ORIGINAL ARTICLE

Non-suicidal self-injury among children with hearing loss and intellectual disability

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Abstract

Objective: To find the prevalence and to identify the predictors of non-suicidal self-injury among school-going children.

Methods: This cross-sectional study was conducted at the University of Gujrat, Gujrat Pakistan, from September 2015 to October 2016, and comprised children with intellectual disability and hearing loss. Participants were recruited from schools for special children located in Gujranwala, Jhelum and Gujrat. Multistage stratified sampling technique was used.

Results: Of the 325 children, 178(50.4%) had intellectual disability and 175(49.6%) had hearing loss. Findings indicated that the prevalence of self-injurious behaviour was higher in children with intellectual disability 48(27%) compared to their counterparts with hearing loss 3(2%). Neural network, when administered on whole data set, indicated type of disability 0.474(100%), education/training 0.99(20.9%) and access of counselling 0.114(24%) as important predictors of non-suicidal self-injury in both groups. On the other hand, the degree of disability (hearing loss 0.42[100%]; intellectual disability 0.32[100%]), education/ training (hearing loss 0.18[43%]; intellectual disability 0.27[84.5%]) and access of counselling (hearing loss 0.175[41.8%]; intellectual disability 0.256[78.7%]) were important predictors of non-suicidal self-injury among the participants, when neural network was run on the split files on the basis of disability.

Conclusion: The prevalence of non-suicidal self-injury among children with intellectual disability was higher as compared to those with hearing loss.

Keywords: Non-suicidal self-injury, Hearing loss, Intellectual disability, Self-injurious. (JPMA 67: 1506; 2017)

Introduction

Non-suicidal self-injury (NSSI) is an intentional, self-imposed damage of body tissue resulting in instant injury without the intention to commit suicide.[1] This intentional and self-imposed damage is also called self-injurious behaviour. Self-injury is referred to as self-mutilation, self-harm, or self-abuse which occurs when someone purposefully and frequently harms herself/himself in a manner that is impulsive and is not intended to be fatal.[2] The ratio of non-suicidal self damage is increasing among adolescents.[3] It has been reported that self-injury happens in almost as many as 4% of adults in the United States, and the rate is as high as 15% among adolescents.[4] On the other hand, individuals have an amplified danger of showing self-injurious behaviour if they have intellectual disability (ID), autism, profound or severe learning disabilities, sensory impairments (e.g. deaf, blind), poor expressive language skills (i.e. no speech) and poor mobility.[5] ID is defined as an important limitation both in intellectual functioning as well as in adaptive behaviour that covers several daily social and practical skills.[6] This disability initiates before the age of 18 and is categorised on the basis of intelligence quotient (IQ) level as follows: mild (50-75) moderate (35-55) severe (20-40) and profound (below 20-25). Moreover, hearing loss (HL) is a partial or total inability to hear. It may be ranked as mild (25-40 dB), moderate (40-70 dB) severe (70-95 dB) and profound (95 dB or more) on the basis of hearing level measured in decibels.[6]

Literature shows that individuals with disabilities are at risk of developing NSSI. It includes a very diverse set of repetitive behaviours that may cause tissue and sensory damage in a single turn, often having amassed effects that may be devastating or life-threatening in severe cases. Head banging, face slapping, skin picking and scratching, body punching, ingestion of inedible objects, hair pulling, and eye, ear, nose poking are among some of these behaviours.[7] NSSI has also been described as a hazardous behaviour difficulty that not only brings direct damage to the body, but also brings heavy psychological burden and is thought to be the most pressing issue for special children. Studies have indicated relative increased risk of self-injury with age

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when statistically published data about the age-related prevalence of self-injury in people with intellectual disability was analysed.[8] The literature regarding NSSI prevalence reveals that individual characteristics are linked with the occurrence and maintenance of self-injury. It has been reported that individuals with autism spectrum disorders and ID have high vulnerability to developing NSSI.[9-11] Besides self-injury, other types of challenging behaviours and emotional difficulties have also been found among intellectually disabled participants. It has been found that even if NSSI is sometimes observed in normal population, the disorder is most frequently related with ID.[12-14] The results of previous studies showed that hearing loss is a diverse situation with influential effects on social, emotional and cognitive development. High rates of mental health complications are reported in deaf people.[15]

