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ORIGINAL ARTICLE

Deliberate Self-Harm Among Patients Attending Tanta University Hospitals: a Descriptive Cross-Sectional Comparative Case–Control Study

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Background Deliberate self-harm (DSH) is a nonsuicidal self-injury defined as the conscious, self-inflicted, body tissue destruction without the intention of committing suicide include cutting, burning, biting, scratching or rubbing the skin excessively, self-hitting, head-banging or hitting fists against objects, ingesting an object, and jumping from a height with the intention of causing self-harm. The work aimed to evaluate the DSH prevalence and psychiatric comorbidities among patients with DSH and to find the relation between DSH and other factors such as sociodemographic and psychosocial.

Patients and Methods This descriptive cross-sectional comparative case–control research was conducted on 150 patients who are able to read and write and be cooperative for the research methods. Participants were divided in to two groups: group A included 100 patients with DSH behavior for further assessment, and group B included 50 patients as a control group with no history of self-harm behavior. All participants underwent a clinical interview, which was structured for Diagnostic and Statistical Manual of Mental Disorders, 4th edition disorders (SCID I) axis I disorders (major mental disorders), structured clinical interview for Diagnostic and Statistical Manual of Mental Disorders, 4th edition disorders (SCID II) axis II disorders (personality disorders), psychometric assessment, and laboratory investigation.

Results Female sex and low socioeconomic level were significantly associated with high self-punishment questionnaire score (P <0.05). Regarding self-punishment questionnaire score, there was a significant negative correlation with age of study patients (P= 0.01) and significant positive correlations with levels of serum b-endorphins (P <0.001).

Conclusions There was obvious relation between personality disorders in the study sample and DSH behavior.

Keywords Deliberate self-harm, Diagnostic and Statistical Manual of Mental Disorders, Nonsuicidal self-injury.

INTRODUCTION

In recent years, deliberate self-harm (DSH) has led to intensified research, clinical, and taxonomic attention, leading to the inclusion of 'nonsuicidal self-injury' (NSSI) in the new Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) (APA, 2013) in the category of 'Conditions for Further Study.' The increasing pace in the scientific debate on NSSI emphasizes its significant clinical value, its reported correlation with a variety of psychiatric disorders, and the need to further characterize it, as it is considered an inadequately understood phenomenon (Cucchi *et al.,* 2016).

DSH is a NSSI (but with the intention of relieving tension or communicating distress), defined as the

conscious, self-inflicted, body tissue destruction without the intention of committing suicide, including cutting, burning, biting, scratching or rubbing the skin excessively, self-hitting, head-banging or hitting fists against objects, ingesting an object, and jumping from a height with the intention of causing self-harm. Breaking bones, wound healing interference, and trichotillomania (hair pulling) are also included (Laporte *et al.,* 2017).

There is substantial evidence linking self-harm to various clinical disorders such as substance use disorders, eating disorders, borderline personality disorder (BPD), posttraumatic stress disorder, major depressive disorder, and anxiety disorders (Moller *et al.,* 2013). It is also a frequent and bothersome symptom in Gilles de la Tourette syndrome mainly linked to tic severity. Lifetime self-harm is mainly related to attention-deficit hyperactive disorder and obsessive compulsive disorder (Szejko *et al.,* 2019). Lesbian, gay, and bisexual individuals tend to be more susceptible to mental disorders than heterosexuals (King *et al.,* 2003). In addition, a survey of individuals with psychotic disorders revealed that almost half had experienced a minimum of one DSH episode at some point in their lives (Morgan *et al.,* 2012).

Completed suicide has more severe consequences than suicide attempts or intentional self-injury. First, because DSH survivors are more numerous than people who committed suicide and may be examined, allowing a more comprehensive research, and second, the diagnosis of patients who committed suicide before contacting mental health services is often unclear, with some patients diagnosed after surviving a fatal suicide attempt with psychosis for the first time (Challis *et al.,* 2013).

The work aimed to evaluate DSH prevalence among patients attending Tanta University Hospitals, assess psychiatric comorbidities among patients with DSH, and find the relation between DSH and other factors such as sociodemographic and psychosocial.

PATIENTS AND METHODS

This descriptive cross-sectional comparative case–control study was conducted on 150 participants aged between 18 and 60 years, both sexes, able to read and write, and be cooperative for the research methods.

An informed written consent was acquired from the patient. The research was done after approval from the Ethical Committee of Tanta University Hospitals.

