

## ORIGINAL ARTICLE

## SCREENING OF EATING DISORDERS USING SCOFF QUESTIONNAIRE IN MALE DIABETICS IN DISTRICT HYDERABAD, SINDH, PAKISTAN

Jamshed Warsi, Benazir Mahar, Shafaq Ansari\*, Tazeen Shah\*

Department of Physiology, University of Sindh, \*Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan

**Background:** Eating disorders (EDs) are very common disorders in the society, nonetheless, underestimated. It is a group of heterogeneous diseases/disorders associated with abnormal eating habits/eating behaviours found in all ages, race and sexes, and are more common in females than males. EDs could possibly be more common in diabetic patients. This study aims to examine the prevalence of eating disorders (using SCOFF questionnaire) in diabetics type I/II and its association with anthropometric indices. **Methodology:** A cross sectional study was conducted with the known cases of diabetes I or II. Subjects suffering from any other disease are excluded from the study. A self designed questionnaire indicating the anthropometric indices and a well-known SCOFF questionnaire for the purpose of screening of EDs was used. SPSS-21 was used to analyze the data. Fisher's exact test was employed as an appropriate for qualitative data. **Results:** The overall prevalence of likelihood of EDs was reported highest (99%), the frequency of EDs in diabetic type II groups was 66.6% and Type I was 32.4% respectively, The prevalence of EDs was significantly more in type II ( $p=0.03$ ) as compared to type I. **Conclusion:** High prevalence of eating disorders was observed in diabetics, more common in Type II diabetic patients. Non-significant fluctuated anthropometric indicators were seen in diabetics type I and II and patients with eating disorders.

**Keywords:** Eating disorders, Diabetes, Anthropometric indicators

Pak J Physiol 2020;16(2):41-4

## INTRODUCTION

Eating disorders (EDs) are the heterogeneous group of conditions that describe the insufficient or/and excessive eating sometime followed by an attempt to compensate it by purging, fasting, exercise or by having laxatives.<sup>1</sup> Anorexia nervosa (AN) is characterized by self limitation of food intake and extreme fear of getting weight.<sup>2</sup> Bulimia nervosa (BN) is characterized by excessive eating and then an attempt to compensate it either by purging, fasting or even exercise.<sup>3</sup> The eating disorders not otherwise specified (EDNOS) neither meet the diagnostic criteria of anorexia nervosa nor bulimia nervosa.<sup>4</sup> EDs as a non-communicable disorder<sup>5</sup> could possibly co-occur with many other abnormal conditions and have been seen in different classes and races of the world: recently the prevalence was observed in drug addicted people.<sup>6</sup> Bulimia nervosa is linked with gastric ulcer and gastric dilation in many studies<sup>7,8</sup>. EDs generally affect gastrointestinal system in two ways: mechanical and paralytic events; mechanically it could be due to duodenal compression whereas paralytic ally it could be because of atrophy of intestinal smooth muscles, delayed intestinal transit or delayed gastric emptying. The relationship between EDs and cancer has been established.<sup>9</sup> The risk of oesophageal adenocarcinoma could be increased due to damage caused by acidity in oesophageal mucosa in bulimia patients.<sup>10</sup> The link between EDs and coronary artery disease has also been reported.<sup>11</sup>

One of the most important disease is Diabetes mellitus (type I/II) in which the quality (carbohydrates

versus non-carbohydrates) and the quantity of food is compromised in order to keep the blood glucose level normal.<sup>12,13</sup> Thus diabetes could possibly co-occurs with abnormal eating behaviour. In young adults, disordered eating behaviours (DEBs) have been observed in 21.2% Type I and in 50.3% Type II diabetic patients respectively.<sup>14</sup> Recently, a significant correlations is reported in abnormal eating and type I diabetes in both gender<sup>15</sup>. The anthropometric indicators just as BMI, obesity or the thinness of body (or the perception of body structure), might be a big concern in EDs patients, thus could add fuel to fire if EDs co-occurs with type I/II diabetes. Binge eating is associated with obesity and weight gain and thus could lead to diabetes.<sup>16</sup>

The co-morbidities of eating disorders with diabetes could be apparent. This study aims to examine the prevalence of eating disorders (using SCOFF questionnaire) in diabetics type I/II and its association with anthropometric indices.

