The prevalence and correlates of bulimia nervosa, binge-eating disorder, and anorexia nervosa: The Saudi National Mental Health Survey

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Abstract

Objective: Limited studies have been conducted in the Kingdom of Saudi Arabia on eating disorders (EDs). This study presents national epidemiological survey data on the prevalence and correlates of anorexia nervosa (AN), bulimia nervosa (BN), and binge-eating disorder (BED) and their association with other mental health disorders, impairment in role functioning, and individual help-seeking behaviors in the Saudi National Mental Health Survey (SNMHS).

Method: A face-to-face survey was conducted in a nationally representative household sample of Saudi citizens aged 15–65 (n = 4004). The Composite International Diagnostic Interview (CIDI 3.0) was used to produce estimates of lifetime and 12-month prevalence and treatment of common DSM-IV mental disorders.

Results: Twelve-month prevalence of any of the three EDs was 3.2%; the overall lifetime prevalence was 6.1%. Education and marital status were significantly associated with both 12-month and lifetime EDs prevalence. Significant mental health comorbidities associated with 12-month EDs were anxiety, mood, and impulse-control disorders, while lifetime EDs were significantly related to all disorders. A similar percentage of respondents that reported having ED-related treatment at some point in their lifetime utilized healthcare and nonhealthcare sector. There was a significant relationship between body mass index category, and lifetime BED and BN.

Discussion: The 12-month prevalence of EDs in the Saudi population was higher than the EDs rates reported worldwide. These findings can help healthcare experts, and policymakers in the implementation of initiatives for raising awareness of EDs among the Saudi population, and the development of a country-wide plan for the prevention of EDs.

Public Significance Statement: The study presents data on the prevalence, correlates, and help-seeking behaviors of AN, BN, and BED, in the Saudi National Mental Health Survey (SNMHS). Obtaining information on this underrepresented region is essential due to the large differences in cross-national data in addition to cultural beliefs about mental illness and treatment seeking to exert an important influence on eating disorders. Such knowledge could provide a better understand of mechanisms underlying...
1 | INTRODUCTION

Three primary EDs are currently recognized in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5)—anorexia nervosa (AN), bulimia nervosa (BN), and binge-eating disorder (BED) (APA, 2013). For individuals with these EDs, the associations with body mass index (BMI) depend on the ED type (Kessler et al., 2013; Scott et al., 2018; Udo & Grilo, 2018). In addition, EDs are frequently associated with role impairment and other mental disorders, such as mood disorders, substance abuse, and anxiety disorders (Hudson et al., 2007; Keski-Rahkonen & Mustelin, 2016; Kessler et al., 2013; Scott et al., 2018).

According to a recent meta-analysis and systematic review of studies from across the world, the lifetime prevalence of AN, BN and BED are 0.16%, 0.63% and 1.53%, respectively (Qian et al., 2021). Prevalence in the European population specifically ranges between 0.2% and 0.5% for AN and 0.1% and 0.9% for BN (Wittchen et al., 2011). Moreover, according to a community-based study conducted in Germany, the cumulative incidence of DSM-IV AN is 1.7%, and 1.1% for BN among young women; and overall, EDs affect 0.3% of men (Nagl et al., 2016). Similarly, a 2018 report on data from 15 countries—under the World Mental Health (WMH) Survey Initiative—indicates that the lifetime prevalence of EDs in the general population is on average 1.0% for BN, and 1.8% for BED (Scott et al., 2018); and the 12-month prevalence estimates are on average 0.4% for BN, and 0.8% for BED (Scott et al., 2018). The WMH results also indicate a relatively early age-of-onset for EDs, where the median age-of-onset (i.e., 21; range 19–24) for BN is earlier than that for BED (i.e., 24; range 21–31) (Scott et al., 2018).

