

The Manifestation of Non-Suicidal Self-Injury in Women with Polycystic Ovary Syndrome (PCOS)

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Abstract

Polycystic Ovary Syndrome (PCOS) is an endocrine condition associated with physical (e.g., ache, hair loss) and mental (e.g., depression, anxiety, suicidal-ideation) health complications, which, combined with atypical emotional regulation can result in non-suicidal self-injury (NSSI) and suicidal intent. This cross-sectional investigation assessed whether NSSI type, onset age, duration, and severity differed between women who did ($n = 113$; WPCOS) and did not ($n = 305$; WoPCOS) self-report PCOS, and whether distinct typologies of NSSI were present. Participants completed demographic questions and a measure of NSSI. Comparative analyses indicated that WPCOS women reported a greater propensity to cut and scratch, but not other NSSIs. In women who engaged in NSSI, self-reported PCOS neither impacted onset age, duration, or severity of NSSI. Cluster analysis indicated three typologies of NSSI engagement: '*Scar-deriving*', '*Nil-to-low engagers*', and '*Intensive engagers*'. Implications for healthcare providers working with women with PCOS are discussed; there is a need for the provision of NSSI- and emotion regulation-related education on an international scale.

1. Introduction

Polycystic ovary syndrome (PCOS) is the most common endocrine long-term health condition of women of reproductive age, affecting 10–13% of women, globally (World Health Organization, 2026). PCOS is characterised by menstrual irregularity, hirsutism, acne, obesity, and infertility (Khan et al., 2019), as well as stress, anxiety, depression, and suicidal ideation (Damone et al., 2019; Williams et al., 2015). With the European Society of Human Reproduction and Embryology urging psychological and self-harm screening for women with PCOS (Teede et al., 2023), understanding its underpinning mechanisms is pivotal.

Extant evidence indicates associations between a diagnosis of PCOS and non-suicidal self-injury (NSSI; Williams et al., 2015), suicidal ideation (Maya et al., 2019), and suicide attempts (Hsu et al., 2024; Månsson et al., 2008), with women with PCOS at higher risk for hospitalisation after engaging in NSSI (Hart & Doherty, 2015). Such data, however, does not go as far to predict specific NSSI behaviours, limiting application for clinicians seeking to identify risk factors, and women seeking to understand their experience.

Williams et al. (2022) utilised cross-sectional serial mediation to test the ideation-to-action framework of suicide (Klonsky et al., 2017), positing that both intention and capability must be present to die by suicide. Here, the use of NSSI as either a strategy to reduce extreme emotions (Selby et al., 2008) or as a call for help (Nock & Favazza, 2009) allows one to realise their capacity and attenuate fears associated with dying by suicide (Joiner et al., 2012). Williams et al. (2022) indicated that the relationship between PCOS and suicidal intent was explained through poor emotion regulation facilitating suicidal ideation and NSSI. Notably, there was no significant role of rumination, a maladaptive strategy involving engaging in negative affective thoughts (Johnson & Whisman, 2013).

This manuscript explores differences in the type, age of onset, duration, and severity of NSSI between women who do (WPCOS) and do not (WoPCOS) self-report PCOS. Owing to its explorative nature, we

made no a-priori hypotheses pertaining to behaviours used, or the onset age or duration thereof, but expected WPCOS women to indicate heightened severity (Hart & Doherty, 2015). We also explored clustering patterns of NSSI behaviours in WPCOS women.

2. Methodology

2.1. Participants

This paper re-analysed data ($n = 418$; $M_{\text{age}} = 32.93$ years, $SD = 10.32$, 27% WPCOS) from Williams et al. (2022). Participants were fluent in English, aged 18 years or over, from the UK (ensuring healthcare congruency), and without personality-based conditions (e.g., bipolar disorder, schizophrenia) or conditions requiring hospitalisation within the past year. All were recruited from professional networks and the crowdsourcing platform *Prolific*.

2.2. Materials

Dataset. Williams et al. (2022) collected demographics (age, education, ethnicity), and measures of emotion dysregulation, rumination, self-injurious behaviour, and destructive body tissue-related behaviour without suicidal intent (Ref: 260319SWDFSD). For this analysis, the *Deliberate Self-Harm Inventory* (Gratz, 2001) outlined whether participants had “ever intentionally” engaged in 16 behaviours: cutting, burning with a [i] cigarette or [ii] lighter, carving [i] words or [ii] images into their skin, scratching, biting, rubbing [i] sandpaper or [ii] glass against their skin, spilling [i] acid or [ii] bleach onto their skin, impaling themselves with sharp objects, breaking their bones, banging their heads, punching themselves, or preventing healing. Responses of “No” and “Yes” were coded 0 and 1, respectively. After affirming engagement, participants specified onset age, duration (years), and any resulting hospitalisation.