## METHODOLOGY

A cross-sectional (survey based) study was performed from Jun to Nov 2019. All the experimentations were carried out in accordance with 1964 Helsinki Declaration and its later amendments for ethical standards. The sample was collected through a random sampling method from the Civil Hospital Hyderabad, and Liaquat Medical University Hospital, Jamshoro. The sample size was 302. All participants were known cases of type I/II diabetes mellitus, and were aged 20–50 years. A self planned questionnaire and a specific questionnaire for detection of likelihood of eating

disorder, SCOFF (Cronbach value=0.470)<sup>17</sup> was distributed during interview to the participants. The questionnaire comprised of five questions, an answer of ‘Yes’ to at least two questions was considered as ED positive. SCOFF questionnaire has sensitivity of 100% and specificity of 90%. While having measurements and interview it was taken care that all participants fully understand the questionnaire. The study group constituted single and/or unmarried male adolescents. The participants who were suffering from any disease like hypertension, coronary artery disease, cancer etc. or any disease other than diabetic mellitus I and/or II were excluded from the study.

Weight was measured by simple weighing machine with minimal and light weight clothes, and height on a stadiometer. Hip and waist circumferences were measured by flexible non-stretchable plastic measuring tape. Waist to hip ratio (WHR) and waist to height ratio (WHtR) and BMI were calculated using standard techniques.<sup>18,19</sup>

The results obtained were shown in percentage. The results were tested for significance using SPSS. Fisher’s Exact Test or Chi-Square test was employed as appropriate for qualitative data.

## RESULTS

Out of 305 participants, 302 returned complete questionnaire, representing the response rate of 99%. Out of 302 diabetic patients 98 were suffering from Type I while 201 were suffering from type II diabetes. The prevalence of EDs through SCOFF questionnaire was reported highest (99%), the frequency of EDs in diabetic type II groups was 66.6% and Type I was 32.4% respectively which is significantly more than in type I. The highest frequency of those who could suffer EDs was found in age group of 40–60. Screening through SCOFF found that patients whether live in rural or urban areas have equal chance of eating disorders, similarly likelihood of EDs was nearly equal in all BMI group slightly higher in normal and overweight participants.

According to WHR, the frequency in obese individuals (WHR >0.90) was 247 (81.7%), higher than those 52 (17.2%) whose WHR was normal (≤0.90), however, not reaching to the significant level. According to WHtR, 117 (38.7%) of the participants fell under the obese (≥0.58) group and 85 (28.1%) participants were under overweight (0.53–0.57) group. These two groups represented the huge number of those who have the chances of EDs.

The total number of ‘Yes’ reply (from SCOFF questionnaire) and the frequency of participants responded to ‘Yes’ is shown in Table-2. The frequency and significance level of ‘Yes’ or ‘No’ for each question of SCOFF questionnaire is indicated in both EDs positive and negative groups in Table-3.

**Table-1: SCOFF results in relation to age, living area, diabetes, marital status, breakfast, junk food, exercise, BMI, WHR and WHtR [n (%)]**

