Review Article

Adverse reactions after Covid-19 vaccination in persons affected by leprosy: A scoping review

Senthilkumar Ramasamy[1], Abhiruchi Galhotra[2], Sanjana Agrawal[1]

[1]State Health Resource Centre, Raipur, Chhattisgarh, India, [2]Department of Community and Family Medicine, All India Institute of Medical Sciences, Raipur, Chhattisgarh, India

Abstract

Background: Leprosy reactions are the main pathway leading to severe nerve damage and disability. These reactions can occur at any time. The coronavirus disease 2019 (Covid-19) pandemic led to a catastrophic loss of human life and has had a devastating impact on persons affected by leprosy. **Objective:** To achieve deep insight into the subject of adverse reactions acquired after Covid vaccinations in persons affected by leprosy through a literature review. **Materials and Methods:** A scoping review was conducted in the studies published between July 2021 and June 2022 using the Preferred Reporting Items for Systematic Review and Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR) checklist. **Results:** Using the search strategy, a total of 130 articles were found, of which five were relevant to the study. The adverse reactions were acquired mostly in males [9 (81.8%)]; the majority of them belong to borderline tuberculoid [4 (36.4%)], and most of them were released from treatment (multi-drug therapy) [7 (63.6%)]. **Conclusion:** Surveillance and management of adverse events following immunization (AEFI) are essential; even minor AEFI should be reported and documented in a line list.

Keywords: Adverse reaction, Covid-19 vaccination, Neuritis, Surveillance

Introduction

Leprosy remains a neglected and forgotten tropical disease, but many new cases have been recorded in countries like India, Brazil, and Indonesia.[1] In recent years, the battle against leprosy seemed to have stalled, and the severe disability because of the disease is on the rise, pushing the sufferer into a life of poverty, stigma, discrimination, and isolation.[2]

Leprosy reactions are the main pathway leading to severe nerve damage and disability. There are two types of auto-immune responses, type 1 and type 2 reaction.[3] These reactions can occur at any time and are immunologically mediated; they may be triggered by the initiation of multi-drug therapy (MDT), infections, stress, trauma, pregnancy, lactation, puberty, and vaccination.[4] The coronavirus disease 2019 (Covid-19) pandemic led to a catastrophic loss of human life, mainly in persons affected by leprosy (PAL).[5] Mass immunization campaigns for the prevention of Covid-19 have been carried out throughout the world to prevent the spread of infection. After administration, Covid-19 vaccines are known to increase TNF-α, IFN-γ, and IL-8 levels stimulated by glycoprotein-S.[6] Recently, in a few articles, researchers have reported the adverse effects acquired after vaccination in persons affected by leprosy, which range from dermatological infection to leprosy reactions and neuritis.[6-10]

This study helps to achieve deep insight into the subject of adverse reactions acquired after Covid vaccinations in persons affected by leprosy through a literature review and not to critique of previous studies. This information may alert the primary health care physicians for the importance of monitoring and

Address for correspondence: Dr. Sanjana Agrawal, State Health Resource Centre, Raipur, Chhattisgarh, India.
E-mail: drsanjana1607@gmail.com

Received: 12-04-2023 **Revised:** 14-06-2023
Accepted: 14-06-2023 **Published:** 30-09-2023

Access this article online

Quick Response Code:

Website: http://journals.lww.com/JFMPC

DOI: 10.4103/jfmpc.jfmpc_635_23

How to cite this article: Ramasamy S, Galhotra A, Agrawal S. Adverse reactions after Covid-19 vaccination in persons affected by leprosy: A scoping review. J Family Med Prim Care 2023;12:1771-4.

recognizing adverse reactions following Covid-19 immunizations in persons affected by leprosy.

Materials and Methods

Since the onset of the pandemic, only a few studies have focused on the adverse effects of Covid-19 vaccination in a person affected by leprosy. We conducted a scoping review of the studies published between July 2021 and June 2022. This review was reported using the Preferred Reporting Items for Systematic Review and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) checklist. Inclusion and exclusion criteria are mentioned in Table 1.

