

Original Research Article

Physical health impairment, disability and suicidal intent among self-harm survivors in South India

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Received: 24 February 2021

Accepted: 18 March 2021

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ABSTRACT

Background: Suicide is major public health concern in India. There are limited data examining the relationship between health impairment, disability and severity of suicidal intent. The aim of the study was to examine the associations of health impairment and disability with severity of suicidal intent among survivors following an act of self-harm.

Methods: A pilot exploratory study of 453 self-harm survivors from a specialist hospital in South India. Socio-demographics, physical health impairment, disability (WHO Disability Schedule-II), suicidal intent, (Pierce suicide intent scale) and mental disorders were studied.

Results: Arthritis was the most common physical impairment among self-harm survivors followed by gastrointestinal, sensory impairment and difficulty with mobilization. Nearly 10% of participants had some degree of functional impairment, with 38% experiencing severe physical pain in the week prior to self-harm. Past history of depression treatment, age, education and occupation influenced positively PSIS scores. There were significant associations between suicidal intent and disability.

Conclusions: Indian self-harm survivors indicated complex relationships between physical health, disability and suicidal intent. Understanding these associations may help to develop suicide prevention strategies. Our findings suggest a need for integrating a comprehensive of physical health assessment in self harm survivors.

Keywords: Self harm, Disability, Health impairment, Mental disorders

INTRODUCTION

WHO estimates that about 1,70,000 deaths by suicide occur in India every year with especially high risks for young people and in South India, where, about half of suicide deaths are due to poisoning (principally ingestion of pesticides).¹ Suicide rates recorded in the South India region are much higher than the national estimate highlighting a major public health concern.² Studies from higher income settings have shown that health status, disability, and activity levels are associated with rates of

Self Harm (SH), repetition and complete suicide.³⁻⁸ Studies which demonstrated improved indicators of health including; quality of life, lower levels of disability and health impairment, fewer chronic conditions, and pain, reported lower levels of depression, self-harm and completed suicide. However, the vast majority of these studies are cross sectional and failed to elucidate the effect of potential mediating or confounding health impairments. To address this gap within the literature a better understanding of the relationship between indicators of health and disability with SH is essential. Further

understanding of the phenomenon would facilitate the development and implementation of preventive measures thereby reducing the burden associated with physical health impairment, disability and suicidal intent to survivor's families and society. There are limited data exploring associations of health status indicators with suicidality in population-based studies in India, where in general such studies are largely restricted to reporting rates of SH and/or suicide, and cross-sectional associations with socio-demographic factors. There are limited data examining associations of health and disability with suicidal intent in Low Middle Income Countries (LMICs) including India. Given the paucity of data on a significant public health concern, this paper reflects the findings from a secondary analysis of data extracted from the self-harm register from an inner-city hospital in Mysore, south India, where suicide rates are particularly high.⁹ The data on this register is routinely collected. The following objectives framed the data examination and analysis: (a) The primary objective of the study was to measure the degree of health impairment, suicidal intent and disability among those who had survived an act of SH. (b) To explore the associations of health impairment and disability with severity of suicidal intent among them.

We explored the hypothesis that those with higher levels of health impairment and disability would have higher levels of suicidal intent.

METHODS

Design and duration

The study approach reflected a case study design. Secondary analyses of data from a cross sectional study was conducted in a tertiary care centre in South India to examine the hypotheses listed above. Following an act of SH between November 2015 and March 2016, 453 SH survivors were recruited from the department of psychiatry CSI Holdsworth Memorial Hospital were referred for a psychiatric evaluation. Those who had presented to the hospital following an act of SH, irrespective of intent, were considered as SH. Inclusion criteria reflected both men and women aged 18 years and above and were able to provide informed consent. The case definition did not include any criterion based on the degree of intent. Ethical approval was granted by CSI Holdsworth Memorial Hospital Ethics committee and all participants have consented for their data to be used in the research.

Power calculation

This was a secondary data analysis of the cohort of SH survivors. Hence an a priori sample size calculation was not carried out. No studies have previously examined the hypotheses outlined above, to inform a power calculation and effect sizes for analyses. Consequently, this enquiry is considered to be an exploratory pilot study and as such does not require sample size estimation.

However, post priori, this study with 453 participants of whom 10% reported a disability had a relative precision of 27% at an alpha error of 0.05 alpha error for the examining the primary objective.

