

THE ANALYSIS OF DROP-OUT IN THE POTENTIAL DIAGNOSTIC SYSTEMS FOR SELF-HARM IN THE ADOLESCENT POPULATION

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Abstract: The paper addresses the potential for the identification of self-harming individuals in the adolescent population through three different systems – the SHI questionnaire (Self-Harm Inventory), the definitions of intentional self-harm from ICD-10 and the diagnostic criteria listed for Non-Suicidal Self-Injury in DSM-5. It is followed by an evaluation of their effectiveness based on the extent of the undetected cases of self-harm. The study was conducted on a sample of 2,210 Slovak adolescents aged from 11 to 19 (mean age = 15.3; st. dev. = 1.67 years). The DSM-5 system proved to be the least effective, with a statistically significant (sig. = 0.000) drop-out of cases. For the purpose of diagnosing self-harm in the adolescent population, we propose a checklist of the forms of self-harm, which would, in addition to direct forms of physical self-harm, also include indirect physical and mental forms.

Keywords: self-harm, diagnostics, prevalence, adolescents.

1 Introduction

One of the problems in the implementation of new nosological classifications is the determination of the diagnostic criteria. It is a relatively complicated process, which must work when applied to the symptoms of the specific disorder and surrounding circumstances as accurately as possible. For instance, it must define a disorder in a way that is distinct from other disorders, whether related or comorbid, and exhaustively set out a unique combination of symptoms, its typical longevity (possibly non-interchangeable), often along with a set of symptoms which cannot be present in the disorder (Balogh, Miller, & Ball 2015). In clinical psychology and psychiatry, the process is even more complicated as many of the symptoms of mental disorders and difficulties are related to the subjective experience of the individual affected and since there are only a few biological tests that are available for use in the diagnosis (Pincus 2014), it is only rarely possible to measure them in an exact manner, as is done in the field of medicine. Yet, there are diagnostic manuals available in psychology and psychiatry that point to the presence of a mental disorder using the registration of symptoms – these mainly include international systems of classification such as the DSM (Diagnostic and Statistical Manual of Mental Disorders) and ICD (International Classification of Diseases).

Experts who have observed the mental health of young children and adolescents over the last few decades have reported an increase in the number of mental problems and difficulties. This includes both the prevalence of problems (see e.g. Comeau, Georgiades, Duncan, Wang, Boyle, & 2014 Ontario Child Health Study Team 2019; Chadda 2018; Jurewicz 2015), as well as the emergence of new forms of mental difficulties that are still not reflected in the diagnostic manuals. One of these forms is self-harm – a maladaptive strategy for coping with mental problems in youth, leading to intentional harm of one's own health. Self-harm as such is not a novel concept in psychology and psychiatry. However, in the past it was associated with certain psychiatric diagnoses and mental disorders – autism (Maddox 2017), mental retardation (van den Bogaard, Nijman, Palmstierna, & Embregts 2018), attempted suicide (Brent 2011), borderline personality disorder (Glenn & Klonsky 2013), sexual abuse (Klonsky, Victor, & Saffer 2014),... and was considered to be a concomitant symptom of these diagnoses. Yet, recent research has suggested that self-harm tends to appear in the psychiatrically intact adolescent population and that it occurs independently of any diagnosis of borderline personality disorder (Glenn & Klonsky 2013) or sexual abuse (Klonsky & Moyer 2008).

This data has clearly proved that self-harm as a diagnosis should be removed from the field of psychiatric conditions and

transferred into the field of clinical psychology or the area of work with the non-clinical adolescent population. This is also confirmed by international studies that sometimes report the prevalence of self-harm among youths at a level of 20 – 70% (Swahn, Ali, Bossarte, Van Dulmen, Crosby, Jones, & Schinka 2012; Plener, Libal, Keller, Fegert, & Muehlenkamp 2009; Dyl 2008; Hallab & Covic 2010), with a proportion of them being included in the non-clinical population (Burešová 2012). In the Slovak population (Démuthová & Démuth 2020), this phenomenon appears to affect approximately 45% of adolescents. A possible reason that the data on the prevalence of self-harm exhibits such a very wide spectrum of values in the various studies (from 1% – Madge et al. 2008; up to 69% – Hallab & Covic 2010) is the lack of a clear definition and diagnostic criteria for self-harming behaviour. Certain diagnostic systems consider self-harm to only be behaviour that exclusively leads to visible physical damage to the bodily tissue (cutting, burning, etc. used in studies e.g. by Rojkova & Mickova 2020), while other systems also include less visible forms (e.g. the intentional consumption of indigestible objects, taking drugs not prescribed by a doctor or intentionally failing to follow a prescribed treatment) or even mental self-harm (e.g. torturing with self-defeating thoughts, setting up in a relationship to be rejected).

