diabetes Patients in Southern Province of Saudi Arabia using WHOQOL-BREF: A Cross-section Study. *Current Diabetes Reviews*, 19(7), 55-64.
- Isfandiari, M. A., Wahyuni, C. U., & Pranoto, A. (2022). *Tuberculosis Predictive Index for Type 2 Diabetes Mellitus Patients Based on Biological, Social, Housing Environment, and Psychological Well-Being Factors*. Paper presented at the Healthcare.
- Izhar, M. D., Butar, M. B., Hidayati, F., & Ruwayda, R. (2021). Predictors and health-related quality of life with short form-36 for multidrug-resistant tuberculosis patients in Jambi, Indonesia: A case-control study. *Clinical Epidemiology and Global Health*, 12, 100872.
- Jaber, A. A. S., & Ibrahim, B. (2019). Health-related quality of life of patients with multidrug-resistant tuberculosis in Yemen: prospective study. *Health and quality of life outcomes*, 17(1), 1-14.
- Jarzebski, M. P., Elmqvist, T., Gasparatos, A., Fukushi, K., Eckersten, S., Haase, D., . . . Takeuchi, K. (2021). Ageing and population shrinking: Implications for sustainability in the urban century. *Npj Urban Sustainability*, 1(1), 17.
- Jiang, L., Wang, Y., Zhang, Y., Li, R., Wu, H., Li, C., . . . Tao, Q. (2019). The reliability and validity of the center for epidemiologic studies depression scale (CES-D) for Chinese university students. *Frontiers in Psychiatry*, 10, 315.
- Jiang, W., Trimawartinah, Rahman, F. M., Wibowo, A., Sanjaya, A., Silitonga, P. I. I., . . . Long, Q. (2022). The co-management of tuberculosis-diabetes co-morbidities in Indonesia under the National Tuberculosis Control Program: results from a cross-sectional study from 2017 to 2019. *BMC Public Health*, 22(1), 689.
- Kakhki, A. D., & Masjedi, M. R. (2015). Factors associated with health-related quality of life in tuberculosis patients referred to the national research institute of tuberculosis and lung disease in Tehran. *Tuberculosis and respiratory diseases*, 78(4), 309.
- Kastien-Hilka, T., Rosenkranz, B., Sinanovic, E., Bennett, B., & Schwenkglenks, M. (2017). Health-related quality of life in South African patients with pulmonary tuberculosis. *PloS one*, 12(4), e0174605.
- Khan, S., Tangiisuran, B., Imtiaz, A., & Zainal, H. (2017). Health status and quality of life in tuberculosis: systematic review of study design, tools, measuring properties and outcomes. *Health Science Journal*, 11(1), 1.
- Koesoemadinata, R., McAllister, S., Soetedjo, N., Santoso, P., Dewi, N., Permana, H., . . . Dockrell, H. (2023). Diabetes characteristics and long-term management needs in diabetic TB patients. *The International journal of tuberculosis and lung disease*, 27(2), 113-120.
- Kotanan, P., Kainu, A., Brander, P., Bergman, P., Lehtomäki, A., & Kreivi, H. R. (2020). Validation of the Finnish severe respiratory insufficiency questionnaire. *The Clinical Respiratory Journal*, 14(7), 659-666.
- Kuchukhidze, G., Baliashvili, D., Adamashvili, N., Kasradze, A., Kempker, R. R., & Magee, M. J. (2021). *Long-Term Mortality and Active Tuberculosis Disease Among Patients Who Were Lost to Follow-Up During Second-Line Tuberculosis Treatment in 2011–2014: Population-Based Study in the Country of Georgia*. Paper presented at the Open Forum Infectious Diseases.
- Lam, A. A., Lepe, A., Wild, S. H., & Jackson, C. (2021). Diabetes comorbidities in low-and middle-income countries: an umbrella review. *Journal of global health*, 11.
- Li, C.-T., Chu, K.-H., Reiher, B., Kienene, T., & Chien, L.-Y. (2017). Evaluation of health-related quality of life in patients with tuberculosis who completed treatment in Kiribati. *Journal of international medical research*, 45(2), 610-620.