Assessments

All participants were interviewed by a trained research assistant for socio-demographics, physical health impairment, disability and severity of suicidal intent by the following instruments validated for use in local population by the 10/66 research group.¹⁰⁻¹⁴

Socioeconomic position was ascertained by administering Standard of Living Index questionnaire (SLI, NFHS, 1999-2000)¹⁵: In National Family Health Survey (NFHS), a standard of living index (SLI) has been developed to measure the household standards based on house type, toilet facility, source of lighting, main fuel for cooking, source of drinking water, separate room for cooking, ownership of house, ownership of agricultural land, ownership of livestock, ownership of goods (eg. Tractor, Scooter, Motorcycle, Telephone, Refrigerator, Television, Cycle, Electric fan, sewing machine, Water pump, bullock cart, thresher, pressure cooker, chair, bed, clock, watch etc). <15 are low and 15-24 are medium and >25 are considered as high.

The Physical Health Impairment Schedule (PHIS) is a self-reported measure of twelve commonly occurring physical health impairments (Duke University 1978). They include arthritis/rheumatism, eyesight problems, hearing difficulty or deafness, persistent cough, breathlessness/asthma, high blood pressure, heart trouble/angina, stomach problems, intestine problems, faints/blackouts, skin disorders and paralysis/ weakness or loss of one leg or an arm. Impairments were rated as present if participants (or subjects) interfered with activities "a little" or "a lot", as opposed to "not at all". This assessment took approximately 5 minutes.

The degree of disability was measured by administering the WHO Disability Schedule-II (WHO DAS II). WHO DAS II is a validated culture-fair assessment tool for use in cross-cultural comparative epidemiological tool to measure health activity and participation restrictions. The 12-items assess five activity limitation domains (communication, physical mobility, self-care, interpersonal interaction, life activities and social participation). Each domain is covered by two questions, with scores ranging from 0 [no difficulty] to 4 (extreme difficulty or cannot do) and yielding a total score between 0 and 48. This assessment took approximately 5 minutes.

Suicide intent was measured using the Pierce Suicide Intent Scale (PSIS), which has three components of medical risk, circumstance, and self-report score. Total score of <3 is considered as low intent, 4-10 considered as moderate and >10 as high intent.¹⁴

Additional clinical information relating to the method of SH was obtained from clinical notes.

Participants received a Mini International Neuropsychiatric Interview (MINI) structured diagnostic assessment for mental disorders by one of the two senior psychiatrists.^{16,17} All participants were examined as inpatients within 7 days of an act of SH.

Statistical analyses

The data was analysed using in spss version 21.0.¹⁸ the descriptive analyses were completed by measuring proportions, mean, median and standard deviations. The inferential statistics was undertaken using chi-square test, pearson and spearman correlations, one-way ANOVA, independent t-test and multiple linear regressions.

RESULTS

A total of 453, (273 men and 180 women) were recruited with a mean age of 30.3 years (10.5) and 26.3 years (8.6) respectively. The socio-demographic characteristics of the participants are provided in Table 1. There are some key areas to note particularly when comparing men and women; there was a significantly higher proportion of men aged >40 years, there were more single men, and the use

of alcohol and smoking was also higher for male participants. Female participants had higher educational achievements. Psychiatric diagnoses as determined by MINI assessment were much higher in men compared to women (22% in men vs 13% in women). However, there were no differences between the groups in proportions of diabetes mellitus, hypertension, Cerebrovascular Accident (CVA), Coronary Heart Disease (CHD) and previous depression (Table 1). Both men and women were similar in Standard of Living Index though men had a slighter higher per monthly income (6000, 4000-15000 INR) compared to women (5750, 2000-28000 INR).

The most commonly reported physical impairment among SH survivors was arthritis 4.4%, n=20, however, other ailments included; gastrointestinal 3.3% n=15, sensory impairment 1.5% n=7, and difficulty with mobilisation 1.5% n=7. A number of participants identified (10% n=45) some degree of disability resulting in functional impairment. Most notably, almost 38% n=172, reported experiencing severe to unbearable physical pain in the week proceeding SH. The severity of suicidal intent between men and women was similar, while health impairment and disability were significantly higher among women, 16.1% of women vs 8.4% for men for health impairment and females (15% for women vs 7.3% of men (p=0.009, 0.05 for both). Overall disability was 10.4% (n=47/453).

Table 1: Demographic Distribution of study subjects with gender differences.