	SCOFF (+)	SCOFF (-)	Total	p
<b>AGE</b>				
20–30	7 (2.3)	–	7	0.4
31–40	45 (14.9)	–	45	
41–50	96 (31.8)	1 (0.33)	97	
51–60	84 (27.8)	–	84	
>60	67 (22.2)	2 (0.66)	69	
<b>Total</b>	299 (99)	3 (0.99)	302	
<b>LIVING AREA</b>				
Rural	240 (79.4)	2 (0.66)	242 (80.1)	0.4
Urban	59 (19.6)	1 (0.33)	60 (19.9)	
<b>Total</b>	299 (99%)	3 (1.0)	302	
<b>DIABETES</b>				
Type I	98 (32.4)	3 (0.99)	101 (33.4)	0.03
Type II	201 (66.6)	–	201 (66.6)	
<b>Total</b>	299 (99.0)	3 (1.0)	302	
<b>MARITAL STATUS</b>				
Single	6 (2.0)	–	6 (2.0)	1.00
Married	293 (97.0)	3 (0.99)	296 (98.0)	
<b>Total</b>	299 (99.0)	3 (0.99)	302	
<b>BREAKFAST</b>				
Yes	289 (95.7)	3 (0.99)	292 (96.7)	1.00
No	10 (3.3)	–	10 (3.3)	
<b>Total</b>	299 (99)	3 (0.99)	302	
<b>JUNK FOOD</b>				
Yes	78 (25.9)	–	78 (25.9)	0.5
No	221 (73.1)	3 (1.0)	224 (74.1)	
<b>Total</b>	299 (99.0)	3 (1.0)	302	
<b>EXERCISE</b>				
Yes	181 (59.9)	1 (0.33)	182 (60.2)	0.5
No	118 (39.0)	2 (0.66)	120 (39.8)	
<b>Total</b>	299 (99)	3 (0.99)	302	
<b>BMI</b>				
Severely underweight	6 (1.98)	–	6 (1.98)	0.1
Underweight	8 (2.6)	–	8 (2.6)	
Normal	131 (43.4)	2 (0.66)	133 (44.0)	
Overweight	116 (38.4)	1 (0.33)	117 (38.7)	
Obese Class I	34 (11.2)	–	34 (11.2)	
Obese class II	4 (1.3)	–	4 (1.4)	
<b>Total</b>	299 (99.0)	3 (0.99)	302	
<b>WHR</b>				
Normal (≤0.90)	52 (17.2)	1 (0.33)	53 (17.6)	0.4
Obese (>0.90)	247 (81.7)	2 (0.66)	249 (82.4)	
<b>Total</b>	299 (99%)	3 (0.99)	302	
<b>WHtR</b>				
Thin (0.35–0.42)	4 (1.3)	–	4 (1.3)	0.2
Healthy (0.43–0.52)	93 (30.8)	1 (0.33)	94 (31.1)	
Overweight (0.53–0.57)	85 (28.1)	1 (0.33)	86 (28.5)	
Obese (≥0.58)	117 (38.7)	1 (0.33)	118 (39.0)	
<b>Total</b>	299 (99)	3 (0.99)	302	

**Table-2: ‘Yes’ reply to SCOFF questionnaire**

SCOFF questionnaire number of ‘Yes’ reply	Frequency of ‘Yes’ in SCOFF questionnaire
0	1
1	2
2	41
3	132
4	112
5	14

Table-3: Analysis of SCOFF questionnaire

Questions from Bulimia and Anorexia of SCOFF	Frequency of response of positive 299 individuals (YES/NO)	Frequency of response of negative 3 individuals (YES/NO)	p
1. Do you make yourself sick because you feel uncomfortably full?	275/24	0/3	0.0006
2. Do you worry you have lost control over how much you eat?	202/97	0/3	0.03
3. Have you recently lost more than one stone in a 3 month period?	254/45	0/3	0.003
4. Do you believe yourself to be fat when others say you are too thin?	225/74	0/3	0.01
5. Would you say that food dominates your life?	218/81	2/1	NS

