

ORIGINAL RESEARCH

Judging the prevalence of depression and anxiety in subjects with leprosy and its correlation to stigma related to leprosy

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ABSTRACT

Background: Leprosy is a chronic infectious disease affecting the psychology of the affected subjects and has been linked to various psychiatric disorders and stigma in society. **Aim:** The present study aimed to judge the prevalence of depression and anxiety in subjects with leprosy and its correlation to stigma related to leprosy. **Methods:** The study assessed 59 subjects with leprosy admitted to the Institute. All included subjects were assessed using semi semi-structured schedule, SARI (stigma assessment and reduction of impact) stigma scale, and hospital anxiety and depression scale. The data gathered were statistically analyzed for result formulation. **Results:** Clinically significant symptoms of depression and anxiety were seen in (n=7) and (n=6) study subjects respectively where the subjects scored above the threshold value of the assessed scores. It was also seen that significant correlates of depression were stay duration at the center and leprosy-related stigma, whereas, significant correlates of anxiety were leprosy attribution to bad deeds and leprosy-related stigma. **Conclusions:** The present study concludes that a higher prevalence of depression and anxiety and its related symptoms is seen in subjects with leprosy compared to the general population. Leprosy-related stigma has a significant association with depression and anxiety in the subjects living with leprosy. The screening of leprosy subjects for mental health and related issues is vital during the management of subjects with leprosy and also implementation of various strategies is vital for reducing the stigma related to leprosy.

Keywords: Leprosy, leprosy-related stigma, mental health, India, psychology

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INTRODUCTION

Leprosy is a chronic infectious disease known to mankind since ancient times dating back to more than 3000 years when it affected a large human population globally including in India. Subjects affected with leprosy are reported to have a high risk of developing various psychiatric disorders. Previous literature data report a higher prevalence of psychiatric disorders among subjects with leprosy compared to the subjects not affected by leprosy. This higher risk of psychiatric disorders in leprosy subjects can be attributed to physical disability and morbidity associated with leprosy and with the long duration of leprosy in affected subjects.¹

Previous literature data assessed the prevalence of psychiatric morbidity in 100 subjects with confirmed diagnosis of leprosy in India and reported that psychiatric illness was prevalent in nearly 76% of the

subjects affected by leprosy. Among these subjects, anxiety and depression were the most common psychiatric illnesses affecting 21% and 55% of the subjects respectively.² Another study assessing Indian subjects also confirmed that anxiety and depression are the most common psychiatric disorders affecting subjects with leprosy in India. Studies from other countries also reported that depression is a common disorder affecting subjects with leprosy with the worsening of depression symptoms seen with increased physical disability and high degree of leprosy-related stigma in affected subjects.³

In the Indian scenario, the prevalence of leprosy in the Indian population has been greatly reduced with a very low incidence of leprosy in India with less than 1 case being reported in every 10,000 population after it was declared as eradicated from India. However, even after its elimination in India has been declared,

pockets of endemic areas and a high detection rate areas still exist in India. The subjects that develop physical deformities during the disease course and subjects with a high duration of illness are reported to have a high prevalence of psychiatric disorders and disturbances in leprosy subjects.⁴

The majority of the existing literature data on leprosy has assessed subjects that either visited the hospitals or clinical for leprosy management. Also, the existing literature data is scarce concerning the psychiatric aspect of subjects affected by leprosy, considering the Indian scenario.⁵ Hence, the present study aimed to assess the prevalence of depression and anxiety in subjects with leprosy and its correlation to stigma related to leprosy. The study also assessed the physical disabilities associated with leprosy with the severity of anxiety and depression symptoms experienced by subjects with leprosy.