Characteristics	Sex				P value	
	Male		Female			
	N	%	N	%		
Age (years)	<20	40	14.7	51	28.3	<0.0001
	21-40	191	70.0	118	65.6	
	>41	42	15.4	11	6.1	
Marital status	Single	117	42.9	48	26.7	<0.0001
	Married	155	56.8	124	68.9	
Education modified	Graduate and above	13	4.8	22	12.2	0.024
	Intermediate	43	15.8	29	16.1	
	High school and below	150	54.9	95	52.8	
	Illiterate	67	24.5	34	18.9	
SLI	Low	26	9.6	9	5.0	0.1
	Medium	133	48.9	85	47.2	
	High	113	41.5	86	47.8	
Locality	Urban	48	17.6	45	25.0	0.06
	Rural	225	82.4	135	75.0	
Family type	Nuclear	233	85.3	146	81.1	0.5
	Joint	39	14.3	33	18.3	
	Living Alone	1	0.4	1	0.6	
Alcohol use pattern	No alcohol use	162	59.3	177	98.3	<0.0001
	Mild use	92	33.7	3	1.7	
	Heavy use	19	7.0	0	0	
	Bi polar	2	0.7	1	6	
	Psychosis	0	0	0	0	
	ADS	13	4.8	0	0	
Smoke everyday	GAD	2	0.7	0	0	

Continued.

Characteristics		Sex				P value
		Male		Female		
		N	%	N	%	
	No	213	78.0	157	87.2	
	Yes	147	53.8	0	0	
Mental disorder	Depression	43	15.8	22	12.2	0.017
Co-morbid conditions	DM	4	1.5	0	0	0.1
	Hypertension	12	4.4	9	5.0	0.8
	CVA	2	0.7	3	1.7	0.4
	CHD	5	1.8	3	1.7	0.9
	Past depression treatment	97	35.5	65	36.1	0.9

*-Median, \$-Mean

Table 2: Correlation of health impairment, disability and suicidal intent.

Variables	Health impairment		Significant HI due to Arthritis		Significant HI due to Visual problem	
	No	Yes	No	Yes	No	Yes
Disability WHO DAS*	0(0-0)	0(0-3.13)	0(0-0)	0(0-6.25)	0(0-0)	0(0-8.33)
P Value	<0.0001		<0.0001		<0.0001	
PSIS score\$	9.87±3.4	10.44±3.7	9.73±3.3	12.31±3.3	9.91±3.4	11.4±3.7
P-value	0.3		<0.0001		0.2	

Table 3: Relationship between disability and health impairment.

Variables		Disability			
		No disability		Disability	
		N	Row (%)	N	Row (%)
Significant health impairment due to arthritis	No	396	91.5	37	8.5
	Yes	10	50.0	10	50.0
Significant health impairment due to VI	No	402	90.1	44	9.9
	Yes	4	57.1	3	42.9
HI	No HI	374	93.3	27	6.7
	HI	32	61.5	20	38.5

All p<0.0001

Table 4: Association of PSIS with socio demographic variables.

Characteristics		PSIS score		P value
		MEAN	SD	
Age-category (Years)	<20	8.85	3.21	<0.0001
	21-40	10.04	3.36	
	>41	11.21	3.46	
Sex	Male	10.15	3.14	0.1
	Female	9.61	3.74	
Marital status	Single	9.57	3.37	0.2
	Married	10.16	3.33	
	Others	9.44	5.57	
Education modified	Graduate and above	9.91	3.51	0.02
	Intermediate	10.94	3.33	
	High school and below	9.55	3.27	
	Illiterate	10.16	3.60	
SLI	Low	9.63	3.55	0.7
	Medium	9.86	3.33	

Continued.

Characteristics	PSIS score		P value
	MEAN	SD	
	High	10.07	3.47
Locality	Urban	10.08	3.68
	Rural	9.90	3.33
Family type	Nuclear	9.83	3.30
	Extended/joint	10.53	3.86
	Living alone	8.00	2.83
Alcohol use pattern	No alcohol use	9.72	3.50
	Mild use	10.26	2.94
	Heavy use	12.11	2.88
Smoke every day	No	9.64	3.47
	Yes	10.53	3.19
History of hypertension	Normal	9.86	3.39
	HTN	11.48	3.22
CHD	Normal	9.93	3.38
	Heart disease	9.88	4.64
CVA	No CVA	9.92	3.34
	CVA	11.20	7.69
DM	No DM	9.94	3.39
	DM	8.75	4.50
Past depression treatment	No treatment in past	8.93	3.17
	Past treatment of mental illness	11.74	3.04
Mental illness	Other mental illness	9.59	3.23
	Depression	12.00	3.66
Significant HI due to arthritis	No	9.73	3.33
	Yes	12.31	3.31
Significant HI due to visual problem	No	9.91	3.39
	Yes	11.43	3.69
Health impairment	No	9.87	3.35
	Yes	10.44	3.72

One-way ANOVA, independent t-test.