3. Results

3.1. Analysis

Pearson chi-squares (SPSS v.26) explored variation in NSSI and hospitalisation between WPCOS and WoPCOS women. Mann-Whitney U tests explored group differences for onset and duration, and cluster analysis identified NSSI patterns in WPCOS women via hierarchical (Ward, 1963) and k-means (MacQueen, 1967) procedures.

3.2. NSSI

Across all NSSIs, both WoPCOS and WPCOS groups demonstrated low engagement in NSSI (Table 1), which did not differ between groups for *burning* (cigarette, lighter), *carving* (words, images), *biting*, rubbing *sandpaper* or *glass* (against skin), spilling *acid* or *bleach* (onto skin), *impaling themselves with sharp objects*, *breaking their bones*, *banging their head*, *punching*, or *preventing healing*. However, the WPCOS group reported more *cutting* (46.9% vs. 29.2%), $\chi^2(1, N = 418) = 11.545, p < .001, \phi = .166$, and

scratching (38.1% vs. 22.6%), $\chi^2 (1, N = 418) = 10.008, p = .002, \varphi = .155$, and self-injury through 'other' ways (20% vs. 8.9%), $\chi^2 (1, N = 413) = 9.490, p = .002, \varphi = .152$ (e.g., over-consuming drugs and alcohol, engaging in poor eating habits, being in uncomfortable situations).

Table 1. *Pearson Chi-squares of the proportion of engaging in NSSI across WoPCOS and WPCOS groups*

		WoPCOS	WPCOS	Pearson Chi-Square Statistics
Cutting	✓	29.2% (89)	46.9% (53)	$\chi^2 (1, N = 418) = 11.545, p = .001, \phi = .166^{**}$
	x	70.8% (216)	53.1% (60)	
Burn - Cigarette	✓	4.9% (15)	3.5% (4)	$\chi^2 (1, N = 418) = .361, p = .548, \phi = .029$
	x	95.1% (290)	96.5% (109)	
Burn – Lighter	✓	9.2% (28)	8% (9)	$\chi^2 (1, N = 418) = .151, p = .698, \phi = .019$
	x	90.8% (277)	92% (104)	
Carved – Words	✓	6.9% (21)	9.7% (11)	$\chi^2 (1, N = 417) = .929, p = .335, \phi = .047$
	x	93.1% (283)	90.3% (102)	
Carved – Images	✓	5.9% (18)	2.7% (3)	$\chi^2 (1, N = 418) = 1.822, p = .177, \phi = .066$
	x	94.1% (287)	97.3% (110)	
Scratched	✓	22.6% (69)	38.1% (43)	$\chi^2 (1, N = 418) = 10.008, p = .002, \phi = .155^{**}$
	x	77.4% (236)	61.9% (70)	
Bit	✓	3.9% (12)	3.5% (16)	$\chi^2 (1, N = 418) = .035, p = .852, \phi = .009$
	x	96.1% (293)	96.5% (109)	
Sandpaper	✓	0.7% (2)	0% (0)	$\chi^2 (1, N = 417) = .738, p = .390, \phi = .042$
	x	99.3% (303)	100% (112)	
Acid	✓	0.7% (2)	0% (0)	$\chi^2 (1, N = 417) = .747, p = .387, \phi = .042$
	x	99.3% (302)	100% (113)	
Bleach	✓	0.3% (1)	1.8% (2)	$\chi^2 (1, N = 416) = 2.383, p = .123, \phi = .076$
	x	99.7% (302)	98.2% (111)	
Sharp Objects	✓	5.6% (17)	7.3% (8)	$\chi^2 (1, N = 414) = .402, p = .526, \phi = .031$
	x	94.4% (287)	92.7% (102)	
Rubbed Glass	✓	0.7% (2)	0% (0)	$\chi^2 (1, N = 418) = .745, p = .388, \phi = .042$
	x	99.3% (302)	100% (113)	
Broken Bones	✓	1.0% (3)	0% (0)	$\chi^2 (1, N = 418) = 1.120, p = .290, \phi = .052$
	x	99.0% (302)	100% (113)	