- Li, Y., Peng, J., & Tao, Y. (2023). Relationship between social support, coping strategy against COVID-19, and anxiety among home-quarantined Chinese university students: A path analysis modeling approach. *Current Psychology*, 42(13), 10629-10644.

- Lins-Kusterer, L., Valdelamar, J., Aguiar, C. V. N., Menezes, M. S., Netto, E. M., & Brites, C. (2019). Validity and reliability of the 36-Item Short Form Health Survey questionnaire version 2 among people living with HIV in Brazil. *The Brazilian Journal of Infectious Diseases*, 23(5), 313-321.
- Lins, L., & Carvalho, F. M. (2016). SF-36 total score as a single measure of health-related quality of life: Scoping review. *SAGE Open Medicine*, 4, 2050312116671725.
- Lodhi, F. S., Montazeri, A., Nedjat, S., Mahmoodi, M., Farooq, U., Yaseri, M., . . . Holakouie-Naieni, K. (2019). Assessing the quality of life among Pakistani general population and their associated factors by using the World Health Organization's quality of life instrument (WHOQOL-BREF): a population based cross-sectional study. *Health and quality of life outcomes*, 17, 1-17.
- Loosman, W. L., Hoekstra, T., van Dijk, S., Terwee, C. B., Honig, A., Siegert, C. E., & Dekker, F. W. (2015). Short-Form 12 or Short-Form 36 to measure quality-of-life changes in dialysis patients? *Nephrology Dialysis Transplantation*, 30(7), 1170-1176.
- Magliano, D., & Boyko, E. (2021). IDF Diabetes Atlas 10th edition scientific committee. *IDF DIABETES ATLAS [Internet]. 10th ed. Brussels: International Diabetes Federation*.
- Mazari, F. A. K., Shahin, Y., Khan, J. A., Samuel, N., Carradice, D., McCollum, P. T., & Chetter, I. C. (2016). Comparison of use of Short Form-36 domain scores and patient responses for derivation of preference-based SF6D index to calculate quality-adjusted life years in patients with intermittent claudication. *Annals of vascular surgery*, 34, 164-170.
- Mishra, R., Krishan, S., Siddiqui, A. N., Kapur, P., Khayyam, K. U., Rai, P. K., & Sharma, M. (2021). Impact of metformin therapy on health-related quality of life outcomes in tuberculosis patients with diabetes mellitus in India: A prospective study. *International Journal of Clinical Practice*, 75(4), e13864.
- Mishra, S. R., Sharma, A., Bhandari, P. M., Bhochhibhoya, S., & Thapa, K. (2015). Depression and health-related quality of life among patients with type 2 diabetes mellitus: a cross-sectional study in Nepal. *PloS one*, 10(11), e0141385.
- Motta, I., Boeree, M., Chesov, D., Dheda, K., Günther, G., Horsburgh, C. R., . . . Guglielmetti, L. (2023). Recent advances in the treatment of tuberculosis. *Clinical Microbiology and Infection*. doi:<https://doi.org/10.1016/j.cmi.2023.07.013>
- Natarajan, J., & Mokoboto-Zwane, S. (2022). Health-related quality of life and domain-specific associated factors among patients with Type2 diabetes mellitus in south India. *Review of Diabetic Studies*, 18(1), 34-41.
- Nikoloski, Z., Alqunaibet, A. M., Alfawaz, R. A., Almudarra, S. S., Herbst, C. H., El-Saharty, S., . . . Algwizani, A. (2021). Covid-19 and non-communicable diseases: evidence from a systematic literature review. *BMC Public Health*, 21(1), 1068.
- Nouri, F., Feizi, A., Roohafza, H., Sadeghi, M., & Sarrafzadegan, N. (2021). How different domains of quality of life are associated with latent dimensions of mental health measured by GHQ-12. *Health and quality of life outcomes*, 19, 1-16.
- Oktamianti, P., Bachtiar, A., Sutoto, S., Trihandini, I., Prasetyo, S., Achadi, A., & Efendi, F. (2021). Tuberculosis control within Indonesia's hospital accreditation. *Journal of Public Health Research*, 10(3), jphr. 2021.1979.
- Oliveira Hashiguchi, L., Cox, S. E., Edwards, T., Castro, M. C., Khan, M., & Liverani, M. (2023). How can tuberculosis services better support patients with a diabetes co-morbidity? A mixed methods study in the Philippines. *BMC health services research*, 23(1), 1027.