## DISCUSSION

In the present study, the overall percentage of likelihood of eating disorders in diabetic patients was 99%. The prevalence of EDs in type I diabetics was 32.4% and in type II diabetics it was 66.6% respectively. EDs are significantly more prevalent in type II diabetes ( $p=0.03$ ) than type I. This study is showing the prevalence at alarming level. EDs are equally prevalent in both rural, urban, single, and married people and in all classes of BMI (slightly higher numbers were observed in normal BMI category. It is also nearly equal in patients whether having normal breakfast or junk food. According to a research conducted in Pakistan, the use of junk food could be a risk factor for diabetes type II patients.<sup>20</sup>

In a longitudinal study, carried out in type I female diabetics<sup>21</sup>, EDs were found very common. A significant association was reported in type II diabetes and binge eating.<sup>22</sup> A meta-analysis of controlled studies showed a significantly higher prevalence of BN patients among the type I diabetics as compared to normal but no difference in the prevalence of AN in both groups.<sup>23</sup> Another meta-analysis showed 7.0% confirmed cases of EDs and 39.3% cases of disordered eating behaviour in type I diabetics.<sup>24</sup> Since in diabetes mellitus type I the metabolism is shifted, it could lead to altered neuroendocrine status and thus could lead to eating disorders. The current study could not find any association between diabetic patients whether taking breakfast or junk food. The SCOFF questionnaire was used to diagnose the likelihood of eating disorder. The SCOFF questionnaire is simple and rapid and useful screening tool to find out the risk of eating disorders.<sup>25</sup>

Further work is required in order to prevent, diagnose and treat EDs in this most vulnerable group. A detailed and comprehensive survey-based cross-sectional study is suggested in different nationalities in order to confirm the aforementioned prevalence of EDs co-morbid with diabetes type I or/and type II.

## CONCLUSION

High prevalence of eating disorders was observed in diabetic patients, more common in Type II diabetics. Non-significant fluctuated anthropometric indicators were seen in diabetics type I and II and patients with eating disorders.

## REFERENCES

1. Fairburn CG, Beglin SJ. Assessment of eating disorders: Interview or self-report questionnaire? *Int J Eat Disord* 1994;16(4):363–70.
2. Phillipou A, Castle DJ, Rossell SL. Anorexia nervosa: Eating disorder or body image disorder? London: SAGE Publications Sage UK;2018.
3. Gibson D, Workman C, Mehler PS. Medical complications of Anorexia Nervosa and Bulimia Nervosa. *Psychiatr Clin North Am* 2019;42(2):263–74.
4. Fairburn CG, Bohn K. Eating disorder NOS (EDNOS): an example of the troublesome 'not otherwise specified' (NOS) category in DSM-IV. *Behav Res Ther* 2005;43(6):691–701.
5. Beaglehole R, Yach D. Globalisation and the prevention and control of non-communicable disease: the neglected chronic diseases of adults. *Lancet* 2003;362(9387):903–8.
6. Buriro AA, Warsi J. Screening of the likelihood of eating disorders in drug addicted adolescents male of district Hyderabad, Sindh, Pakistan. *Univ Sindh J Animal Sci* 2019;2(4):1–2.
7. Antonelli JR, Seltzer R. Oral and physical manifestations of anorexia and bulimia nervosa. *Tex Dent J* 2016;133(9):528–35.
8. Maung H, Buxey KN, Studd C, Ket S. Acute gastric dilatation in a bulimic patient. *Gastrointest Endosc* 2017;85(2):455–7.
9. De Backer F. The relation between eating disorders and the risk of developing cancer. (Dissertation MS) Ghent University, Belgium. 2019.
10. Brewster DH, Nowell SL, Clark DN. Risk of oesophageal cancer among patients previously hospitalised with eating disorder. *Cancer Epidemiol* 2015;39(3):313–20.
11. Orvos JM. Does bulimia nervosa increase long-term risk of CVD and death? 2019. Available at: <https://www.contemporaryobgyn.net/view/does-bulimia-nervosa-increase-long-term-risk-cvd-and-death>
12. Ryman B, MacIsaac J, Robinson T, Miller MR, Herold Gallego P. Assessing the clinical utility of the diabetes eating problem survey-revised (DEPS-R) in adolescents with type 1 diabetes. *Endocrinol Diabetes Metab* 2019;2(3):e00067.
13. Goebel-Fabbri A, Copeland P, Touyz S, Hay P. Eating disorders in diabetes: Discussion on issues relevant to type 1 diabetes and an overview of the Journal's special issue. *Eat Disord* 2019;7:27.
14. Nip AS, Reboussin BA, Dabelea D, Bellatorre A, Mayer-Davis EJ, Kahkoska AR, et al. Disordered eating behaviors in youth and young adults with type 1 or type 2 diabetes receiving insulin therapy: The SEARCH for Diabetes in Youth Study. *Diabetes Care* 2019;42(5):859–66.
15. Wisting L, Wonderlich J, Skrivvarhaug T, Dahl-Jørgensen K, Rø Ø. Psychometric properties and factor structure of the diabetes eating problem survey-revised (DEPS-R) among adult males and females with type 1 diabetes. *J Eat Disord* 2019;7(1):2.
16. McCuen-Wurst C, Ruggieri M, Allison KC. Disordered eating and obesity: associations between binge eating-disorder, night-eating syndrome, and weight-related co-morbidities. *Ann N Y Acad Sci* 2018;1411(1):96–105.
17. Morgan JF, Reid F, Lacey JH. The SCOFF questionnaire. *West J Med* 2000;172(3):164–5.
18. Warsi J, Mahar B. Short communication comparison of anthropometric indicators in anemic and non-anemic females. *Pak J Biotech* 2020;17(1):49–52.