Banged Head	✓	7.2% (22)	9.7% (11)	$\chi^2 (1, N = 418) = .721, p = .396, \varphi = .042$
	x	92.8% (283)	90.3% (102)	
Punched Self	✓	6.9% (21)	8.8% (10)	$\chi^2 (1, N = 418) = .463, p = .496, \varphi = .033$
	x	93.1% (284)	91.2% (103)	
Prevented Healing	✓	7.6% (23)	5.3% (6)	$\chi^2 (1, N = 417) = .648, p = .421, \varphi = .039$
	x	92.4% (281)	94.7% (107)	
Other	✓	8.9% (27)	20% (22)	$\chi^2 (1, N = 413) = 9.490, p = .002, \varphi = .152^{**}$
	x	91.1% (276)	80% (88)	
Note. Brackets = observed count, $^{**}p < .05, \varphi$ = Phi / Cramer's V statistic				

3.2. Onset PCOS did not impact NSSI onset (Table 2).

Table 2. Mann-Whitney <i>U</i> tests comparing age of onset of NSSI across WoPCOS and WPCOS groups			
	WoPCOS	WPCOS	
Cutting	14 (89)	15 (53)	$U = 2184.00, p = .46$
Burn - Cigarette	17 (15)	14 (4)	$U = 17.50, p = .21$
Burn – Lighter	16 (28)	14 (9)	$U = 106.00, p = .48$
Carved – Words	15 (21)	15 (11)	$U = 111.00, p = .82$
Carved – Images	15 (18)	15 (3)	$U = 25.50, p = .88$
Scratched	15 (69)	15 (43)	$U = 1423.00, p = .72$
Bit	15 (12)	17.50 (4)	$U = 12.00, p = .14$
Sandpaper	13.5 (2)	0 (0)	-
Acid	15 (2)	0 (0)	-
Bleach	18 (1)	23 (2)	-
Sharp Objects	13 (17)	15 (8)	$U = 50.00, p = .29$
Rubbed Glass	14 (2)	0 (0)	-
Broken Bones	24 (3)	0 (0)	-
Banged Head	16 (22)	15 (11)	$U = 112.50, p = .75$
Punched Self	15 (21)	15 (10)	$U = 101.50, p = .88$
Prevented Healing	13 (23)	14 (5)	$U = 51.50, p = .72$
Note. Reported central tendency = median age, Brackets = observed count			

3.3. *Duration* PCOS did not impact NSSI duration, except for those carving words into skin, wherein the WPCOS group reported a longer duration (Table 3).

Table 3. Mann-Whitney <i>U</i> tests comparing duration of NSSI across WoPCOS and WPCOS groups			
	WoPCOS	WPCOS	
Cutting	3 (88)	3 (50)	$U = 2076.50, p = .58$
Burn - Cigarette	1 (15)	4 (4)	$U = 13.00, p = .08$
Burn – Lighter	1 (28)	8 (9)	$U = 114.00, p = .66$
Carved – Words	.5 (21)	1 (11)	$U = 60.00, p = .024^*$
Carved – Images	1 (18)	3 (3)	$U = 19.50, p = .44$
Scratched	5 (68)	4.5 (42)	$U = 1423, p = .98$
Bit	3.5 (12)	1.10 (4)	$U = 12.40, p = .17$
Sandpaper	.75 (2)	0 (0)	-
Acid	1 (2)	0 (0)	-
Bleach	1 (1)	4 (2)	-
Sharp Objects	2 (17)	3.5 (6)	$U = 46.50, p = .75$
Rubbed Glass	2 (2)	0 (0)	-
Broken Bones	.2 (3)	0 (0)	-
Banged Head	3 (22)	2 (11)	$U = 116.50, p = .86$
Punched Self	6 (21)	2 (10)	$U = 88.00, p = .47$
Prevented Healing	10 (23)	7 (5)	$U = 54.00, p = .83$
Note. Reported central tendency = median years, Brackets = observed count, $*p < .05$			

3.4. *Hospitalisation* Both groups reported low hospitalisation need post-NSSI, save for *breaking their bones*, which resulted in hospitalisation for all ($n = 3$). WPCOS women reported greater hospitalisation for *preventing healing*, $\chi^2 (1, N = 29) = 3.970, p = .046, \phi = .370$ (likely driven by low responders), but hospitalisation did not differ for *cutting, scratching, or impaling with sharp objects, banging their heads, punching themselves, or using ‘other’ means* (Table 4.).