Hence, there are several definitions and possible “diagnostic systems” for the evaluation of self-harm – generally, they may be classified into three groups. The first is the narrowest and is represented by the most recent (fifth) revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), published by the APA (American Psychiatric Association). It has proposed diagnostic criteria for “Non-Suicidal Self-Injury” (NSSI) disorder in “Section III – Emerging Measures and Models” and it defines NSSI as: “intentional self-inflicted damage to the surface of their body of a sort likely to induce bleeding, bruising, or pain (e.g. cutting, burning, stabbing, hitting, excessive rubbing), with the expectation that the injury will only lead to minor or moderate physical harm (i.e. there is no suicidal intent)” (DSM-5 2013, 803). The second may be implicitly identified in the diagnostic system ICD-10 (International Statistical Classification of Diseases and Related Health Problems, 10th version). It defines the term “intentional self-harm” as a wide range of behaviours (see categories X60 – X84) and it is a category that falls under “External Causes of Morbidity and Mortality” (ICD-10, 2016). The extent of the individual types of self-harming behaviour in ICD-10 is broader than in DSM-5 and includes hidden/indirect physical self-harm, such as deliberate poisoning, taking drugs not prescribed by a doctor and the like. Finally, there are approaches that view self-harm as any intentional act that results in damage to health of the individual – whether physical or mental. One such approach is the creation of a methodology to measure self-harm – the SHI questionnaire (Self-Harm Inventory – Sansone & Sansone 2010), which is intended to capture various types and forms of this behaviour.

It is clear that the definition of what should (or should not) be deemed self-harm and which diagnostic criteria should be used will have a significant impact on the data obtained with regard to prevalence. Consequently, an individual may be captured under one system and not by another, and as a result, they may not be diagnosed and provided with the necessary intervention and treatment. Previous observations of this issue have revealed, for instance, that of the 835 participants identified as self-harming by the SHI, 41.9% (N=350) exhibit self-harming behaviour which, according to the DSM-5 criteria, is not classified as belonging to NSSI ((Demuthova & Demuth 2019^a). At the same time, it is appropriate to limit the number of observed symptoms to the minimum necessary in order to ensure the efficiency of the diagnostic tools. The principle of Occam's razor in science postulates that the optimal strategy is to work with the smallest number of elements possible in any given situation. On the other

hand, it is necessary to analyse the impact that the narrowing of the diagnostic criteria might have on the identification of real cases of self-harm. If the narrowing of the criteria was practical but led to the drop-out of an overly large number of cases, it would be inappropriate.

Thus, in order to evaluate the advantages and disadvantages of the individual systems, it is desirable to analyse the drop-out, which is an indicator of the number of individuals that do not fall into the criteria set out in the three diagnostic approaches. A simple observation of the prevalence of individual forms of self-harm is not satisfactory in this case. Even though this may identify that, for example, indirect or mental forms of self-harm are just as frequent as direct physical forms, and thus provide valuable data for the correct understanding of the concept, it does not mean that all forms must fulfil the diagnostic criteria. In fact, it is quite possible that certain forms of self-harm (such as the above mentioned indirect or mental forms) are common, but are only rarely present without direct physical forms. And should this be true, the NSSI definition from DSM-5 would be limiting, but quite satisfactory to identify cases for diagnostic purposes.

2 Objective

The objective of the paper is:

- to employ three independent systems for the detection of self-harm (DSM-5 criteria, ICD-10 criteria, SHI-criteria);
- to discover what percentage of the observed cases of self-harm in the study population of adolescents can be captured by these systems;
- to evaluate the differences in the sensitivity of the individual systems and to assess their effectiveness in the diagnosis of self-harm.