Globally, EDs treatment rates are low (Kessler et al., 2013; Scott et al., 2018). About 47.4% of BN, and 38.3% of BED lifetime cases are reported to receive or seek treatment (Kessler et al., 2013; Scott et al., 2018). And about 25.9% and 9.8% of individuals with BN and BED, respectively, have received treatment in the preceding 12 months (Kessler et al., 2013). Although EDs prevalence estimates seem comparatively lower in the general population, the burden imposed by these disorders on affected individuals is high, given the increase in mortality and morbidity rates (Crow et al., 2009; Hudson et al., 2007; Smink et al., 2012). Furthermore, this burden extends to the caretakers of the individuals suffering from EDs, and the community in general (Raenker et al., 2013).

Research on EDs in the Kingdom of Saudi Arabia (KSA) has been conducted in local settings (Alhazmi & Al Johani, 2019; Aljormaa, 2018; AlShebali et al., 2021; Alasulaiman & El Keshky, 2019; Alwosaifer et al., 2018; Anitha et al., 2019; Fatima et al., 2018; Hussein et al., 2016; Taha et al., 2018), mostly focusing on university students, and using screening instruments such as Eating Attitude Test-26 (EAT-26; Garner et al., 1982), and the Eating Disorder Diagnostic Scale–DSM-5 (EDDS; Stice et al., 2000). There is a need for research studies aimed at determining the prevalence of EDs in representative population samples, using standardized assessments.

The Saudi National Mental Health Survey (SNMHS) was implemented to address the research gaps in psychiatric epidemiology within the context of the KSA, including the lack of studies involving national representation, and using standardized methodology as part of the WMH Survey Consortium. Under the World Health Organization (WHO)-WMH Survey Initiative (Alonso et al., 2013; Kessler & Üstün, 2008; Scott et al., 2018), psychiatric epidemiological surveys of common mental disorders in various countries across the world are coordinated. Standardized design and methods are used in WMH surveys to ensure valid data on the prevalence, burden, and treatment of mental disorders. This strategy provides insights for policy makers to better understand EDs, their associated burden, as well as data related to treatment (Harkness et al., 2008; Heeringa et al., 2008; Pennell et al., 2008).

The SNMHS is a nationally representative population household survey conducted across various regions of the KSA, to establish the prevalence of lifetime and 12-month mental disorders, including the three EDs diagnoses (AN, BN, and BED). The survey also provides data on age-of-onset distributions, duration, and association with sociodemographic factors (Altwaijri, Al-Habeeb, et al., 2020; Altwaijri, Al-Subaie et al., 2020) of AN, BN, and BED.

2 | METHODS

2.1 | Sample

The SNMHS relied on a multistage clustered area probability sampling design, involving 4004 male and female Saudi respondents, aged between 15 and 65 years old, living in the KSA (Al-Subaie et al., 2020; Mneimneh et al., 2020). Fieldwork was conducted between 2014 and 2016, with pauses for Ramadan and summer months (due to very high temperatures), across 11 administrative areas of the country. Two administrative areas (Jazan and Najran) were excluded because of a political conflict at the time of the survey. Face-to-face interviews were held with respondents in their homes to administer the survey. The response rate was 61%. Further details of the survey procedures can be found elsewhere (Aradati et al., 2019; Hyder et al., 2017; Kessler et al., 2020; Shahab et al., 2017).

The interviews were administered in two parts. Part I included a core diagnostic assessment and was administered to all respondents.
(n = 4004), while Part II included questions about the risk factors, consequences, other correlates, and assessments of additional disorders. Part II was administered to all Part I respondents with any core disorder, and to a 25% probability sub-sample of other Part I respondents (n = 1981). All respondents provided informed consent prior to the interview. The field procedures and the consent form were approved by the Institutional Review Board committee at the KFSH&RC, Riyadh.