Table 4. *Pearson Chi-squares of hospitalisation need following NSSI across WoPCOS and WPCOS groups*

		WoPCOS	WPCOS	Pearson Chi-Square Statistics
Cutting	✓	12.5% (11)	7.5% (4)	$\chi^2 (1, N = 141) = .854, p = .36, \phi = .078$
	x	87.5% (77)	92.5% (49)	
Burn - Cigarette	✓	0% (0)	0% (0)	-
	x	100% (15)	100% (4)	
Burn – Lighter	✓	0% (0)	0% (0)	-
	x	100% (28)	100% (9)	
Carved – Words	✓	0% (0)	0% (0)	-
	x	100% (21)	100% (1)	
Carved – Images	✓	0% (0)	0% (0)	-
	x	100% (6)	100% (3)	
Scratched	✓	1.4% (1)	4.7% (2)	$\chi^2 (1, N = 112) = 1.042, p = .31, \phi = .096$
	x	98.6% (68)	95.3% (41)	
Bit	✓	0% (0)	0% (0)	-
	x	100% (12)	100% (4)	
Sandpaper	✓	0% (0)	NS% (0)	-
	x	100% (2)	NS% (0)	
Acid	✓	0% (0)	NS% (0)	-
	x	100% (2)	NS% (0)	
Bleach	✓	0% (0)	0% (0)	-
	x	100% (1)	100% (2)	
Sharp Objects	✓	0% (0)	12.5% (1)	$\chi^2 (1, N = 25) = 2.214, p = .14, \phi = .298$
	x	100% (17)	87.5% (7)	
Rubbed Glass	✓	0% (0)	NS% (0)	-
	x	100% (2)	NS% (0)	
Broken Bones	✓	100% (3)	NS% (0)	-
	x	0% (0)	NS% (0)	

Banged Head	✓	4.5 % (1)	0% (0)	$\chi^2 (1, N = 33) = .516, p = .47, \varphi = .125$
	x	95.5% (21)	100% (11)	
Punched Self	✓	4.8% (1)	0% (0)	$\chi^2 (1, N = 31) = .492, p = .48, \varphi = .126$
	x	95.2% (20)	100% (10)	
Prevented Healing	✓	0% (0)	16.7% (1)	$\chi^2 (1, N = 29) = 3.970, p = .046, \varphi = .370^*$
	x	100% (23)	83.3% (5)	
Other	✓	14.8% (4)	22.7% (5)	$\chi^2 (1, N = 49) = .506, p = .48, \varphi = .102$
	x	85.2% (23)	77.3% (17)	
Note. Brackets = observed count, * $p < .05, \varphi$ = Phi / Cramer's V statistic				

3.5. Cluster Analysis

Cluster analysis was conducted on NSSI behaviours engaged in by ≥ 3 WPCOS women (removing *carving images, rubbing sandpaper or glass onto skin, spilling acid or bleach, breaking bones*). Ward's hierarchical method was applied, wherein the two most-similar clusters (squared Euclidean distance) were iteratively combined. A three-cluster solution was fed into the k-means procedure. Participants were assigned to clusters reflecting their Euclidean distance to the cluster centres (Figure 1). Cluster 1 ('Scar-deriving'; 38.1%, $n = 43$) represents women who, unlike Cluster 2 ('Nil-to-low engagers'; 53.1%, $n = 60$) who solely favour scratching, additionally engage in scar-deriving actions (e.g., cutting, carving). Cluster 3 ('Intensive engagers'; 6.2%, $n = 7$) represented a smaller group who partook in NSSI that would likely result in long-term injury (e.g., burning, impaling, banging heads, preventing healing).

4. Discussion

Whilst WPCOS women report a greater propensity to cut and scratch, between group differences suggest PCOS neither impacted NSSI onset age, duration (save for carving words), or severity (save for healing prevention). Cluster analysis indicated three typologies of NSSI in WPCOS women: 'Scar-deriving', 'Nil-to-low engagers', and 'Intensive engagers'.