MATERIALS AND METHODS

The present cross-sectional descriptive clinical study aimed to assess the prevalence of depression and anxiety in subjects with leprosy and its correlation to stigma related to leprosy. The study also assessed the physical disabilities associated with leprosy with the severity of anxiety and depression symptoms experienced by subjects with leprosy. The study was done at Sri Lakshmi Narayana Institute of Medical sciences, Pondicherry from January 2020 to December 2022 after the clearance was given by the concerned institutional ethical committee board. The study subjects were from the Institute admitted with leprosy. Verbal and written informed consent was taken from all the subjects before study participation and after explaining the detailed study design.

The inclusion criteria for the study were subjects above 18 years of age, who gave informed consent for participation, and subjects that had conformed diagnosis of leprosy and were admitted to the Institute. The exclusion criteria for the study were subjects who were not willing to participate in the study, subjects of age less than 18 years, and those who did not give consent in either verbal or written form.

The study included 59 subjects with leprosy from both genders admitted to the institute. After final inclusion, detailed history and demographics were recorded for all the study participants in preformed structured proforma. The information gathered on proforma included the demographics and social profiles of the subjects including gender, age, illness duration, address, family visits to the institute, and family history of all the subjects. The proforma also assessed the clinical profile including the history of any psychiatric illness and the cause of leprosy.

The HADS (hospital anxiety depression scale) was used to assess depression and anxiety in the study participants. The HADS scale was developed by Zigmond and Snaith in 1983,⁶ and is considered a practical, valid, and reliable tool to assess depression

and anxiety which are the two most common psychiatric illnesses in subjects admitted to the hospitals. HADS helps in assessing depression and anxiety in both quantitative and qualitative formats. Also, HADS is considered useful in hospitals for screening the general population for any psychiatric illness including anxiety and depression. For use in the present study, HADS was given to all the participants in Hindi and English formats.

The study also utilized the SARI (Stigma assessment and reduction of impact) scale in the study participants developed by Dadun et al⁷ in 2017 to assess four aspects related to stigma in subjects with leprosy. The SARI scale has good validity and reliability of use. SARI is a modified version of the Berger scale⁸ of 2001 which was originally developed to assess the stigma related to AIDS and HIV in affected subjects. The SARI scale utilizes 22 items for judging the four aspects of leprosy including the anticipated stigma, internalized stigma, disclosure concerns, and experienced stigma. For the feasibility of use in the present study, the SARI scale was translated to Hindi utilizing the study instruments or translation scale by the WHO method of 2013.⁹

The data gathered were analyzed statistically using SPSS (Statistical Package for Social Sciences) software version 21.0 (IBM Corp., NY, USA). The results concerning HADS scores, leprosy-related stigma, clinical characteristics, and sociodemographic profiles were described in frequency and percentages and mean and standard deviations. The statistical tests used in the present study were the Mann-Whitney U test, Spearman correlation, and Kruskal-Wallis test). Correlates of anxiety and depression were assessed using separate multiple linear regression analyses for variables with significant bivariate relationships. The statistical significance level was taken at a p-value of <0.05.

RESULTS

The present cross-sectional descriptive clinical study aimed to assess the prevalence of depression and anxiety in subjects with leprosy and its correlation to stigma related to leprosy. The study also assessed the physical disabilities associated with leprosy with the severity of anxiety and depression symptoms experienced by subjects with leprosy. The study included 59 subjects with leprosy from both genders admitted to the institute. The demographic data of study participants are listed in Table 1.

There were 47.45% (n=28) males and 52.54% (n=31) females in the present study. The mean age of study subjects was 62.07±16.72 years. For marital status, 8.47% (n=5), 49.15% (n=39), 23.72% (n=14), and 1.69% (n=1) subjects were unmarried, married, widowed, and separated respectively. Concerning educational status, 55.92% (n=33), 32.20% (n=19), and 11.86% (n=7) subjects respectively were illiterate, could read and write, and had education till high school respectively. The subjects attributed causes of

their leprosy to be bad deeds, supernatural, disease, and others by 13.55% (n=8), 13.55% (n=8), 71.86% (n=42), and 1.69% (n=1) study subjects respectively. Leprosy history of family members was positive in 49.15% (n=29) subjects and history of psychiatric illness was positive in 1.69% (n=1) subjects. Only 76.27% (n=45) of subjects had their family to visit them. For leprosy-related disability, disability for esthetics, infertility, sensation loss, facial palsy, eye involvement, ulcers, limb involvement, and others were reported in 74.57% (n=44), 16.94% (n=10), 93.22% (n=55), 13.55% (n=8), 38.98% (n=23), 71.68% (n=42), 94.91% (n=56), and 6.77% (n=4) subjects respectively (Table 1).