Table 5: Linear regression model for the suicidal intent among subjects with SH.

Model	Unstandardized coefficients		Standardized coefficients	t	P value
	B	SE			
Conatants	6.281	2.713	Beta	2.315	0.022
Age (year)	0.088	0.031	0.276	2.817	0.006
Sex	2.442	1.790	0.104	1.364	0.175
Marital status	-0.886	0.648	-0.125	-1.367	0.174
Occupation	0.436	0.164	0.205	2.657	0.009
Education	0.404	0.202	0.193	-2.002	0.047
Past depression treatment	2.039	0.544	0.309	3.745	0.000
Locality	-0.165	0.697	-0.019	-0.236	0.814
Mental illness	0.294	0.662	0.034	0.445	0.657
SLI	-0.061	0.043	-0.125	-1.428	0.155
Heavy drinker	1.262	0.754	0.128	1.672	0.097
Disability	-0.115	0.900	-0.010	-0.128	0.898
Income	-3.42	0.000	-0.003	-0.046	0.963

Health impairment was significantly associated with suicide intent particularly that resulting from arthritis, visual problems, cough and hypertension (Table 2). As expected, WHO DAS II and Pierce suicidal intent scores were significantly higher among those with health impairment(s), particularly in those where the impairment was due to arthritis or visual problems (Table 2).

Disability was directly associated with overall global health impairment and more specifically from impaired vision and arthritis (Table 3).

The suicidal intent was significantly higher among those with depression when compared to those with 'other' mental illness. Suicidal intent was also higher among those with depression when compared to 'other' mental illness. Disability rate among participants who were also diagnosed with depression was 24.6%, which was significantly ($p < 0.0001$) higher in comparison to other mental illness (7.99%) among SH survivors. The suicidal intent was significantly higher (12 ± 3.66) in those with depression when compared to other mental disorders (9.59 ± 3.93).

In univariate analysis, there was a significantly higher suicidal intent with increasing age, higher alcohol use and smoking cigarettes. Education was associated with suicidal intent, but on post hoc test, intermediate had higher suicidal intent than high school and below education. SH survivors with known hypertension, a previous history of, or current depression, and arthritis had much higher suicidal intent compared to their counterparts (Table 4). Though the Standard of Living Index was not associated with suicidal intent, there was a weak and positive Correlation between disability and severity of suicidal intent ($r = 0.14$, $p < 0.001$).

The linear regression model for PSIS score was completed, considering income, mental illness, disability, occupation, heavy drinking, education, sex, locality, marital status, past depression, SLI, age in years, as predictors, it was found that model was statistically significant ($p < 0.0001$ and R^2 was 0.245). Hence, only 24.5% of variation was explained by the variables in the model. Health impairment was removed from model, as it had multicollinearity and low tolerance. Past history of depression treatment, was the most influencing variable (based on beta coefficient), which influenced positively and age, education and occupation were also positively influencing the PSIS score (Table 5).

DISCUSSION

To our knowledge this is a first study to explore complex relationship between health impairment, disability and suicidal intent among SH survivors in a LMIC setting. Depression leads to higher suicidal intent compared to other mental disorders. Suicidal intent is also influenced by past depression. Disability leads to higher suicidal intent, which underlies the importance of the monitoring of disabled individuals.

Our aim was to examine the associations of health impairment and disability with severity of suicidal intent among survivors of an act of SH, and not compare differences between the groups with and without intent. We have treated the suicidal intent scores as a continuous variable. There were no participants with a score of 0 on suicidal intent score (i.e. no suicidal intent), though there were some ($n=24$) participants whose PSIS scores were between 1 and 3, therefore, all participants in this study had suicidal intent, all be it to differing degrees. Consequently, it was not possible to compare the differences in outcomes between the groups based on 'no intent' and 'having suicidal intent'.