4.1 Manifestations of NSSI

Though encouraging to see low levels of NSSI reported overall, the WPCOS, relative to WoPCOS group, evidenced both a greater propensity to engage in cutting and scratching and a greater likelihood to partake in 'other' behaviours, including over-consuming drugs and alcohol, poor eating habits, and placing themselves in uncomfortable situations (hot/cold showers). Low reports of 'other' behaviours limited further statistical interrogation; possibly reflecting participants being reliant on unprompted self-reporting and indicating both a need for replication and to develop measures of NSSI that meaningfully represent PCOS samples. This data supports previous associations linking PCOS diagnosis with NSSI

engagement (Hsu et al., 2024; Månsson et al., 2008; Williams et al., 2022) and develops literature by specifying NSSI behaviours posing potential clinical risk.

Self-reported PCOS was not related to NSSI onset, duration (save for carving words into one's skin), or severity (save for the prevention of wounds healing). In the two noted exceptions, effects were small and isolated, limiting confidence in their meaning and practicality. Though we made no a-priori hypotheses about the onset or duration of NSSI, we did expect WPCOS women to be at higher hospitalisation risk post NSSI (Hart & Doherty, 2015). We did not find evidence that PCOS presents further NSSI risk. However, given NSSI has been qualitatively linked with PCOS diagnoses (Williams et al., 2015), further exploration and understanding of NSSI as WoPCOS comorbid behaviour is important.

4.2. Typologies of NSSI in WPCOS Women

Using data from WPCOS women engaging in NSSI, we identified three behavioural clusters. Cluster 1 (titled 'Scar-deriving') reflects cutting, carving, and scratching behaviours that maps onto discourse reflecting *positive* cognitions of scarring (Bachtelle & Pepper 2015; Lewis & Mehrabkhani, 2016), wherein scars are thought to demonstrate physical/emotional strength (Burke et al., 2017). Here, WPCOS women may demonstrate control in the context of largely uncontrollable physical and psychological complications (Barry et al., 2011). As self-cutting is unlikely to lead to hospitalisation or signposting to appropriate clinical services, understanding support needs of this cluster is critical (Lilley et al., 2008).

Cluster 2 (titled 'Nil-to-low engagers') comprised participants who largely did not engage in NSSI (save for scratching). In contrast, Cluster 3 (titled 'Intensive engagers') represented participants who, in addition to engaging in Cluster 1 behaviours, engaged in behaviours that could cause long-term injury (e.g., burning, impaling, head banging, preventing healing). Though a much smaller group, long-term injury is of clinical concern, with trauma-inducing behaviour negatively impacting treatment pathway progress in forensic services (Chester & Alexander, 2017). These clusters need international replication and warrant investigation alongside the implementation of emotion regulation strategies (Klonsky, 2007) to best identify effective treatment management and interventions.

4.3. Study Limitations

Results should be considered alongside limitations. First, though adequately powered, there is a need to replicate findings in more substantial and internationally diverse samples. This would facilitate [a] identification of between-group variation in rarer NSSI behaviours, [b] confidence in our typologies, [c] typological comparisons between WPCOS and WoPCOS groups, and [d] identification of cultural variation. Second, though validated in posttraumatic stress disorder (Dixon-Gordon et al., 2014), borderline personality disorder (Williams & Sharp, 2013), and eating pathology contexts (Skinner et al., 2017), the DSHI (Gratz, 2001) is both reliant upon retrospection and might suffer from deception/response avoidance owing to stigma associated with NSSI (Aggarwal et al., 2021). Third, our design could not capture specific NSSI location across the body. Though cutting is prevalent on forearms and wrists (Horrocks et al., 2003), NSSI location might be individually meaningful (Matsumoto et al., 2004), knowledge of which would help inform our results. Finally, though we neither anticipate

deception nor believe incidence thereof would have any meaningful impact, participants self-reported diagnoses. Replication should utilise clinical samples to strengthen reinforce our arguments.

4.4. Application of Findings

Results reinforce the need for clinicians to be mindful about the barriers they face in diagnosing PCOS (e.g., evidence of diagnostic features, Kiconco et al., 2021), and how NSSI in women with PCOS might further interfere with therapeutic interventions and treatment (Favazza, 1989; Lewis, 2016). This is of vital importance given that up to 70% of women with PCOS are thought to be undiagnosed (World Health Organization, 2026). The proposed typologies can begin to guide responses to different manifestations of NSSI in WPCOS women, each with potentially different underpinnings and psychological/environmental predictors. These findings should drive international collaborations with researchers and stake holders to help identify and intervene with respect to NSSI in women with PCOS. Such intervention might range from broader education-based materials to psychological interventions both accessible within community settings and as a supplement to clinical care.