The mean score of stigmas in study subjects was 17.86 ± 14.51 . The mean score of HADS for depression in study subjects was 6.94 ± 2.86 . The clinical symptoms of depression were definitive and doubtful in 11.86% (n=7) and 38.98% (n=23) study subjects respectively with respective scores of >10 and >7 . The mean score of HADS for anxiety was 5.56 ± 3.62 where the clinical symptoms of anxiety were definitive and doubtful in 10.16% (n=6) and 27.11% (n=16) study subjects respectively with respective scores of >10 and >7 .

On assessing the relationship between depression and anxiety symptoms and clinical characteristics in study subjects, it was seen for leprosy-related stigma, subjects have high anxiety and depression with $p=0.01$ and <0.01 respectively. The subjects that attributed the cause of leprosy to bad deeds had high levels of anxiety and depression with $p=<0.01$ and 0.04 respectively. Non-significant results were seen for depression and anxiety in subjects that attributed the cause of leprosy as supernatural, disease, and others with $p=0.84$, 0.05, and 0.14 for depression and

0.42, 0.77, and 0.67 respectively for anxiety. Level of family contact and family history of leprosy had no significant effect on anxiety and depression in study subjects. Currently, married subjects with leprosy had high levels of depression with $p=0.03$. Educational status, gender, and age had no significant effect on depression and anxiety in study subjects with leprosy as seen in Table 2.

Linear regression analysis for anxiety symptoms correlates in study subjects showed that all the study variables had significant association with depression and anxiety symptoms in the study subjects as depicted in Table 3. For leprosy-related stigma, standardized coefficient, unstandardized coefficient, 95% CI (confidence interval), and p-value were 0.24, 0.04, 0.02-0.12, and <0.01 respectively showing significant association of leprosy-related stigma to depression and anxiety symptoms in the study subjects. A similar significant association was seen in depression and anxiety symptoms in the study subjects to attribution of leprosy to bad deeds with standardized coefficient, unstandardized coefficient, 95% CI (confidence interval), and p-value of 0.21, 2.34, 0.56-4.07, and <0.01 respectively as shown in Table 3. These results showed that the attribution of leprosy to bad deeds and leprosy-related stigma are significant correlates of anxiety in leprosy subjects.

On assessing the correlates of depression in study subjects, it was seen that leprosy-related stigma had a significant association with depression symptoms in study subjects with $p<0.01$, whereas, a non-significant association was seen in depression symptoms of study subjects to leprosy linked to bad deeds, currently married status, and male gender with p-value of 0.22, 0.12, and 0.26 respectively as depicted in Table 4.

Table 1: Demographics and social data of the study subjects

S. No	Characteristics	Number (n=59)	Percentage (%)
1.	Mean age (years)	62.07 ± 16.72	
2.	Gender		
a)	Males	28	47.45
b)	Females	31	52.54
3.	Marital status		
a)	Unmarried	5	8.47
b)	Married	39	49.15
c)	Widow	14	23.72
d)	Separated	1	1.69
e)	Divorced	-	
4.	Educational status		
a)	Illiterate	33	55.92
b)	Read and write	19	32.20
c)	High-school	7	11.86
d)	Intermediate or higher	-	
5.	Leprosy causes attributed		
a)	Bad deeds	8	13.55
b)	Supernatural	8	13.55
c)	Disease	42	71.86
d)	Others	1	1.69