- Oluchi, S. E., Manaf, R. A., Ismail, S., Kadir Shahar, H., Mahmud, A., & Udeani, T. K. (2021). Health related quality of life measurements for diabetes: a systematic review. *International journal of environmental research and public health*, 18(17), 9245.
- Ong, K. L., Stafford, L. K., McLaughlin, S. A., Boyko, E. J., Vollset, S. E., Smith, A. E., . . . Hagins, H. (2023). Global, regional, and national burden of diabetes from 1990 to 2021, with projections of prevalence to 2050: a systematic analysis for the Global Burden of Disease Study 2021. *The Lancet*.
- Oo, M. M., Tassanakijpanich, N., Phyu, M. H., Safira, N., Kandel, S., Chumchuen, K., . . . Bilmumad, B. (2020). Coverage of tuberculosis and diabetes mellitus screening among household contacts of tuberculosis patients: a household-based cross-sectional survey from Southern Thailand. *BMC Public Health*, 20(1), 1-10.
- Organization, W. H. (2011). *Collaborative framework for care and control of tuberculosis and diabetes* (9241502258). Retrieved from
- Organization, W. H. (2022). Framework for collaborative action on tuberculosis and comorbidities.
- Organization, W. H. (2023). Assessing national capacity for the prevention and control of noncommunicable diseases: report of the 2021 global survey.
- Ozoh, O., Ojo, O., Dania, M., Dede, S., Adegboyega, O., Irurhe, N., . . . Adeyeye, O. (2021). Impact of post-tuberculosis lung disease on health-related quality of life in patients from two tertiary hospitals in Lagos, Nigeria. *African Journal of Thoracic and Critical Care Medicine*, 27(2), 46-52.

- Pandia, P., Syafiuddin, T., Bachtiar, A., & Rochadi, K. (2019). The relationship between concordance behaviour with treatment compliance and quality of life of patients with pulmonary tuberculosis in medan. *Open Access Macedonian Journal of Medical Sciences*, 7(9), 1536.
- Panzini, R. G., Mosqueiro, B. P., Zimpel, R. R., Bandeira, D. R., Rocha, N. S., & Fleck, M. P. (2017). Quality-of-life and spirituality. *International Review of Psychiatry*, 29(3), 263-282.
- Peyrovian, B., Rosenblat, J. D., Pan, Z., Iacobucci, M., Brietzke, E., & McIntyre, R. S. (2019). The glycine site of NMDA receptors: a target for cognitive enhancement in psychiatric disorders. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 92, 387-404.
- Pham, T. B., Nguyen, T. T., Truong, H. T., Trinh, C. H., Du, H. N. T., Ngo, T. T., & Nguyen, L. H. (2020). Effects of diabetic complications on health-related quality of life impairment in Vietnamese patients with type 2 diabetes. *Journal of diabetes research*, 2020.
- Pradipta, I. S., Idrus, L. R., Probandari, A., Lestari, B. W., Diantini, A., Alffenaar, J.-W. C., & Hak, E. (2021). Barriers and strategies to successful tuberculosis treatment in a high-burden tuberculosis setting: a qualitative study from the patient's perspective. *BMC Public Health*, 21(1), 1903. doi:10.1186/s12889-021-12005-y
- Prior, T. S., Hoyer, N., Shaker, S. B., Davidsen, J. R., Yorke, J., Hilberg, O., & Bendstrup, E. (2019). Validation of the IPF-specific version of St. George's Respiratory Questionnaire. *Respiratory research*, 20, 1-10.
- Reba, K., Birhane, B. W., & Gutema, H. (2019). Validity and reliability of the Amharic version of the World Health Organization's quality of life questionnaire (WHOQOL-BREF) in patients with diagnosed type 2 diabetes in Felege Hiwot referral hospital, Ethiopia. *Journal of diabetes research*, 2019.
- Rehman, A. u., Hassali, M. A. A., Harun, S. N., Abbas, S., Munswarao, J., Ali, I. A. B. H., & Hussain, R. (2020). Validation and clinical interpretation of the St George's respiratory questionnaire for COPD (SGRQ-C) after adaptation to Malaysian language and culture, in patients with COPD. *Health and quality of life outcomes*, 18, 1-12.