Declarations

Ethics and Guidelines: Ethical approval was granted by the University of Derby prior to data collection (Ref: (260319SWDFSD, Date: 29 April 2019), and the study adhered to the British Psychological Society's Code of Ethics and Conduct (British Psychological Society, 2021). All participants signed an informed consent before they participated in the study. The research adhered to the Declaration of Helsinki and informed consent was obtained.

Clinical Trial Number

Not applicable, this was not a clinical trial.

Conflicts of Interest:

The authors declare no conflict of interest.

Consent to Participate:

Participation in this study was optional and all participants gave informed consent in writing prior to participation. Participation was entirely voluntary, and respondents could withdraw at any time without consequence.

Consent to Publish:

Not applicable.

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Author Contribution

Conceptualisation, D.F., S.W., D.S.; methodology, D.F., S.W., D.S.; validation, D.F., S.W., D.S.; formal analysis, D.F.; investigation, D.F., S.W., D.S.; data curation, D.F.; writing—original draft preparation, D.F.; writing—review and editing, D.F., S.W., D.S.; project administration, D.F. All authors have read and agreed to the published version of the manuscript.

Data Availability

The datasets generated during and/or analysed during the current study are available in the OSF repository: https://osf.io/28p7b/?view_only=0400dccde50c4f02b767eca50027caa3

References

1. Aggarwal S, Borschmann R, Patton GC. Tackling stigma in self-harm and suicide in the young. *Lancet: Public Health*. 2021;6(1):6–7.
2. Bachtelle SE, Pepper CM. The physical results of nonsuicidal self-injury: the meaning behind the scars. *J Nerv Ment Dis*. 2015;203(12):927–33. <https://doi.org/10.1097/NMD.0000000000000398>.
3. Barry JA, Kuczmierczyk AR, Hardiman PJ. Anxiety and depression in polycystic ovary syndrome: a systematic review and meta-analysis. *Hum Reprod*. 2011;26(9):2442–51. <https://doi.org/10.1093/humrep/der197>.
4. Burke TA, Olino TM, Alloy LB. Initial Psychometric Validation of the Non-Suicidal Self-Injury Scar Cognition Scale. *J Psychopathol Behav Assess*. 2017;39(3):546–62. <https://doi.org/10.1007/s10862-017-9595-9>.
5. Chester V, Alexander RT. Head banging as a form of self-harm among inpatients within forensic mental health and intellectual disability services. *J Forensic Psychiatr Psychol*. 2018;29(4):557–73. <https://doi.org/10.1080/14789949.2018.1425472>.
6. Daley K. I'd Just Cut Myself to Kill the Pain: Seeing Sense in Young Women's Self-Injury. In: Wright K, McLeod J, editors. *Rethinking Youth Wellbeing*. Singapore: Springer; 2015.
7. Damone AL, Joham AE, Loxton D, Earnest A, Teede HJ, Moran LJ. Depression, anxiety and perceived stress in women with and without PCOS: a community-based study. *Psychol Med*. 2019;49(9):1510–20. <https://doi.org/10.1017/S0033291718002076>.
8. Deeks AA, Gibson-Helm ME, Paul E, Teede HJ. Is having polycystic ovary syndrome a predictor of poor psychological function including anxiety and depression? *Hum Reprod*. 2011;26(6):1399–407.