Strengths and limitations

The study had several strengths including; participants had assessments that were validated and culturally adapted to the population setting and undertook a diagnostic evaluation for mental disorders by a psychiatrist. This study comprised of a clinical sample of the SH survivors who were referred to the department of psychiatry in a specialist care hospital for an assessment prior to discharge. Due to the nature of the sample and the case study design the findings might not be generalisable beyond similar study settings, or be truly representative of south Indian population. This study is a cross sectional study of SH survivors and no comparisons has been made with individuals who committed suicide, or controls without a history of SH. Importantly, some participants may have underreported previous SH and alcohol use or abuse. Retrospective reporting of health impairments, activity limitation and behaviours preceding an act of SH will be subject to recall bias. Participants were not assessed for the presence of personality disorders or traits. The study is limited by a relatively smaller size and by design to confirm any causal nature of association of the exposures (like disability, impairment) with an act of SH.

Comparison with existing literature

An important observation in this study was that the rates of mental disorders were higher among men than women among SH survivors. This is paradoxical to an observation by a previous study, Krishna et al in a similar population where women had much higher rates of mental disorders including depression when compared to men.¹⁹ There were no differences in rates of non-communicable diseases between men and women in this study. Despite this, women had significantly higher levels of health impairment and disability when compared to men, even after adjusting for age. This may be due to higher levels of somatisation among women, a phenomenon that is observed in transitioning societies like India. However, similar findings were observed in study conducted in Mysore among slightly older community dwelling men and women (Kumar et al).²⁰ Despite having higher rates of health impairment and disability there were no significant differences in the severity of suicidal intent between the groups.

Arthritis, sensory problems and severe chronic pain were major causes of functional impairment and resulting disability in this cohort, and these were also associated with higher suicidal intent. Though causal inference cannot be inferred due to a cross sectional nature of the study design. Cho et al had identified the relationship of visual impairment leading to poor mental health in general.⁴ Stenager et al noted higher incidences of suicide among patients of chronic pain; indicating chronic illness, higher risk of self-harm and suicide.⁶ Giannini et al reviewed suicidality among patients with a disability as a result of chronic central nervous system illness and Qin et al, studied the national suicide registry and found that unemployment, disability, family history of suicide/mental illness, and being single are significant risk factors of suicide.^{8,21} Furthermore, subtle differences in the gender, regarding these risks were reported. Lee et al studied the relationship of adolescent suicidal probability with depression, anxiety and attitudes towards parents, suggesting that depression makes them at higher probability of suicide and attitudes towards parents mediates it, Stressing the role of both relationships and depression in suicidal intent/probability.²²

Implications for Research, policy and/or practice

The findings from this study are comparable to reports from several other studies where the relationship between disability, health impairment, depression and suicide from higher income settings have been explored: Cho et al, Stenager et al, Giannini et al, Qin et al and Lee et al, highlight the importance of routine detection of depression, health impairment and disability levels in those with chronic health conditions.^{4,8,16,21,22} However, the extents to which such services can be developed in already resource poor settings including India are perhaps limited. Alternative models of mental health service provision for example; task shifting into delivery of services by trained non-specialists and the introduction of digital/computerised mental health assessments could be a way forward.

Acknowledging that disability or other health impairment may not be the major contributing factors for suicide. Yet this study has demonstrated for those with a disability and health impairment may increase the risk of suicide. Consequently, these factors are of increasing importance in clinical practice and hence careful monitoring for depression and suicidality are advocated. Given the cross-sectional nature of this study, causality cannot be inferred from the observations made and caution should be exerted in interpreting the findings from this study as either protective or risk factors. A longitudinal follow up study of a much larger cohort of SH survivors, utilising similar methodology, is planned in order to examine the causal nature of these associations.²³ exploration of a cross cultural mixed method study may further illuminate this phenomenon ameliorating the limitations of the single method, case study design.

CONCLUSION

Despite these limitations this study provides indicators of areas that need to be examined in future research using larger clinical and community-based samples. There is an urgent need for additional and improved information regarding general health impairment, disability (including severe pain) and other behaviours that can help predict SH in a number of countries including India. This information is required at both individual and population levels. In particular, studies must address culture-specific risk factors associated with self-harm and suicide in these countries.

ACKNOWLEDGEMENTS

We acknowledge Tropical Health Education Trust (THET), UK, and DFID UK for an award of grant that supported the initial data collection for this study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: This study was approved the Institute Ethics committee CSI Holds worth Memorial Hospital.

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Cite this article as: Majgi SM, Jones S, Taylor L, Somashekar R, Nagaraj S, Bharath DU, et al. Physical health impairment, disability and suicidal intent among self-harm survivors in South India. *Int J Community Med Public Health* 2021;8:2370-7.