6.	Leprosy history in family members	29	49.15
7.	Leprosy related disability		
a)	Esthetics	44	74.57
b)	Infertility	10	16.94
c)	Sensation loss	55	93.22
d)	Facial palsy	8	13.55
e)	Eye involvement	23	38.98
f)	Ulcers	42	71.86
g)	Limb involvement	56	94.91
h)	Others	4	6.77
8.	Family visits		
a)	Yes	45	76.27
b)	No	14	23.72
9.	History of psychiatric illness	1	1.69

Table 2: Relationship between depression and anxiety symptoms and clinical characteristics in study subjects

S. No	Variables	HADS-A scores for depression	p-value	HADS-A scores for anxiety	p-value
1.	Leprosy-related stigma score	0.23	<0.01	0.21	0.01
2.	Leprosy cause attribution				
a)	Bad deeds	673.50	0.04	525.52	<0.01
b)	Supernatural	795.02	0.84	7.15.02	0.42
c)	Disease	1094.02	0.05	1372.52	0.77
d)	Others	513.02	0.14	641.52	0.67
3.	Family contact level	1.213	0.56	1.084	0.56
4.	Family leprosy history	1575.02	0.32	1613.02	0.37
5.	Marital status	1223.50	0.03	1494.50	0.52
6.	Educational status	1433	0.08	1704	0.87
7.	Male gender	1364.52	0.03	1505.00	0.18
8.	Age	0.175	0.07	0.08	0.36

Table 3: Linear regression analysis for anxiety symptoms correlates in study subjects

S. No	Variables	Standardized coefficient	Unstandardized coefficient	95% CI of Unstandardized coefficient	p-value
1.	Leprosy related stigma	0.24	0.04	0.02-0.12	<0.01
2.	Leprosy linked to bad deeds	0.21	2.34	0.56-4.07	<0.01
3.	Constant	-	4.03	3.07-5.03	<0.01

Table 4: Linear regression analysis for depression symptoms correlates in study subjects

S. No	Variables	Standardized coefficient	Unstandardized coefficient	95% CI of Unstandardized coefficient	p-value
1.	Leprosy-related stigma	0.27	0.03	0.02-0.07	<0.01
2.	Leprosy linked to bad deeds	0.13	0.86	-0.45-2.22	0.22
3.	Currently married	-0.14	-0.74	-1.76-0.27	0.12
4.	Male gender	-0.07	-0.54	-14.6-0.42	0.26
5.	Constant	-	5.63	4.32-7.02	<0.01

DISCUSSION

The present study included 59 subjects with leprosy from both genders admitted to the institute. There were 47.45% (n=28) males and 52.54% (n=31) females in the present study. The mean age of study subjects was 62.07±16.72 years. For marital status, 8.47% (n=5), 49.15% (n=39), 23.72% (n=14), and 1.69% (n=1) subjects were unmarried, married,

widowed, and separated respectively. Concerning educational status, 55.92% (n=33), 32.20% (n=19), and 11.86% (n=7) subjects respectively were illiterate, could read and write, and had education till high school respectively. The subjects attributed causes of their leprosy to be bad deeds, supernatural, disease, and others by 13.55% (n=8), 13.55% (n=8), 71.86% (n=42), and 1.69% (n=1) study subjects respectively.

Leprosy history of family members was positive in 49.15% (n=29) subjects and history of psychiatric illness was positive in 1.69% (n=1) subjects. Only 76.27% (n=45) of subjects had their family to visit them. For leprosy-related disability, disability for esthetics, infertility, sensation loss, facial palsy, eye involvement, ulcers, limb involvement, and others were reported in 74.57% (n=44), 16.94% (n=10), 93.22% (n=55), 13.55% (n=8), 38.98% (n=23), 71.68% (n=42), 94.91% (n=56), and 6.77% (n=4) subjects respectively. These results were similar to the studies by Somar PMW et al¹⁰ in 2020 and Govindasamy K et al¹¹ in 2021 where authors assessed subjects with sociodemographic data similar to the present study.