Search strategy

The databases searched were Medline, Google Scholar, and PubMed. The search strategy used MeSH keywords "Leprosy AND Covid-19". The search was restricted to human studies with adult patients only.

Results

Using the search strategy, a total of 130 articles were found, of which five were relevant to the study, which were included in the study [Figure 1]. Of the five studies, three were from India (two case series and one cross-sectional), one was from Brazil (case study), and one was from Singapore (case study). Descriptive statistics were used to summarize the characteristics of the included studies [Table 2]. A total of 11 people affected with leprosy-acquired adverse events after the administration of the Covid-19 vaccine were identified from these studies. The adverse reactions were acquired mostly in males [9 (81.8%)], and the majority of them belong to borderline tuberculoid (BT) [4 (36.4%)], borderline lepromatous (BL) [4 (36.4%)], and lepromatous leprosy (LL) [3 (27.3%)]. Most of the patients were released from treatment (MDT) [7 (63.6%)], and 2 (18.2%) were newly identified after vaccination. In the context of Covid-19 vaccination, 4 (45.5%) were vaccinated with ChAdOx1 nCoV-19 vaccine, 4 (36.4%) were immunized with Covaxin, and the remaining were vaccinated with Covishield and Pfizer-BioNTech Covid-19 vaccination. After administration of Covid-19 vaccination, 6 (54.5%) patients developed type 2 reaction of erythema nodoum leprosy (ENL), 2 (18.2%) patients developed type 1 reaction, and 3 (27.3%) patients along with leprosy reactions developed nerve inflammation, which includes median nerve abscess, right foot drop, and right ulnar nerve pain.

Discussion

In the last 40 years, vaccines have proven to be the most cost-effective public health measure to reduce disease morbidity and mortality

Table 1: Inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Time Period	July 2021 to June 2022	Any study outside these dates
Language	English	Non-English
Species	Human	Non-human
Article Type	All Articles	-

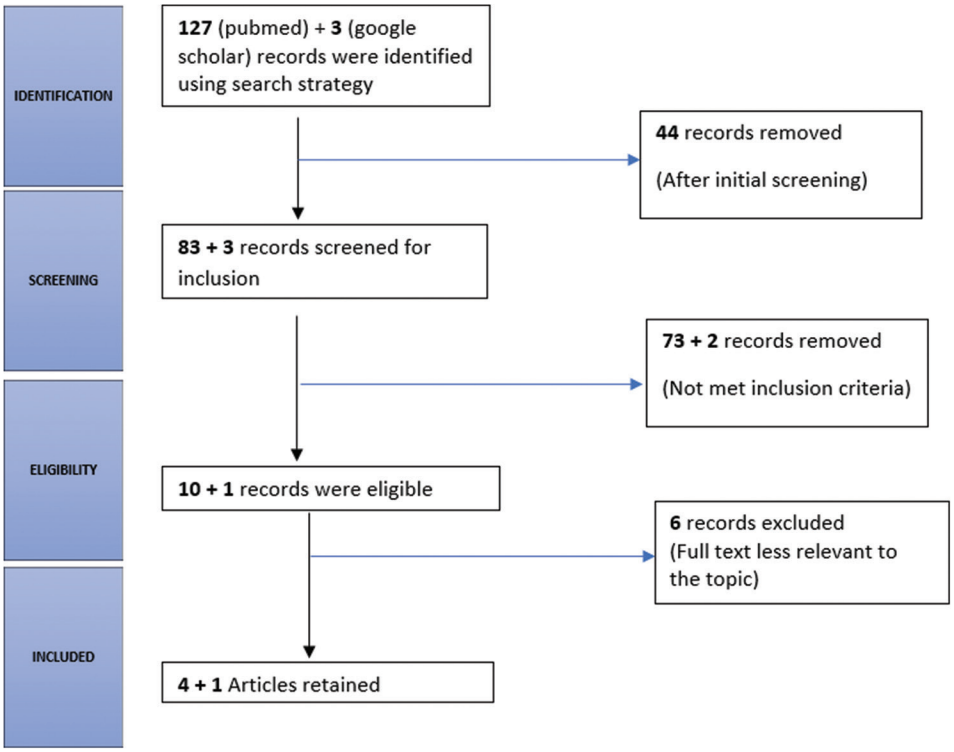

Figure 1: PRISMA flow chart for study selection

Table 2: List of sources of the literature identified and its socio-demographic and clinical profile