- Rivera-Riquelme, M., Piqueras, J. A., & Cuijpers, P. (2019). The Revised Mental Health Inventory-5 (MHI-5) as an ultra-brief screening measure of bidimensional mental health in children and adolescents. *Psychiatry research*, 274, 247-253.
- Roba, A. A., Dasa, T. T., Weldegebreal, F., Asfaw, A., Mitiku, H., Teklemariam, Z., . . . Befikadu, H. (2018). Tuberculosis patients are physically challenged and socially isolated: A mixed methods case-control study of Health Related Quality of Life in Eastern Ethiopia. *PloS one*, 13(10), e0204697.
- Rocha, V., Jácome, C., Martins, V., & Marques, A. (2021). Are in person and telephone interviews equivalent modes of administrating the CAT, the FACIT-FS and the SGRQ in people with COPD? *Frontiers in Rehabilitation Sciences*, 64.
- Saleem, S., A. Malik, A., Ghulam, A., Ahmed, J., & Hussain, H. (2018). Health-related quality of life among pulmonary tuberculosis patients in Pakistan. *Quality of life research*, 27, 3137-3143.
- Sartika, I., Insani, W. N., & Abdulah, R. (2019). Assessment of health-related quality of life among tuberculosis patients in a public primary care facility in Indonesia. *Journal of global infectious diseases*, 11(3), 102.
- Sereda, Y., & Dembitskyi, S. (2016). Validity assessment of the symptom checklist SCL-90-R and shortened versions for the general population in Ukraine. *BMC psychiatry*, 16(1), 1-11.
- Sezgin, H., Hocaoglu, C., & Guvendag-Guven, E. S. (2016). Disability, psychiatric symptoms, and quality of life in infertile women: a cross-sectional study in Turkey. *Shanghai archives of psychiatry*, 28(2), 86.
- Shamshirgaran, S. M., Ataei, J., Alamdari, M. I., Safaeian, A., & Aminisani, N. (2016). Predictors of health-related quality of life among people with type II diabetes Mellitus in Ardabil, Northwest of Iran, 2014. *Primary care diabetes*, 10(4), 244-250.
- Shayo, F. K., & Shayo, S. C. (2021). Readiness of healthcare facilities with tuberculosis services to manage diabetes mellitus in Tanzania: A nationwide analysis for evidence-informed policy-making in high burden settings. *PloS one*, 16(7), e0254349.
- Sherpa, C. T., LeClerq, S. L., Singh, S., Naithani, N., Pangeni, R., Karki, A., . . . Tielsch, J. M. (2015). Validation of the St. George's respiratory questionnaire in Nepal. *Chronic Obstructive Pulmonary Diseases: Journal of the COPD Foundation*, 2(4), 281.
- Siddiqui, A. N., Khayyam, K. U., Siddiqui, N., Sarin, R., & Sharma, M. (2017). Diabetes prevalence and its impact on health-related quality of life in tuberculosis patients. *Tropical medicine & international health*, 22(11), 1394-1404.
- Sitlinger, A., & Zafar, S. Y. (2018). Health-related quality of life: the impact on morbidity and mortality. *Surgical Oncology Clinics*, 27(4), 675-684.
- Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., . . . Kim, J. H. (2022). Age at onset of mental disorders worldwide: large-scale meta-analysis of 192 epidemiological studies. *Molecular psychiatry*, 27(1), 281-295.

- Sun, Y., Yang, Z., Wan, C., Xu, C., Chen, L., Xu, L., . . . Yan, F. (2018). Development and validation of the pulmonary tuberculosis scale of the system of Quality of Life Tools for Chronic Diseases (QLICD-PT). *Health and quality of life outcomes*, 16, 1-10.
- Svedbo Engström, M., Leksell, J., Johansson, U.-B., Borg, S., Palaszewski, B., Franzén, S., . . . Eeg-Olofsson, K. (2019). Health-related quality of life and glycaemic control among adults with type 1 and type 2 diabetes—a nationwide cross-sectional study. *Health and quality of life outcomes*, 17(1), 1-11.