2.2 | Measures

2.2.1 | Diagnostic assessment

Psychiatric diagnosis was based on the WHO Composite International Diagnostic Interview 3.0 (WMH-CIDI; Kessler & Üstün, 2004)—a fully structured interview administered by trained lay interviewers that generates diagnoses based on the criteria of both the ICD-10 and DSM-IV diagnostic system. The computerized version of CIDI (CAPI) was translated into Arabic and adapted to the local context (Mneimneh et al., 2018; Shahab et al., 2019).

In the SNMHS, the DSM-IV criteria were used to allow comparison with previous WMH epidemiological surveys. Disorders were grouped as follows: anxiety disorders (panic disorder, generalized anxiety disorder, agoraphobia without panic disorder, social phobia, posttraumatic stress disorder, obsessive–compulsive disorder, separation anxiety disorder), mood disorders (major depressive disorder, bipolar disorder I or II), impulse control disorders (conduct disorder, attention-deficit/hyperactivity disorder, intermittent explosive disorder), substance use disorders (alcohol and drug abuse and dependence), and the EDs of AN, BN, and BED. The DSM-IV organic exclusion rules and diagnostic hierarchy rules were applied to all diagnoses except substance use disorders, where misuse was defined with or without dependence.

The EDs diagnostic algorithm, and the details of the assessment of age of onset, and clinical validation studies can be found in Appendix Table A. For BN and BED diagnosis, the symptom questions were closely matched to the DSM-IV criteria with two exceptions. First, DSM-IV BED requires 6 months of regular BN; only 3 months were adopted in the CIDI, in line with the proposed DSM-5 criteria (Hudson et al., 2012; Keel et al., 2012; Trace et al., 2012), and DSM-IV BN criteria (Wilson & Sysko, 2009). Second, for BED, DSM-IV requires loss of control, and distress. Rather than addressing these symptoms directly, the CIDI probes into the attitudes and behaviors indicative of loss of control and distress (upset at out-of-control eating; feeling guilty, upset, or depressed after binging; continued eating after full; eating until uncomfortably full; eating alone because of embarrassment about volume eaten). These differences are outlined in Appendix Table B.

2.2.2 | Socio-demographic data

Variables that describe the sociodemographic characteristics were extracted for all respondents from the survey data. This included gender (male/female), age (categorized as 15–24 years, 25–34 years, 35–49 years, and 50+ years), completed years of education (categorized as 0–6 years, i.e., low; 7–9 years, i.e., low average; 10–15 years, i.e., high average; and 16+ years, i.e., high), and income (below average, high average, high). Family income was defined as the household income divided by the number of household members. A case was assigned a category on a scale based on the per capita income of the respondent’s household divided by the median income for the country, where it was categorized as low if it was less than 50% of the median value, low-average if equal to the median, high-average if up to twice the median, and high if greater than twice the median.

Socioeconomic status was measured using neighborhood observation records (low, medium, and high). This is a subjective measure, where interviewers recorded their assessment of the neighborhood for each household. Finally, urbanicity (rural and urban), and region (Central, Eastern, Northern, Southern, and Western) based on the administrative areas were extracted from the sample frame (2010 Census) provided by the General Authority for Statistics in Saudi Arabia.

2.2.3 | Seeking treatment

In Part II of the interview, respondents were asked if they had sought treatment from any of the 14 professionals listed for “problems with their emotions or nerves or use of alcohol or drugs” in the past 12 months. Further questions were asked to ascertain the age when treatment was first obtained, types of treatment, and number of visits to each of these types of professionals. Summary measures of treatment were created separately for the healthcare sector, and the nonhealthcare sector. Healthcare sector treatment was further divided into treatment in the general medical sector, and the mental health specialty sector. Nonhealthcare sector was classified into human services and complementary-alternative medicine (CAM).

Several treatment questions were also administered at the end of each diagnostic section, where respondents were asked whether they had ever sought help from a medical doctor or any other professional about the disorder assessed in the interview and, if so, at what age they first sought treatment for the disorder. Responses to these disorder-specific questions and the more general treatment questions were combined in the descriptive analyses of treatment prevalence.