Exclusion criteria were patients with intellectual disability, current psychotropic medications, epilepsy or any neurological illness, history of traumatic brain injury, and chronic medical illness that may result in self-harm.

Patients were divided into two groups: group A included 100 patients with DSH behavior for further assessment and group B included 50 patients as a control group that had no history of self-harm behavior and were matched for age, sex, education, marital status, and occupation and they were requited from the hospital's doctors, nurses, and workers.

All patients were subjected to structured clinical interview for DSM IV disorders (SCID I) axis I disorders (major mental disorders) Arabic version validated for use by El Missiry *et al.,* (2003), structured clinical interview for DSM IV disorders (SCID II) axis II disorders (personality disorders) Arabic version validated for use by Hatata *et al.,* (2004), psychometric assessment, and laboratory investigation [(Urine Drug Screening Test) (Wilkening *et al.,* 2016) and Human Beta-endorphin ELISA kit (Carrasco *et al.,* 2007)].

Psychometric assessment

Beck Anxiety Invent ory (BAI; Beck *et al.,* 1988) Arabic version validated for use by Al-Issa *et al.,* (2000).

BAI is a scale used for assessing the anxiety symptoms' degree and includes 21 self-reported items. The items were scored as 0, 1, 2, or 3. The score spectrum is 0–63. A total score of 0–7 is considered minimal spectrum, 8–15 is mild, 16–25 is moderate, and 26–63 is severe. It has been determined that the BAI discriminates effectively between anxious and nonanxious diagnostic groups. The test is intended for self-report by people aged from 17 years and older. The time for scale completion is 5–10min.

Beck Depression Inventory (Beck *et al.,* 1996) Arabic version validated for use by Fawzi *et al.,* (2012).

The Beck Depression Inventory (BDI) is a self-rated scale that consists of 21-items that evaluate depression's key symptoms. A total score of 0–7 is considered minimal spectrum, 8–15 is mild, 16–25 is moderate, and 26–63 is severe. Higher scores indicate greater depressive severity. The test is intended for self-report by people aged from 17 years and older. The time to complete the scale is 5–10min.

Self-punishment questionnaire

It assesses self-punishment function. Depending on its procedural definition of self-injurious behaviors, it has 52 items expressed in its 4 dimensions (affective punishment, physical punishment, self-neglect, and self-deprivation). Each dimension has a score ranging from 0 to 39 for 13 items in a Likert scale ranging from 0 to 3, with 0 not true at all (false), 1-slightly true, 2-mainly true, and 3-very true, giving a total score ranging from 0 to 156, which includes forms and manifestations of self-injury through which self-injurious behavior can be evaluated. It scores 0–38 for

mild, 39–78 for moderate, 79–118 for above moderate, and 119–156 for severe.

The socioeconomic status scale for health research in Egypt (El-Gilany *et al.,* 2012).

This scale was used for evaluation of the family's socioeconomic status. Socioeconomic status was classified as follows: less than 42= very low level of socioeconomic status, 42 less than 63= low level of socioeconomic status, 63 less than 71.4= middle level of socioeconomic status, and 71.4–84= high level of socioeconomic status.

Sample size calculation

Assuming that total number of patients with DSH attending Tanta University Hospitals in 6 months is 198 patients, percentage of studied patients is 84%, at confidence level 95%, total sample size is 100 patients. Calculated by Epi Info 7, version 7.2.0.1.

Statistical Analysis

For statistical analysis, SPSS, version 27, was employed. Quantitative data were described using the mean, SD, and interquartile range. x^2 and Fisher's exact tests were employed to compare qualitative variables presented as frequencies or proportions. Variable distributions and variances were examined using the Shapiro–Wilk test in this research. Quantitative factors were compared using the Student *t* test. The Kruskal–Wallis test can be used to compare variables having more than two categories. To assess the linear relationship between quantitative data, Pearson's and Spearman's correlation coefficients were used to investigate. A *P* value of 0.05 was considered statistically significant. There was a two-tailed *P* value less than 0.05 that was found to be significant.

RESULTS

Marital status, sex, age, occupation, education, and socioeconomic level were insignificantly different between groups A and B. Special habits were considerably higher in group A in comparison with group B (P <0.001) (Table 1).

Table 2 shows DSH characteristics and substance abuse among group A.

Table 3 shows the structured clinical interview for DSM IV disorders (SCID I) axis I disorders (major mental disorders) and (SCID II) axis II disorders (personality disorders) among group A.