- Teli, M., Thato, R., & Rias, Y. A. (2023). Predicting factors of health-related quality of life among adults with type 2 diabetes: a systematic review. *SAGE Open Nursing*, 9, 23779608231185921.
- Topak, O. Z., BALTARLI, A., Gökhan, Ö., & ÖZDEL, O. (2022). Is it important to give patients verbal-visual information about the operation to improve their psychological functions in coronary artery bypass graft surgery? *Pamukkale Medical Journal*, 15(3), 555-562.
- Tran Kien, N., Phuong Hoa, N., Minh Duc, D., & Wens, J. (2021). Health-related quality of life and associated factors among patients with type II diabetes mellitus: A study in the family medicine center (FMC) of Agricultural General Hospital in Hanoi, Vietnam. *Health Psychology Open*, 8(1), 2055102921996172.
- Turan, G. B., Dayapoğlu, N., & Özer, Z. (2021). Evaluation of care burden and caregiving preparedness in caregivers of patients with epilepsy: A sample in eastern Turkey. *Epilepsy & Behavior*, 124, 108370.
- Tusa, B. S., Geremew, B. M., & Tefera, M. A. (2020). Heath related quality of life and associated factors among adults with and without diabetes in Adama city East Shewa, Ethiopia 2019; using generalized structural equation modeling. *Health and quality of life outcomes*, 18(1), 1-13.
- Vilagut, G., Forero, C. G., Barbaglia, G., & Alonso, J. (2016). Screening for depression in the general population with the Center for Epidemiologic Studies Depression (CES-D): a systematic review with meta-analysis. *PloS one*, 11(5), e0155431.
- Vu, L. G., Nguyen, L. H., Nguyen, C. T., Vu, G. T., Latkin, C. A., Ho, R., & Ho, C. S. (2022). Quality of life in Vietnamese young adults: A validation analysis of the World Health Organization's quality of life (WHOQOL-BREF) instrument. *Frontiers in Psychiatry*, 13, 968771.
- Wonde, T. E., Ayene, T. R., Moges, N. A., & Bazezew, Y. (2022). Health-related quality of life and associated factors among type 2 diabetic adult patients in Debre Markos Referral Hospital, Northwest Ethiopia. *Heliyon*, 8(8).
- Xie, S., Li, M., Wang, D., Hong, T., Guo, W., & Wu, J. (2023). Comparison of the measurement properties of the EQ-5D-5L and SF-6Dv2 among overweight and obesity populations in China. *Health and quality of life outcomes*, 21(1), 118.
- Xu, G., Hu, X., Lian, Y., & Li, X. (2023). Diabetes mellitus affects the treatment outcomes of drug-resistant tuberculosis: a systematic review and meta-analysis. *BMC Infectious Diseases*, 23(1), 813. doi:10.1186/s12879-023-08765-0
- Xu, R. H., Shi, L.-S.-B., Xia, Y., & Wang, D. (2022). Associations among eHealth literacy, social support, individual resilience, and emotional status in primary care providers during the outbreak of the SARS-CoV-2 Delta variant. *Digital Health*, 8, 20552076221089789.
- Yadav, R. K., Kaphle, H. P., Yadav, D. K., Marahatta, S. B., Shah, N. P., Baral, S., . . . Ojha, R. (2021). Health related quality of life and associated factors with medication adherence among tuberculosis patients in selected districts of Gandaki Province of Nepal. *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, 23, 100235.
- Yasobant, S., Nazli Khatib, M., Syed, Z. Q., Gaidhane, A. M., Shah, H., Narkhede, K., . . . Puwar, T. (2022). Health-Related Quality of Life (HRQoL) of patients with tuberculosis: A review. *Infectious Disease Reports*, 14(4), 509-524.
- Yoon, Y. S., Jung, J.-W., Jeon, E. J., Seo, H., Ryu, Y. J., Yim, J.-J., . . . Lee, B. J. (2017). The effect of diabetes control status on treatment response in pulmonary tuberculosis: a prospective study. *Thorax*, 72(3), 263-270.
- Zare, F., Ameri, H., Madadzadeh, F., & Reza Aghaei, M. (2020). Health-related quality of life and its associated factors in patients with type 2 diabetes mellitus. *SAGE Open Medicine*, 8, 2050312120965314.