Literature indicates a limited number of studies on the prevalence and factors of self-injurious behaviour in youth; the number of such studies involving children with disabilities is even lower.[10] It has also been shown that self-injurious behaviour is increasing among the youth, and children with disabilities are at a greater risk of developing this maladaptive behaviour.[3,5] The daily routine life challenges of children with disabilities are very unique as compared to their counterparts without disabilities. The current study was planned to determine the prevalence of NSSI among children with HL and ID. Another objective was to identify the types of disability (HL and ID) and their associated factors as predictors of NSSI among the participants.

The present study will enhance awareness about NSSI as well as stakeholders may know the prevalence and factors of self-injurious behaviour according to the types of disability because the children having different disabilities cannot be managed or treated in a same way for showing the same maladaptive behaviour. This study will be helpful in understanding the connection between the self-injurious behaviour and the above-mentioned disabilities and may further provide an opportunity to reduce this psychological as well as other associated problems faced by these children by early identification and plan management according to their problems.

Subjects and Methods

This cross-sectional study was conducted at the University of Gujrat (UOG), Gujrat Pakistan, from September 2015 to October 2016, and comprised children with intellectual disability and hearing loss. The children were aged between 8-18 years and were enrolled from different special education schools located in the districts of Gujranwala, Jhelum and Gujrat. They were selected through multi-stage stratified random sampling technique. First of all, 6 schools for children with HL and 8 schools for ID students were selected randomly. The population of 6 schools with hearing impairment was 601 whereas the population of 8 schools of intellectually disabled was 586. The sample size was calculated with the help of formulae described in literature.[16] A standardised tool named as Inventory of Statements About Self-injury (ISAS)[17] was administered to assess NSSI. ISAS categorises the scores measuring NSSI into three response categories given as: 0 $\geq$ not relevant which means no self-injurious behaviour at all; 1-39 = somewhat relevant which means mild to moderate level of self-injurious behaviour, and 40-78 = very relevant which means high level of self-injurious behaviour.

Neural network was implied to compare NSSI behaviour among the two groups based on the type of their disability as well as to find the type of disability itself and other associated factors as predictors of NSSI. Neural network has been found to be more powerful model than multiple linear regression.[18]

In the first step, input layer with 8 units, the type of disability as factor whereas levels of disability, counselling facility, gender and age were entered as covariates. Severity level of NSSI having 3 units was output layer. Almost all of the variables were contributing to NSSI.

For training, the sum of squared error was equal to 172.23 (a sample size at 240 with 70% sample size) and in testing sum of squared error was 80.09 with 30% sample. The relative error of training set was 32.1% whereas relative error in testing was 30.1%.

In the end, we appeared to have a reasonable neural network model based on the short and simple analysis of importance of independent variables.

Before data collection, ISAS was translated into Urdu using lexicon equivalence method. As ISAS was to be filled by teachers, only those teachers who had at least 1 year of teaching experience with these children were included.

The research was approved by the institutional review board. Permission was obtained from the author of ISAS to use his tool and to translate it. Informed consent was

also obtained from the heads of the schools, and teachers as well as from the parents of the participants.

Results

Of the 325 children, 178(50.4%) had intellectual disability and 175(49.6%) had hearing loss.

The results of severity of NSSI revealed higher prevalence of self-injurious behaviour in children with ID with scores of 11(6%) falling in the category of 'not relevant', 119(67%) in 'somewhat relevant' and 48(27%) in 'very relevant'. In contrast, low prevalence of self-injurious behaviour was reported in children with HL with scores of: 'not relevant' 122(70%), 'somewhat relevant' 50(29%), and very relevant 3(2%). Further, the percentages of NSSI was higher in the children having severe 123(35%) and profound levels 113(32%) compared to the participants with mild 18(5%) and moderate levels 99(28%) of disability. Similarly, the participants with HL having severe 4(2%) and profound 9(5%) levels of disability showed higher levels of NSSI compared to children with mild (0%) and moderate levels 2(1%). The results also showed higher prevalence of NSSI among boys (HL= 124[71%] and ID= 123[69%]) compared to girls (HL=51[29%]; ID= 55[31%]). The participants with higher level of training and education showed lower levels of NSSI (HL=16[09%]; ID=21[12%]) compared to the children at lower level (HL=107[61%]; DI=121[68%]). Further, the participants who had access to counselling services showed lower (HL=38[22%]; ID= 44[25%]) levels of NSSI compared to the children who did not have the counselling facilities (HL=136[78%]; ID=133[75%]). The severity level of NSSI seemed to increase with the age of children with IDs 78(44%) and decrease with the age of children with HL 9(05%) (Table-1).