Table 1: Socio-demographic characteristics of group A and group B:

Variables		Group (A)	Group (B)	*P* Value
Age (years)		27.5±7.3	25.5±8.3	0.259
Sex	Male	36(36.0%)	18(36.0%)	1
	Female	64(64.0%)	32(64.0%)	
Marital status	Single	53(53.0%)	27(54.0%)	0.961
	Married	9(9.0%)	5(10.0%)	
	Divorced	38(38.0%)	18(36.0%)	
Education	Illiterate	0	0	0.306
	Primary education	15(15.0%)	1(2.0%)	
	Preparatory education	26(26.0%)	14(28.0%)	
	Secondary education	34(34.0%)	20(40.0%)	
	High education	25(25.0%)	14(28.0%)	
Occupation	Not working	30(30.0%)	15(20.0%)	0.163
	Student	35(35.0%)	18(36.0%)	
	Housewife	20(20.0%)	9(18.0%)	
	Working	15(15.0%)	8(22.0%)	
Socio-economic level	The socioeconomic status scale	33(30.0%)	15(30.0%)	0.933
	Very low	48(48.0%)	25(50.0%)	
	Middle	19(19.0%)	10(20.0%)	
	High	0	0	
Special habits	No special habits	60(60%)	50(100%)	<0.001*
	Smoking	18(18%)	0	

Data are presented as mean±SD or *n*(%); *: Significant as *P* value less than 0.05.

Table 2: Deliberate self-harm characteristics and substance abuse among group (A):

Variables		Group (A)
Type of injury	Cutting	64(64.0%)
	Scratching	17(17.0%)
	Pinching	14(14.0%)
	Punching	4(4.0%)
	Burning	1(1.0%)
Site of injury	Upper limbs	42(42.0%)
	Lower limbs	14(14.0%)
	Both upper and lower limbs	23(23.0%)
	Head and neck	12(12.0%)
	Trunk	6(6.0%)
	All body	3(3.0%)
Substance abuse history	No	78(78.0%)
	Cannabis	14(14.0%)
	Heroin	4(14.0%)
	Benzodiazepines	4(4.0%)

Data are presented as frequency (%).

Beck depression inventory, beck anxiety scale, and self-punishment questionnaire comparative total score were significantly different between group A and group B (P= 0.012, P= 0.010, and P <0.0001, respectively). Serum B-endorphin levels were considerably higher in group A in comparison with group B (P <0.001) (Table 4).

Table 3: Structured clinical interview for DSM IV disorders (SCID I) axis I disorders (major mental disorders) and (SCID II) axis II disorders (personality disorders) among group (A):

		Group (A)
SCID I	Negative	26(26.0%)
	SUD	22(22.0%)
	Major Depressive disorder	17(17.0%)
	GAD	8(7.0%)
	Impulse control disorder	5(5.0%)
	Bulimia Nervousa	4(4.0%)
	OCD	3(3.0%%)
	OCD related disorders	8(8.0%)
	PTSD	2(2.0%)
	Schizophrenia	1(1.0%)
	Body dysmorphophobia	1(1.0%)
	Anorexia nervousa	2(2.0%)
	Schizoaffective disorder	1(1.0%)
SCID II	Borderline personality disorder	58(58.0%)
	Antisocial personality disorder	9(9.0%)
	Obsessive compulsive personality Disorder	8(8.0%)
	Histrionic personality disorder	11(11.0%)
	Paranoid personality disorder	3(3.0%)
	Avoidant personality disorder	4(4.0%)
	Schizoid personality disorder	3(3.0%)
	Depressive personality disorder	4(4.0%)

Data are presented as frequency (%); SCID: Structured Clinical Interview Disorders.

Table 4: Beck depression inventory, beck anxiety scale, self-punishment questionnaire comparative total score and serum B-endorphins among group (A) and control group (B):

		Group (A)	Group (B)	*P*- value
Beck Depression Inventory	No depression	51(51.0%)	39(78%)	0.012*
	Mild depression	22(22.0%)	8(16%)	
	Moderate depression	16(16.0%)	3(6%)	
	Severe depression	6(6.0%)	0(0%)	
	Very severe depression	5(5.0%)	0(0%)	
Beck Anxiety Scale	No anxiety	44(44.0%)	36(72%)	0.010*
	Mild anxiety	31(31.0%)	9(18%)	
	Moderate anxiety	13(13.0%)	5(10%)	
	Severe anxiety	8(8.0%)	0(0%)	
	Very severe anxiety	4(4.0%)	0(0%)	
Self-Punishment Questionnaire comparative total score	Mild (0-38)	0(0%)	16(32%)	<0.0001*
	Moderate (39-78)	91(91%)	34(68%)	
	Above moderate (79-118)	9(9%)	0(0%)	
	Severe (119-156)	0(0%)	0(0%)	
Serum B-endorphins		156.65±14.32	115.9±6.30	<0.001*

Data are presented as mean±SD or frequency (%); *: Significant as p value <0.05.