3 Method

3.1 Participants and Procedure

The study sample was comprised of 2,210 Slovak adolescents (63.3% of whom were female) between the ages of 11 and 19 (mean age = 15.3; st. dev. = 1.67 years) who were in primary and secondary education. All participants were enrolled in the public-school system and were recruited from classes that were randomly selected from various public schools that represent all the different types of schools. Of the initial number of 2,210 responses, 387 (17.5%) were excluded due to a lack of complete data. Thus 1,823 adolescents were included in the statistical analyses. The data was collected anonymously from the subjects who (or their guardians) had given their informed consent for their participation. The questionnaire was administered in a standard manner by trained administrators.

3.2 Measures and Statistical Analysis

The platform used for the collection of data was a modified SHI questionnaire (The Self-Harm Inventory – Sansone & Sansone 2010). The original SHI is a self-assessment questionnaire that includes 22 questions that assess the existence of individual forms of self-harming behaviour. The items are preceded by the phrase “Have you ever intentionally, deliberately to cause yourself harm...” followed by the different forms of self-harm: “cut yourself, burned yourself, hit yourself, scratched yourself”, etc. (for all the items see Table 1). The items were slightly modified according to studies that observed the prevalence of the most frequent forms of self-harm in the study population (see e.g. Demuth & Demuthova 2019; Demuthova & Demuth 2019B) and the participants were also asked to report how many times they had repeated the behaviour as well as the frequency (0=never, 1=rarely, 2=sometimes, 3=often). The relatively high internal consistency of this method has been confirmed through an analysis (Cronbach’s $\alpha=0.809$) (see e.g. Demuthova & Doktorova 2019). The aim of the questionnaire was to detect the presence and extent of the most common forms of self-harm. It also separated self-harming individuals from the studied group – in order to classify a participant as a member of the group of

self-harming individuals, it was necessary that they admitted to at least one form of self-harming behaviour with a frequency of 2 or 3 (sometimes or often), or to several forms of self-harming behaviour with a frequency of 1 or above.

The DSM-5 system only considers direct physical forms of self-harm and excludes attempted suicide. Hence, according to this criteria, self-harming individuals are those who reported at least one of the direct forms of self-harming behaviour in the SHI questionnaire (for the list, see Table 1). The ICD-10 system, with its broader categorisation, increases the number of observed types of self-harm with items that fall under the indirect forms of self-harm; however, it still does not take mental self-harm into account. All the indirect physical forms of self-harm were included in this system as they meet the criteria of the X84 category (“Intentional self-harm by unspecified means”). The SHI questionnaire represents the broadest diagnostic system, mapping a wide range of forms of self-harm. Within this system, self-harmers are identified as those individuals who meet one basic criterion – an admission to at least one form of self-harming behaviour with a frequency of 2 or 3 (sometimes or often), or an admission to several forms of self-harming behaviour with a frequency of 1 or above.

Tab. 1: Observed forms of self-harm and their classification in the individual systems

Have you ever intentionally, or on purpose, done any of the following:	Diagnostic systems		
	DSM-5	ICD-10	SHI
Forms of self-harm:			
<i>Direct physical self-harm:</i>			
Scratched yourself on purpose	x	x	x
Hit yourself	x	x	x
Cut yourself on purpose	x	x	x
Exercised an injury on purpose	x	x	x
Banged your head on purpose	x	x	x
Prevented wounds from healing	x	x	x
Burned yourself on purpose	x	x	x
Attempted suicide*		x	x
<i>Indirect physical self-harm:</i>			
Abused alcohol to hurt yourself		x	x
Not slept enough to hurt yourself		x	x
Starved yourself to hurt yourself		x	x
Over-exercised to hurt yourself		x	x
Made medical situations worse on purpose		x	x
Overdosed		x	x
Abused prescription medication		x	x
Abused laxatives to hurt yourself		x	x
<i>Mental self-harm:</i>			
Distanced yourself from God as a punishment			x
Set yourself up in a relationship to be rejected			x
Tortured yourself with self-defeating thoughts			x
Engaged in emotionally abusive relationships			x

*Note: Although attempted suicide is a direct and physical form of self-harm, DSM-5 strictly excludes it. For this reason, it was included in the ICD-10 and SHI systems.

Source: authors

The data analysis was conducted using IBM SPSS 22 statistical software. The statistical significance threshold (α) in each data analysis was set to 0.05.