	Study 1	Study 2	Study 3	Study 4	Study 5
Authors	Saraswat N *et al.*, 2022[6]	Bhandari A *et al.*, 2022[7]	Rebello PF, Pennini SN. 2021[8]	Panda A K *et al.*, 2022[9]	Shashendra Aponso *et al.*, 2021[10]
Country	India	India	Brazil	India	Singapore
Year	2022	2022	2021	2022	2021
Type of Study	Case series	Cross-sectional	Case series	Case Study	Case Study
No. of the patients with adverse reaction	Four	Three	Two	One	One
Age	25 to 45 years	35 to 45 years	43 to 44 years	60 years	24 years
Gender	All Male	2 Females; 1 Male	All Male	Male	Male
Type of leprosy	Out of four cases, three were BT, and one was BL	Among the three cases, LL, BL, and BT leprosy were found	Each case of LL and BL	BL	LL
MDT Status	Under treatment (UT): 02 Released from treatment (RFT): 02	RFT: 02 Newly diagnosed for leprosy: 01	RFT: 02	RFT: 01	Newly diagnosed for leprosy: 01
Vaccine administered	Covishield and Covaxin	ChAdOx1 nCoV-19 (Oxford/AstraZeneca)	ChAdOx1 nCoV-19 (Oxford/AstraZeneca)	Covishield	Pfizer-BioNTech Covid-19 vaccination
Duration of adverse reaction	5–11 days	7–14 days	2–5 days	5 days	10–15 days
Type of Lepra Reaction and Neuritis	Cases: 1) Type 1 reaction alone 2) Type 1 reaction with right ulnar neuritis 3) Type 1 reaction with median nerve abscess 4) Type 2 reaction (erythema nodosum leprosum (ENLs))	Two cases with type 2 reaction (ENLs) and one with type 1 reaction	Both the cases with type 2 reaction (ENLs)	Type 2 reaction with right foot drop	Type 2 reaction (ENLs)
Other Clinical Presentations	1. Sudden onset sharp shooting pain down right elbow 2. Pain and swelling over the volar aspect of the left forearm around the wrist joint 3. Erythematous tender nodules with subsequent ulceration	1. Marked leucocytosis and neutrophilia 2. Fever, joint pain, and painful erythematous nodules 3. Hypoaesthetic, well-defined erythematous, edematous annular plaque	1. Fever, malaise, and painful nodules	Thickening and tenderness of bilateral common peroneal nerve and right tibial nerve.	Swelling of the hands, feet, earlobes, and lips, bilateral ankle pain, and swelling.

across the globe. However, there is no "perfect" vaccine that protects and is entirely safe for everyone. Most adverse events following immunization (AEFI) are mild, but some can be serious and even fatal. It is important to identify these adverse events related to the Covid-19 vaccine, especially by the primary health care providers for appropriate early treatment and referral of leprosy reactions/neuritis patients cautiously and effectively in higher centers.

The present literature review shows that adverse events occurred in the multi-bacillary type of borderline and lepromatous leprosy. Of 11 patients, 27.3% developed leprosy reactions along with nerve inflammation. If the reaction and neuritis that occurred by adverse events of immunization are left unmanaged, they can lead to permanent, progressive, and disfiguring disabilities.[11] In this study, the majority of adverse events occurred in patients (7 out of 11) who have been released from the treatment, and 2 out of 11 were newly diagnosed with leprosy after vaccination, which clears the concept that leprosy reactions can occur at any time before, during, or after the treatment and the importance of surveillance even after release from MDT.[12]

Surveillance and management of AEFI are essential; even minor AEFI should be reported and documented in a line list. The Covid-19 vaccine appears to be safe for use in leprosy patients, and all patients should be encouraged to get vaccinated against Covid-19.[13] Effective reporting of AEFI is a step to ensure vaccine products safety. However, almost half the world's population lives in countries without an effective system for monitoring the safety of vaccines.[14] The reporting and evaluation of AEFI in neglected diseases will provide a standardized and transparent method allowing stakeholders to understand the nature of the decision-making process and will improve the way for future safety and effectiveness.