Comparative scores on four dimensions of self-punishment questionnaire (moral abuse, physical abuse, self-deprivation, and self-neglect) were significantly higher in group A in comparison with group B (P <0.001). Female sex and low socioeconomic level were significantly associated with high self-punishment questionnaire score (P= 0.01 and 0.03, respectively) (Table 5).

Regarding self-punishment questionnaire score, there was a significant negative correlation with age of study patients (P= 0.01) and significant positive correlations with levels of serum b-endorphins (P <0.001) (Figure 1).

Table 5: Comparative scores on four dimensions of self-punishment questionnaire and association between it and socio-demographic characteristics between group (A) and group (B):

Items			Group (A)	Group (B)	*P* value
Comparative scores on four dimensions of Self-punishment Questionnaire	Physical abuse		14.12±4.38	9.64±2.98	< 0.001*
	Moral abuse		13.7±2.81	7.8±2.23	< 0.001*
	Self-neglect		15.29±4.69	9.18±2.4	< 0.001*
	Self-deprivation		22.7±5.09	15.36±5.45	<0.001*
Association between Self-Punishment Questionnaire score and Socio-demographic characteristics	Sex	Male	58.4±10.4		0.01*
		Female	74.3±8.2		
	Marital status	Single	63.1±11.2		0.7
		Married	59.9±13.7		
		Divorced	60.1±12.4		
	Education	Illiterate & Primary education	59.5±13.5		0.5
		Preparatory education	61.7±12.4		
		Secondary education	55.4±17.2		
		High education	52.9±10.5		
	Occupation	Not working	61.7±10.6		0.9
		Student	67.1±12.3		
		Housewife	65.4±13.7		
		Working	59.5±15.3		
	Socio-economic level	Very Low	67.6±13.7		0.03*
		Low	60.9±8.9		
		Middle	50.6±7.0		
		High	-		

Data are presented as mean±SD; *: Significant as p value <0.05.

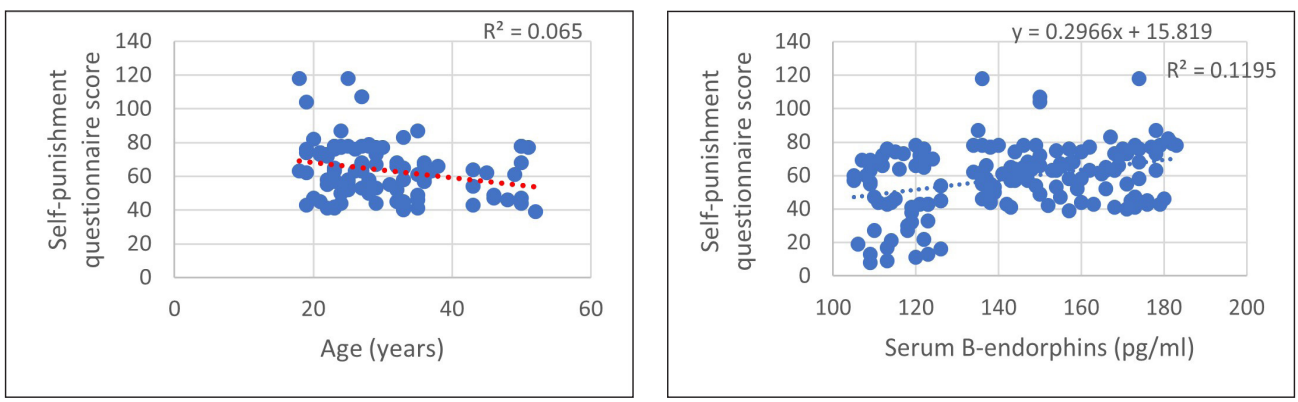

Figure 1: Correlation between (A) self-punishment questionnaire score and age and between (B) self-punishment questionnaire score and serum B-endorphins level (pg/ml) of study subjects.