4 Results

The first diagnostic criteria, based on the mapping of self-harm from the modified SHI questionnaire, detected 830 cases. The narrower diagnostic system, based on the ICD criteria, detected 803 cases, and the narrowest system, based on DSM-5, only 701 cases (see Table 2).

Tab. 2: Number of cases of self-harm detected using the three systems under study

Diagnostic system	Number of cases detected		Number of cases not detected	
	N	%	N	%
SHI	830	100	0	0
ICD-10	803	96.7	27	3.3
DSM-5	701	84.5	129	15.5

Source: authors

The total drop-out rate when using the ICD-10 diagnostic criteria (versus the SHI system) is moderate – it represents only 3.3% of cases. This difference is caused by the omission of the mental forms of self-harm; however, a closer analysis (see Table 3) indicated that the majority of cases that would be omitted if the ICD-10 criteria were used were in the following two items: “tortured yourself with self-defeating thoughts” and “engaged in emotionally abusive relationships”.

Tab. 3: Items from the SHI that are not included in the ICD-10 criteria and the corresponding number of participants that were not detected

Item	“dropped-out” cases	
	N	% of whole sample
<i>Mental self-harm:</i>		
Distanced yourself from God as a punishment	3	0.4
Set yourself up in a relationship to be rejected	5	0.6
Tortured yourself with self-defeating thoughts	20	2.4
Engaged in emotionally abusive relationships	19	2.3

Source: authors

An analysis of the drop-out rate coming from the use of the DSM-5 diagnostic system revealed that 129 (15.5%) cases would be left undetected versus the original SHI questionnaire. A statistically significant ($sig. = 0.000$) decrease in the number of cases detected also occurred when the DSM-5 criteria was used as opposed to the ICD-10 (see Table 4).

Tab. 4: Differences in the number of detected cases using the ICD-10 and DSM-5 systems

Cases within DSM-5:	Cases within ICD-10:		
	Detected (N/%)	Not detected (N/%)	Total (N/%)
Detected (N/%)	27/3.3	102/12.3	129/15.5
Not detected (N/%)	0/0.0	701/84.5	701/84.5
Total	27/3.3	803/96.8	830/100.0
Chi-Square test			
Pearson coefficient	Sig.		
151.65	0.000		

Source: authors

It is apparent that the indirect forms of self-harm that are included in the ICD-10, but are absent from DSM-5, are represented to a statistically significant rate in the population of self-harmers. The item analysis (see Table 5) revealed that this is mostly related to the following items: “abused alcohol to hurt yourself” (6.3% of all cases) and “not slept enough to hurt yourself” (4.1% of all cases).

Tab. 5: Items from ICD-10 that are not included in the DSM-5 criteria and the corresponding number of participants that were not detected

Item	“dropped-out” cases	
	N	% of whole sample
Attempted suicide*	2	0.2
<i>Indirect physical self-harm:</i>		
Abused alcohol to hurt yourself	52	6.3
Not slept enough to hurt	34	4.1

yourself		
Starved yourself to hurt yourself	23	2.5
Over-exercised to hurt yourself	31	3.7
Made medical situations worse on purpose	11	1.3
Overdosed	1	0.1
Abused prescription medication	4	0.5
Abused laxatives to hurt yourself	0	0.0

Source: authors

5 Discussion

The basic (modified) SHI questionnaire identified a rate of self-harm among adolescents of 45.5%. This prevalence is comparable to the data reported by Dyl (2008), who reported 47% of adolescents. In comparison to an overview of the prevalence of self-harm in similar studies (4.7% – Madge et al. 2008; 8% – Moran et al. 2012, 9.3% – Tjørmoen, Rossow, Larsson, & Mehlum 2013; 10% – Hawton, Saunders, & O'Connor 2012; 20.3% – Swahn et al. 2012; 25.6% – Plener et al. 2009) it is one of the higher rates of prevalence. This might be caused by more up-to-date data, which might have captured the recent trend in the increase of self-harm among adolescents (Clarke, Allerhand, & Berk 2019), or by the fact that the sample had a slightly higher proportion of female subjects (63.3% of females vs. 36.7% of males). Several studies (see e.g. Laye-Gindhu & Schonert-Reichl 2005; Rodham, Hawton, & Evans 2004, Demuthova & Doktorova 2019) have reported a higher prevalence of self-harm in female participants.