- <https://doi.org/10.1093/humrep/der071>.
9. Dixon-Gordon KL, Tull MT, Gratz KL. Self-injurious behaviors in posttraumatic stress disorder: An examination of potential moderators. *J Affect Disord*. 2014;166:359–67. <https://doi.org/10.1016/j.jad.2014.05.033>.
 10. Favazza AR. Normal and deviant self-mutilation: An essay review. *Transcultural Psychiatric Res*. 1989;26(2):113–27. <https://doi.org/10.1177/1363461589026002>.
 11. Gratz KL. Measurement of Deliberate Self-Harm: Preliminary Data on the Deliberate Self-Harm Inventory. *J Psychopathol Behav Assess*. 2001;23(4):253–63. <https://doi.org/10.1023/A:1012779403943>.
 12. Hart R, Doherty DA. The potential implications of a PCOS diagnosis on a woman's long-term health using data linkage. *J Clin Endocrinol Metab*. 2015;100(3):911–9. <https://doi.org/10.1210/jc.2014-3886>.
 13. Hsu TW, Kao YC, Tsai SJ, Bai YM, Su TP, Chen TJ, Liang CS, Chen MH. Suicide Attempts After a Diagnosis of Polycystic Ovary Syndrome: A Cohort Study. *Ann Intern Med*. 2024;177(3):335–42. <https://doi.org/10.7326/M23-2240>.
 14. Johnson DP, Whisman MA. Gender differences in rumination: A meta-analysis. *Pers Individ Differ*. 2013;55(4):367–74. <https://doi.org/10.1016/j.paid.2013.03.019>.
 15. Joiner TE, Ribeiro JD, Silva C. Nonsuicidal self-injury, suicidal behavior, and their co-occurrence as viewed through the lens of the interpersonal theory of suicide. *Curr Dir Psychol Sci*. 2012;21(5):342–7. <https://doi.org/10.1177/0963721412454873>.
 16. Khan MJ, Ullah A, Basit S. Genetic Basis of Polycystic Ovary Syndrome (PCOS): Current Perspectives. *Application Clin Genet*. 2019;12:249–60. <https://doi.org/10.2147/TACG.S200341>.
 17. Kiconco S, Teede HJ, Azziz R, Norman RJ, Joham AE. The Need to Reassess the Diagnosis of Polycystic Ovary Syndrome (PCOS): A Review of Diagnostic Recommendations from the International Evidence-Based Guideline for the Assessment and Management of PCOS. *Semin Reprod Med*. 2021;39:71–7. <https://doi.org/10.1055/s-0041-1735259>.
 18. Klonsky ED. The functions of deliberate self-harm: a review of the evidence. *Clin Psychol Rev*. 2007;27:226–39. <https://doi.org/10.1016/j.cpr.2006.08.002>.
 19. Klonsky ED, Saffer BY, Bryan CJ. Ideation-to-action theories of suicide: A conceptual and empirical update. *Curr Opin Psychol*. 2017;22:38–43. <https://doi.org/10.1016/j.copsyc.2017.07.020>.
 20. Lewis SP. The overlooked role of self-injury scars: Commentary and suggestions for clinical practice. *J Nerv Ment Dis*. 2016;204(1):33–5. <https://doi.org/10.1097/NMD.0000000000000436>.
 21. Lewis SP, Mehrabkhani S. Every scar tells a story: Insight into people's self-injury scar experiences. *Counselling Psychol Q*. 2016;29(3):1–15. <https://doi.org/10.1080/09515070.2015.1088431>.
 22. Lilley R, Owens D, Horrocks J, House A, Noble R, Bergen H, Hawton K, Casey D, Simkin S, Murphy E, Cooper J, Kapur N. Hospital care and repetition following self-harm: multicentre comparison of self-poisoning and self-injury. *Br J Psychiatry: J Mental Sci*. 2008;192(6):440–5. <https://doi.org/10.1192/bjp.bp.107.043380>.