DISCUSSION

DSH is a complex phenomenon. Research indicates that it is associated with multiple biological, psychological, and social factors (Hawton *et al.,* 2012). NSSI term is the direct, intentional destroying of one's own body tissue without the intention of death.

Regarding self-harm data, we found that the procedures included cutting (64%), scratching (17%), pinching (14%), hitting (4%), hanging and burning (1%), and consequently, the most prevalent tools were sharp object body, and sites included abdomen and trunk (6%), extremities (79%), both upper and lower limbs (23%), and head and neck (12%).

Levine *et al.,* (2020) reported that one of the most prevalent forms of DSH is skin cutting (70–97% of cases) followed by banging or hitting (21–44%) and burning (15–35%).

In other studies, cutting (70–90%), banging or hitting (21–44%), and burning (15–35%) were considered the most prevalent DSH behaviors (Pompili *et al.,* 2015), but several reports have shown that multiple methods are used (50–70%).

In our study, we found that 16% were dependent on cigarettes smoking. Overall, 78% were negative in urine drug screening test and 22% were positive (14% were positive for cannabis, 4% were positive for heroine, and 4% were positive for benzodiazepines).

Giletta *et al.,* (2012) also analyzed data from Italy, USA, and the Netherlands and found smoking cigarettes and marijuana usage were more closely associated with DSH in the USA' sample than the samples from Italy and the Netherlands.

Ali *et al.,* (2020) failed to find any correlation between SUD in an Egyptian sample most likely due to not doing drug screening tests. The study depended only on the history taken from studied sample, which we decided not to depend on.

Regarding the scores of BDI in group A (the case group) and group B (the control group), we found statistically significantly higher scores of depression in group A. Not all who showed symptoms of depression and scored for mild or moderate depression using BDI met the SCID I diagnostic criteria for depression. Only 17 patients were diagnosed for major depressive disorder from group A on SCID I and 0 from group B.

Our study came in agreement with Haw *et al.,* (2002), who conducted a research on patients who arrived to a general hospital after a DSH episode and found that the most prevalent psychiatric comorbidity with DSH was depression and alcohol abuse.

Cerutti *et al.,* (2011) reported that people with a DSH history exhibited negative body views and decreased levels of body protection rather than being anxious or depressed.

Regarding the scores of BAI on group A (the case group) and group B (the control group), we found considerably higher scores of anxiety in group A. Not all who showed symptoms of anxiety and scored for mild or moderate anxiety using BAI met the SCID I diagnostic criteria for anxiety. Only eight patients from group A were diagnosed for generalized anxiety disorder on SCID I and 0 from group B.

Our study agreed with Gratz *et al.,* (2015), who conducted a systematic review and reported that significantly more depression and anxiety were present in patients presented with DSH.

However, some studies failed to find significant relation between anxiety alone and DSH. Ali *et al.,* (2020) conducted a study on an Egyptian sample and failed to find a significant relation between anxiety alone and DSH.

Regarding diagnosis distribution data, we found axis 1 psychiatric disorders, such as major depressive disorder (17%), feeding disorders (6%), bulimia nervosa (4%), anorexia nervosa (2%), obsessive compulsive disorder (3%), schizophrenia one (1%), and none (26%), and axis 2 personality disorders such as BPD (58%).

Ghimire *et al.,* (2014) conducted a cross-sectional research study on patients with DSH in a tertiary referral center in Eastern Nepal. The study found that according to ICD-10 criteria, psychiatric disorders were reported only in 37% of cases and premorbid personality problems in only 20% of cases. Adjustment disorder (13.5%) was the most prevalent psychiatric disorder followed by mood disorder (11%).

In the study by Cerutti *et al.,* (2011) on DSH behavior among young Italian adults, those with a history of DSH reported higher degrees of dissociations and depersonalization than participants without a history of DSH.

We also found a statistically significant relation between self-harm behavior and axis 2 personality disorders, which came in agreement with Ali *et al.,* (2020), who reported that 100% of the study sample had axis 2 personality disorders or traits [BPD (59%) and mixed personality traits (41%)].

However, Venta *et al.,* (2012) reported that 8–10% of those diagnosed with BPD within the adult samples committed suicide. However, only one study to our knowledge has investigated the BPD incremental role in self-harm above and beyond major depressive disorder (Muehlenkamp *et al.,* 2012). It is widely recognized that higher DSH attempts are prominent among patients with BPD.