The modified SHI questionnaire covers a wide range of self-harming behaviours including mental forms (not included in ICD-10 and DSM-5) and indirect physical forms (not included in DSM-5). It is one of the more complex questionnaires used for the identification of self-harming behaviour – others (e.g. DSHI (Deliberate Self-Harm Inventory) – Gratz 2001) primarily focus on its physical forms. The disadvantage of the broader design of the SHI is the relatively large (20) number of items, which is inappropriate when setting out diagnostic criteria. Hence, the subsequent analyses examined how many of the cases that were identified by the SHI can still be detected by systems based on narrower criteria, such as ICD-10 and DSM-5 and, possibly, which items are important from the more broadly designed systems.

Using the ICD-10 system caused a drop-out of 27 self-harming adolescents. The ICD-10 system excludes four items in comparison to SHI, with a decrease in the ability to detect cases being negligible in only two of them: “distanced yourself from God as a punishment” and “set yourself up in a relationship to be rejected” (less than 1% of cases). On the other hand, the other two items, “tortured yourself with self-defeating thoughts” and “engaged in emotionally abusive relationships”, were detected in more than 2% of the cases. Overall, using the ICD-10 criteria for the self-harming adolescent population would result in the non-detection of 3.3%. According to international studies, the items “distanced yourself from God as a punishment” and “set yourself up in a relationship to be rejected” are not commonly found forms of self-harm – the reported prevalence is only 2.6% (“set yourself up in a relationship to be rejected”) and 1.4% (“distanced yourself from God as a punishment”) (Müller, Claes, Smits, Brähler, & de Zwaan 2016). Still, there are specific cases that are exceptions – e.g. adult patients with chronic pain (Sansone, Sinclair, & Wiederman 2009). At the same time, the reported prevalence of the items “tortured yourself with self-defeating thoughts” and “engaged in emotionally abusive relationships” is respectively 30% (“tortured yourself with self-defeating thoughts”) and 6% (“engaged in emotionally abusive relationships”) (Müller, Claes, Smits, Brähler, & de Zwaan 2016) and we deem their exclusion from the self-harm checklist (especially in the case of “tortured yourself with self-defeating thoughts”) to be excessively narrowing for the purposes of diagnosis.

The application of the DSM-5 system led to a statistically significant decrease in the number of detected cases (sig. = 0.000), even when compared to the already narrowed ICD-10 system. The decrease was primarily caused by four items: "abused alcohol to hurt yourself", "not slept enough to hurt yourself", "starved yourself to hurt yourself" and "over-exercised to hurt yourself" – all of them have the potential to detect 2 to 6% of cases. It is apparent that indirect forms of physical self-harm represent a crucial element of self-harming behaviour. Without recording them, 129 (15.5%) cases of self-harm in adolescents would "be lost". Considering the fact that two items ("not slept enough to hurt yourself", and "over-exercised to hurt yourself") were added as part of our research (modification of the SHI questionnaire), it is impossible to compare them with other (international) studies. According to our findings (Demuth & Demuthova 2019), their prevalence is as high as 52.5% ("not slept enough to hurt yourself") and 26.1% ("over-exercised to hurt yourself"). Considering their high prevalence, we believe it is very necessary to integrate them into any diagnostic checklist.

6 Conclusion

The application of three independent systems for the detection of the presence of self-harm (the DSM-5 criteria, ICD-10 criteria, SHI criteria) revealed that the most substantial drop-out of cases of self-harming behaviour occurred when using the DSM-5 criteria. The system failed to detect 15.5% of self-harming adolescents, and the analysis identified items which should be preserved for diagnostic purposes. It appears that it is viable to define self-harm in accordance with the ICD-10 criteria, with the possibility of using the most frequent forms of self-harm as identified by the SHI questionnaire. In order to draw more unambiguous conclusions, we suggest the further analyses of a sample that is more balanced in terms of gender representation. At the same time, it would be appropriate to investigate the prevalence of other forms of intentional self-harm that are included in the ICD-10 criteria (e.g. choking, throttling, searing with acid, etc.) and were not examined in our research, and to assess their diagnostic potential. A subsequent factor analysis of the items (of self-harm forms) could also be helpful in terms of the extended analysis of other forms of self-harm.

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Primary Paper Section: A

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