When the goodness of fit model was applied, relative error fell in the range of 10% from 32.1% to 30.1% for total data set, which was also true for the data sets of HL and ID (Table-2).

Table-2: Model Summary.

Data Sets	Relative Error	
	Training	Testing
HL and ID	32.1	30.1
Hearing Loss	30.3%	26.8%
Intellectual Disability	33.6%	28.6%

ID: Intellectual disability
HL: Hearing loss.

Table-1: Demographic characteristics and NSSI severity level in percentages of the participants with hearing loss (HL, n=175) and intellectual disability (ID, n=178).

	Demographics in %ages		NSSI Severity Level					
			Not Relevant %		Somewhat Relevant%		Very relevant%	
	HL	ID	HL	ID	HL	ID	HL	ID
			70	06	28	67	02	27
Degree of Disability								
Mild	4	5	70	15	30	10	0	5
Moderate	34	24	66	17	33	12	1	28
Severe	41	41	74	21	24	38	2	35
profound	21	30	78	47	17	40	5	32
Gender								
Boys	58	55	38	40	71	70	66	69
Girls	42	45	62	60	29	30	34	31
Education and training								
Level 1	60	79	9	25	72	52	61	68
Level 2	28	19	26	45	18	37	30	20
Level 3 and above	12	2	65	30	10	11	9	12
Access of counselling								
No	57	59	24	42	61	59	78	75
Yes	43	41	76	58	39	41	22	25
Age in years								
11-Aug	31	34	14	37	60	4	79	27
15-Dec	35	41	40	25	29	39	16	29
16-19	34	25	46	38	11	58	5	44

NSSI: Non-suicidal self-injury
ID: Intellectual disability
HL: Hearing loss.

Table-3: Predictive importance of Independent factors.

Sr#	Independent Factors	Results when Neural Network Run on both (HL and DI) files		Results when Neural Network Run on the data of HL only		Results when Neural Network Run on the data of DI only	
		Importance	Normalised importance	Importance	Normalised importance	Importance	Normalised importance
1	Type of Disability	0.474	100	_	_	_	_
2	Levels of Disability	0.93	19.6	0.420	100	0.325	100
3	Counselling Access	0.114	24	0.175	41.8	0.256	78.7
4	Grade	0.99	20.9	0.180	43	0.274	84.5
5	Age	0.50	10.6	0.143	34.2	0.031	9.6
6	Gender	0.92	19.5	0.081	19.3	0.114	35.1

ID: Intellectual disability
HL: Hearing loss.

When neural network model was run on the total data set, the most important predictor of NSSI was type of disability 0.474(100%). However, counselling access 0.114(24%) and the level of disability 0.093(19.6%) were the second- and third-most important predictors, respectively.

For the participants with hearing loss the most important predictor was the level of disability 0.325(100%), whereas education and training level 0.27(85%) and the access to counselling services 0.25(78.7%) were second- and third-most important predictors, respectively. Similarly, the level of disability appeared to be the most important predictor of NSSI among the participants with ID 0.420(100%). On the other hand, training and education 0.180(43%) and access to counselling 0.175(41.8%) were the second- and third-most important predictors, respectively. However, the results indicated that age and gender were playing minimum roles in developing NSSI among the participants with disabilities (Table-3).