Key findings

This study found that most of the adverse reactions following Covid-19 vaccine occurred in patients with BL and LL types of leprosy and the majority of them were released from treatment. This conveys important information of the need for continuous surveillance and contact tracing. These measures are essential to identify leprosy-related complications at an early stage and

ensure timely intervention, even after patients are released from treatment.

Key message

Primary care physicians should timely detect and report adverse events following the use of Covid-19 vaccine; it will be the first step in the continuous verification of vaccine safety.

Acknowledgement

The authors express their gratitude towards the School of Public Health, All India Institute of Medical Sciences, Raipur for their unconditional support during the study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. CDC. World Leprosy Day. Centers for Disease Control and Prevention. 2021. Available from: https://www.cdc.gov/leprosy/world-leprosy-day/index.html. [Last accessed on 2023 Apr 5].
2. Ram A. Leprosy: India's hidden plague. Financial Times. 2017. Available from: https://www.ft.com/content/b7c8ffb2-ff67-11e6-8d8e-a5e3738f9ae4. [Last accessed on 2023 Apr 05].
3. Nery JA, Bernardes Filho F, Quintanilha J, Machado AM, Oliveira Sde S, Sales AM. Understanding the type 1 reactional state for early diagnosis and treatment: A way to avoid disability in leprosy. An Bras Dermatol 2013;88:787-92.
4. Bilik L, Demir B, Cicek D. Leprosy Reactions. Hansen's Disease - The Forgotten and Neglected Disease. IntechOpen; 2017. Available from: https://www.intechopen.com/chapters/undefined/state.item.id. [Last accessed on 2023 Apr 5].
5. Leprosy and COVID-19 | Infolep. Available from: https://https://www.leprosy-information.org/key-topics/leprosy-and-covid-19. [Last accessed on 2023 Apr 5].
6. Saraswat N, Tripathy DM, Kumar S, Awasthi P, Gopal MM. A spectrum of leprosy reactions triggered by Covid-19 vaccination: A series of four cases. J Eur Acad Dermatol Venereol 2022;36:e858-60.
7. Bhandari A, Shilpa, Gupta S, Dogra S, Narang T. Reactions in leprosy patients triggered by COVID-19 vaccination - A cross-sectional study from a tertiary care centre in India. J Eur Acad Dermatol Venereol 2022;36:e971-2.
8. Rebello PFB, Pennini SN. Erythema nodosum leprosum and active leprosy after ChAdOx1-S/nCoV-19 recombinant vaccine. A report of two cases. Leprosy Review 2021;92:421-6.
9. Panda AK, Begum F, Panda M, Jena AK. Trigger of type 2 Lepra reaction with acute foot drop following Covid-19 vaccination. J Eur Acad Dermatol Venereol 2022;36:e334-5.
10. Aponso S, Hoou LC, Wei YY, Salahuddin SA, Yit PJ. Multibacillary leprosy unmasked by COVID-19 vaccination. JAAD Case Rep 2022;19:87-9.
11. Leprosy. Available from: https://www.who.int/news-room/fact-sheets/detail/leprosy. [Last accessed on 2023 Apr 5].
12. Bilik L, Demir B, Cicek D. Leprosy reactions. hansen's disease - the forgotten and neglected disease. IntechOpen; 2017. Available from: https://www.intechopen.com/chapters/undefined/state.item.id. [Last accessed on 2023 Apr 5].
13. Bhandari A, Shilpa, Gupta S, Dogra S, Narang T. Reactions in leprosy patients triggered by COVID-19 vaccination - a cross-sectional study from a tertiary care centre in India. J Eur Acad Dermatol Venereol 2022;36:e971-2.
14. Adverse events following immunization (AEFI). Available from: https://www.who.int/teams/regulation-prequalification/regulation-and-safety/pharmacovigilance/health-professionals-info/aefi. [Last accessed on 2023 Apr 5].