It was seen that the mean score of stigmas in study subjects was 17.86±14.51. The mean score of HADS for depression in study subjects was 6.94±2.86. The clinical symptoms of depression were definitive and doubtful in 11.86% (n=7) and 38.98% (n=23) study subjects respectively with respective scores of >10 and >7. The mean score of HADS for anxiety was 5.56±3.62 where the clinical symptoms of anxiety were definitive and doubtful in 10.16% (n=6) and 27.11% (n=16) study subjects respectively with respective scores of >10 and >7. The findings were consistent with the studies of Ricco M et al¹² in 2019 and Tsutsumi A et al¹³ in 2007 where authors reported similar prevalence of depression and anxiety in their study subjects as seen in the present study.

For the relationship between depression and anxiety symptoms and clinical characteristics in study subjects, it was seen for leprosy-related stigma, subjects have high anxiety and depression with p=0.01 and <0.01 respectively. The subjects that attributed the cause of leprosy to bad deeds had high levels of anxiety and depression with p=<0.01 and 0.04 respectively. Non-significant results were seen for depression and anxiety in subjects that attributed the cause of leprosy as supernatural, disease, and others with p=0.84, 0.05, and 0.14 for depression and 0.42, 0.77, and 0.67 respectively for anxiety. Level of family contact and family history of leprosy had no significant effect on anxiety and depression in study subjects. Currently, married subjects with leprosy had high levels of depression with p=0.03. Educational status, gender, and age had no significant effect on depression and anxiety in study subjects with leprosy. These results were in agreement with the findings of Rueda S et al¹⁴ in 2016 and Yi S et al¹⁵ in 2015 where authors reported that a high level of depression and anxiety is seen in subjects having leprosy associated with social stigma.

Concerning the linear regression analysis for anxiety symptoms correlates in study subjects showed that all the study variables had a significant association with depression and anxiety symptoms in the study subjects as depicted in Table 3. For leprosy-related stigma, standardized coefficient, unstandardized coefficient, 95% CI (confidence interval), and p-value

were 0.24, 0.04, 0.02-0.12, and <0.01 respectively showing significant association of leprosy-related stigma to depression and anxiety symptoms in the study subjects. A similar significant association was seen in depression and anxiety symptoms in the study subjects to attribution of leprosy to bad deeds with standardized coefficient, unstandardized coefficient, 95% CI (confidence interval), and p-value of 0.21, 2.34, 0.56-4.07, and <0.01 respectively. These results showed that the attribution of leprosy to bad deeds and leprosy-related stigma are significant correlates of anxiety in leprosy subjects. These results were in line with Lusli M et al¹⁶ in 2016 and Singh GP¹⁷ in 2012 where authors suggested that the attribution of leprosy to bad deeds and leprosy-related stigma are significant correlates of anxiety in leprosy subjects.

The study results showed that for assessment of the correlates of depression in study subjects, it was seen that leprosy-related stigma had a significant association with depression symptoms in study subjects with p<0.01, whereas, a non-significant association was seen in depression symptoms of study subjects to leprosy linked to bad deeds, currently married status, and male gender with p-value of 0.22, 0.12, and 0.26 respectively. These results showed that leprosy-related stigma is a significant correlate of anxiety in leprosy subjects. These findings were confirmed by Lastoria JC et al¹⁸ in 2014 and Bhatia MS et al¹⁹ in 2006 where authors reported that leprosy-related stigma is a significant correlate of anxiety in leprosy subjects which was also seen in the results of the present study.

CONCLUSIONS

Considering its limitations, the present study concludes that a higher prevalence of depression and anxiety and its related symptoms is seen in subjects with leprosy compared to the general population. Leprosy-related stigma has a significant association with depression and anxiety in the subjects living with leprosy. The screening of leprosy subjects for mental health and related issues is vital during the management of subjects with leprosy and also implementation of various strategies is vital for reducing the stigma related to leprosy.

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