Our study found a statistically significant relation between total self-punishment questionnaires and psychiatric diagnosis.

In another research of women experiencing BPD, 63% described 'self-punishment' as a reason for self-injury (Sadeh *et al.,* 2014).

However, our study came in disagreement with the study by Ali *et al.,* (2020), which found no significant relation between total scores of self-punishment questionnaire and psychiatric disorders. The study by Ali *et al.,* (2020) found a statistically significant relation on only the four dimensions of the questionnaire but not the total score.

Regarding the comparison between the two groups regarding self-punishment questionnaire, we found a statistically highly significant increase in moral abuse, physical abuse, self-deprivation, self-neglect, and total score in the case group in comparison with the control group (P <0.01, respectively).

Snir *et al.,* (2015) evaluated five groups of explicit reasons for engaging in DSH and found that internally directed incentives were more prevalent than interpersonally directed ones. Adults experiencing BPD, avoidant personality disorder, or no psychopathology were included in a 3-week computerized diary study. The results emphasize different motives for DSH among individuals with BPD and avoidant personality disorder, with some resemblances (primarily in the explicit motives) and some variances (primarily in the inferred motives) between the disorders.

In other studies like Muehlenkamp *et al.,* (2012) that reported patients with a skin-cutting history, potential reasons for self-injury were rated as primary, secondary, or negligible.

We found no statistically significant relation between sociodemographic data and scores of self-punishment scores except for age, sex, and socioeconomic status, which came in agreement with Ali *et al.,* (2020). We also found a negative correlation between Self-Punishment Questionnaire score and age of study patients. The younger ages showed higher scores on the questionnaire, which agreed with Ramdurg *et al.,* (2011), who found that younger ages were involved in self-harm behaviors much more than older adults.

However, our study disagreed with Husky *et al.,* (2013), who conducted a study on data collected from the 2010 Health Barometer, a large telephone survey on a sample representative of the general population. They reported that lower level of education, being divorced or separated, and being inactive or unemployed were strongly correlated with increased odds of reporting self-harm behavior, and being married or living with one's significant other was correlated with strongly lower odds of self-harm behavior.

Data from our study showed that comparative levels of B-endorphins between the two groups were statistically significant, which also resulted in a statistically significant positive correlation, between self-punishment questionnaire score and levels of B-endorphins. This agreed with a review by Zalewska-Kaszubska, (2018) that was based on a primary literature search on Medline/PubMed using the search terms 'beta endorphin, with the descriptors psychiatric disease and self-injury behavior.' The study found that participants who engage in self-injury practice show considerably higher pain tolerance than participants who do not engage in self-injury. This condition was assumed to be correlated with abnormalities in the endogenous opioid system.

Limitations: few individuals seek professional assistance for their self-harming behavior, so the numbers are much lower than the actual numbers. Definitional problems of self-harm, including the suicidal intent issue, constitute significant obstacles to research in this field. Limited data were available from hospital records for psychiatric patients involved in self-harm behavior and previous history of assessed or nonassessed episodes of DSH. Cases that showed positive drug screening test findings altered the results of human beta-endorphins, so they were excluded. A bigger sample size might facilitate generalizing the findings. We attempted to eliminate all potential sources of bias; however, a double-blind approach may have eliminated physician bias. Follow-up research comparing applicants who underwent interventions to those who did not would have strengthened the findings.

CONCLUSION

There was an obvious relation between personality disorders in the study sample and DSH behavior and also between socio-demographics in the study sample and DSH behavior, except for marital state. DSH behavior had a strong relation with self-punishment as a motive for self-injurious behavior, with highest range of scores

in dimension of physical abuse, which is more obvious in patients with self-injury.

RECOMMENDATIONS

People who have DSH behavior should be offered treatment for the physical consequences of self-injury, regardless of their willingness to accept psychosocial assessment or psychiatric treatment.

All people who have self-harm should be offered an assessment of needs, which should be comprehensive and include evaluation of the social, psychological, and motivational factors specific to the act of self-injury, current suicidal intent, as well as a full mental health and social needs assessment.

Clinical and nonclinical staffs who come in contact with people who do self-harm in any setting should be provided with appropriate training for equipping them with the ability to understand and care for people who are self-injured.

Better liaise between ER, surgery departments, and neuropsychiatry department is needed.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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