23. MacQueen JB. (1967). Some methods for classification and analysis of multivariate observations. In L. M. Le Cam & J. Neyman, editors, *Proceedings of the fifth Berkeley symposium on mathematical statistics and probability* (Vol. 1, pp. 281–297). California: University of California Press.
24. Månsson M, Holte J, Landin-Wilhelmsen K, Dahlgren E, Johansson A, Landén M. Women with polycystic ovary syndrome are often depressed or anxious – A case control study. *Psychoneuroendocrinology*. 2008;33:1132–8. <https://doi.org/10.1016/j.psytneuen.2008.06.003>.
25. Matsumoto T, Yamaguchi A, Chiba Y, Asami T, Iseki E, Hirayasu Y. Patterns of self-cutting: a preliminary study on differences in clinical implications between wrist- and arm-cutting using a Japanese juvenile detention center sample. *J Neuropsychiatry Clin Neurosci*. 2004;58(4):377–82. <https://doi.org/10.1111/j.1440-1819.2004.01271.x>.
26. Maya J, Siegel J, Cheng TQ, Rousseau-Pierre T. Prevalence and Risk Factors of Polycystic Ovarian Syndrome Among an Ethnically Diverse Overweight/Obese Adolescent Population. *J Sci Innov Med*. 2019;2(2):26. <https://doi.org/10.29024/jsim.38>.
27. Nock MK, Favazza AR. (2009). Nonsuicidal self-injury: Definition and classification. In M. K. Nock, editor, *Understanding Nonsuicidal Self-injury: Origins, Assessment, and Treatment* (pp. 9–18). American Psychological Association. <https://doi.org/10.1037/11875-001>
28. Selby EA, Connell LD, Joiner TE Jr.. The pernicious blend of rumination and fearlessness in non-suicidal self-injury. *Cogn Therapy Res*. 2010;34(5):421–8. <https://doi.org/10.1007/s10608-009-9260-z>.
29. Skinner KD, Rojas SM, Veilleux JC. Connecting eating pathology with risk for engaging in suicidal behavior: The mediating role of experiential avoidance. *Suicide Life-Threatening Behav*. 2017;47(1):3–13. <https://doi.org/10.1111/sltb.12249>.
30. Teede HJ, Tay CT, Laven J, Dokras A, Moran LJ, Piltonen TT, Costello MF, Boivin J, Redman M, Boyle LA, Norman J, Mousa RJ, Joham A, A. E., International PCOS Network. Recommendations from the 2023 International Evidence-based Guideline for the Assessment and Management of Polycystic Ovary Syndrome. *Fertil Steril*. 2023;120(4):767–93. <https://doi.org/10.1016/j.fertnstert.2023.07.025>.
31. Ward JH. Hierarchical Grouping to Optimize an Objective Function. *J Am Stat Assoc*. 1963;58(301):236–44. <https://doi.org/10.1080/01621459.1963.10500845>.
32. Williams L, Sharp C. Borderline personality disorder in adolescence: The case for medium stay inpatient treatment. *J Psychiatr Pract*. 2013;19(2):162–72. <https://doi.org/10.1097/01.pra.0000428563.86705.84>.
33. Williams S, Fido D, Sheffield D. Polycystic Ovary Syndrome (PCOS) and Non-Suicidal Self-Injury (NSSI): A Community-Based Study. *Healthcare*. 2022;10(6):1118. <https://doi.org/10.3390/healthcare10061118>.
34. Williams S, Sheffield D, Knibb RC. Everything's from the inside out with PCOS': Exploring women's experiences of living with polycystic ovary syndrome and co-morbidities through Skype™ interviews. *Health Psychol Open*. 2015;2(2). <https://doi.org/10.1177/2055102915603051>.

Figures

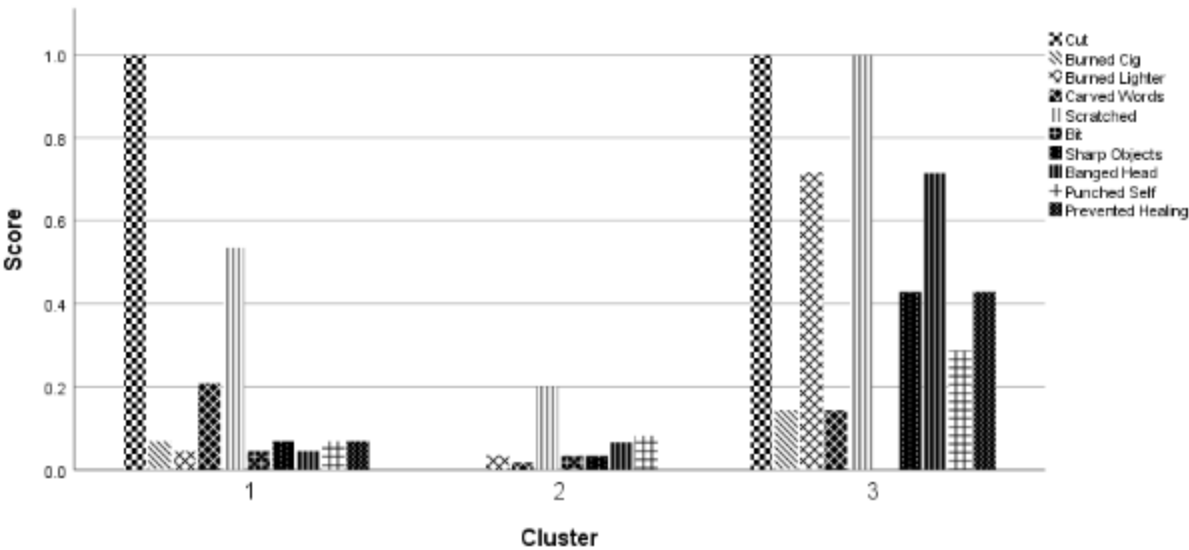


Figure 1

Cluster analysis (Ward's hierarchical, k-means clustering) of NSSI in women with PCOS.