Discussion

The findings of the current study revealed high prevalence of self-injurious behaviour in intellectually disabled children. Percentages of scores obtained on the ISAS revealed higher prevalence of NSSI among participants with intellectual disability as compared to their counterparts with hearing loss. These results are consistent with the previous study which indicated high prevalence of self-injurious behaviour in intellectually disabled children.[9] It was revealed that though NSSI is sometimes observed in normal population, the disorder is most frequently related with intellectual disability.[10,19,20] The current findings confirmed low prevalence of self-injury in participants with hearing loss as compared to the children with other intellectual disability.

The results of present study also indicated that NSSI is more prevalent in the participants having severe and profound levels of disabilities as compared to the children with mild and moderate levels. Further level of self-injury is higher among the children who belong to lower education and training levels. The children with hearing loss studies in grades like children without hearing loss, but the children with intellectual disabilities are divided in training level 1 and 2 and above according to their intellectual capabilities. At training level 1 the children are taught self-help skills. Therefore, the results of present study indicate that NSSI prevails at lower level among the children as compared to the participants who are at higher levels of education and training. It also found high prevalence of NSSI among the boys of both groups.[21] However, it seems that the severity level of NSSI tends to increase with the age of children with intellectual disabilities. A plausible reason is their lack of awareness, knowledge and adjustment to many physical and hormonal changes between the ages of 12 to 18 years. All of the above-mentioned findings are further supported by the results of neural network.

Neural network, when administered on the total data obtained from both of the samples, showed type of disability as the most important predictor of NSSI which further supported the results that self-harm behaviour is prevailing among the participants with intellectual disabilities as compared to the participants with hearing loss. Disability itself is undoubtedly the main cause of restricted cognitive and social functioning of the participants and puts them at the risk of maladjustment. This leads towards the use of negative coping strategies by them. However, we cannot ignore the importance of associated factors such as education and training as well as access to counselling. Previous studies concluded that education, training programme, interventions and

counselling reduce the self-harm behaviour in children with disabilities.[13,22-25]

In addition, the degree of disability predicted the self-injurious behaviour in children with disabilities when neural network run on the split file on the basis of disability. Here again, the education and training as well as access to counselling service have been the second- and third-most important factors to predict NSSI among the participants. The results of neural network on the separate data files of participants with hearing loss and intellectual disabilities showed the levels of disability as the most important predictor of self-injurious behaviour among the participants. The literature showed that severity of disability is associated with self-injurious behaviour among intellectually disabled children.[12] It is obvious that the cognitive, social and communication skills become poor with the severity of disability. These poor skills lead towards poor interpersonal relationships of the individuals with disabilities in their homes, schools and at other social places because they cannot express their needs and emotions properly, and as a result they cannot be understood by others. This lack of understanding further leads towards improper fulfilment of their unique needs which triggers frustration in the individuals with disabilities. This frustration may be minimised with the help of education and training programme which further reduces NSSI.[22,23,25] Positive family experiences, strong connectedness to school and good peer relationships can protect young people who may otherwise be at risk of suicide. In addition, the emotional and cognitive skills possessed by young people themselves can help them to manage adversity more effectively, without engaging in self-harming or suicidal behaviour. Problem solving skills such as self-control, self-efficacy and positive future thinking can be protective.[24]

Education and training as well as access to counselling services are also playing an important role in predicting NSSI among participants because these programmes improve the awareness, knowledge and adaptive social skills of the participants. Moreover, these programmes improve coping strategies among the individuals.

The current study had a few limitations as well. For instance, it presented preliminary information on NSSI among the children with two types of disability residing in 3 cities only. The sample could not be calculated according to all study variables. Further in-depth research on a larger scale focusing and exploring the factors associated to NSSI is needed.

Conclusion

The prevalence of NSSI among children with intellectual disability was higher as compared to those with hearing loss. The results of neural network support these findings. It is revealed that disability itself and the associated factors like the degree of the disability, access to counselling services and education and training are the most important predictors of self-injury among the participants. In order to prevent, reduce and manage NSSI among the children with disabilities, awareness and training programmes should be introduced in educational institutes for children, parents and teachers. Moreover, the children with disabilities must have access to counselling services, particularly in their adolescence which is the time period that is characterised by physical and hormonal changes.

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