19. Warsi J, Faheem B, Laghari ZA, Memon MA. Association of anaemia with oxidized tea drinking in affluent Pakistani female university students. *Pak J Physiol* 2019;15(3):63–6.
20. Khalid N. Social media target on type-2 diabetes: Prevent threat for Pakistani population. *J Liaquat Univ Med Health Sci* 2018;17(1):60–1.
21. Colton PA, Olmsted MP, Daneman D, Farquhar JC, Wong H, Muskat S, *et al.* Eating disorders in girls and women with type 1 diabetes: a longitudinal study of prevalence, onset, remission, and recurrence. *Diabetes Care* 2015;38(7):1212–7.
22. Raevuori A, Suokas J, Haukka J, Gissler M, Linna M, Grainger M, *et al.* Highly increased risk of type 2 diabetes in patients with binge eating disorder and bulimia nervosa. *Int J Eat Disord* 2015;48(6):555–62.
23. Mannucci E, Rotella F, Ricca V, Moretti S, Placidi GF, Rotella CM. Eating disorders in patients with type 1 diabetes: a meta-analysis. *J Endocrinol Invest* 2005;28(5):417–9.
24. Young V, Eiser C, Johnson B, Brierley S, Epton T, Elliott J, *et al.* Eating problems in adolescents with type 1 diabetes: a systematic review with meta-analysis. *Diabetic Med* 2013;30(2):189–98.
25. Kutz AM, Marsh AG, Gunderson CG, Maguen S, Masheb RM. Eating Disorder Screening: a systematic review and meta-analysis of diagnostic test characteristics of the SCOFF. *J Gen Intern Med* 2020;35(3):885–93.

---

### Address for Correspondence:

**Jamshed Warsi**, Department of Physiology, University of Sindh, Jamshoro, Pakistan. **Cell:** +92-300-3088742

**Email:** jamshed.warsi@usindh.edu.pk

---

Received: 21 Feb 2020

Reviewed: 2 Jun 2020

Accepted: 3 Jun 2020

### Contribution of Authors:

**JW:** Conception of idea, data analysis, drafting, final approval

**BM:** Data analysis, revision

**SA:** Data collection and analysis

**TS:** Data collection, drafting

**Funding source:** None

**Conflict of interest:** None