Respondents that reported having AN, BN, or BED within the preceding 12 months were asked to assess the severity of recent eating problems based on the Sheehan Disability Scale (SDS; Leon et al., 1997). The modified SDS requires responses on a 0–10 visual analogue scale, ranging from none (0) to very severe (10), to characterize the severity of impairment in each of four areas of living (work, home management, social life, and relationships). The SDS has excellent internal consistency reliability, and good concordance with the objective measures of role functioning (Hambrick et al., 2004; Leon et al., 1997; Ormel et al., 2008; Pallanti et al., 2006). For calculating the BMI, respondents were asked to self-report their height and weight.
TABLE 1  Sociodemographic correlates of 12-month and lifetime ED diagnosis (AN, BN, or BED) in the Saudi National Mental Health Survey

<table>
<thead>
<tr>
<th>Sociodemographic characteristics</th>
<th>12 month disorders (N = 91)</th>
<th>Lifetime disorders (N = 169)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1.52</td>
<td>(0.88–2.62)</td>
</tr>
<tr>
<td>Male</td>
<td>1.00</td>
<td>—</td>
</tr>
<tr>
<td>$\chi^2_1$</td>
<td>2.27</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 15–24</td>
<td>4.33</td>
<td>(0.59–32.02)</td>
</tr>
<tr>
<td>Age 25–34</td>
<td>6.30</td>
<td>(0.94–42.37)</td>
</tr>
<tr>
<td>Age 35–49</td>
<td>2.82</td>
<td>(0.42–18.78)</td>
</tr>
<tr>
<td>Age 50+</td>
<td>1.00</td>
<td>—</td>
</tr>
<tr>
<td>$\chi^2_3$</td>
<td>7.21</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1.00</td>
<td>—</td>
</tr>
<tr>
<td>Low average</td>
<td>3.43</td>
<td>(0.67–17.49)</td>
</tr>
<tr>
<td>High average</td>
<td>2.14</td>
<td>(0.42–10.86)</td>
</tr>
<tr>
<td>High</td>
<td>5.16</td>
<td>(1.08–24.73)</td>
</tr>
<tr>
<td>$\chi^2_3$</td>
<td>9.78&lt;sup&gt;a&lt;/sup&gt;</td>
<td>18.50&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>SES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>0.80</td>
<td>(0.31–2.1)</td>
</tr>
<tr>
<td>Middle</td>
<td>0.88</td>
<td>(0.43–1.8)</td>
</tr>
<tr>
<td>High</td>
<td>1.00</td>
<td>—</td>
</tr>
<tr>
<td>$\chi^2_2$</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>1.00</td>
<td>—</td>
</tr>
<tr>
<td>Separated/widowed/divorced</td>
<td>3.29</td>
<td>(1.32–8.17)</td>
</tr>
<tr>
<td>Never married</td>
<td>0.94</td>
<td>(0.44–2.01)</td>
</tr>
<tr>
<td>$\chi^2_2$</td>
<td>7.46&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.65</td>
</tr>
<tr>
<td>Urbanicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>1.00</td>
<td>—</td>
</tr>
<tr>
<td>Rural</td>
<td>1.68</td>
<td>(0.86–3.28)</td>
</tr>
<tr>
<td>$\chi^2_1$</td>
<td>2.32</td>
<td></td>
</tr>
<tr>
<td>Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>1.00</td>
<td>—</td>
</tr>
<tr>
<td>Eastern</td>
<td>0.67</td>
<td>(0.31–1.48)</td>
</tr>
<tr>
<td>Northern</td>
<td>0.51</td>
<td>(0.12–2.07)</td>
</tr>
<tr>
<td>Southern</td>
<td>1.42</td>
<td>(0.65–3.09)</td>
</tr>
<tr>
<td>Western</td>
<td>0.51</td>
<td>(0.24–1.11)</td>
</tr>
<tr>
<td>$\chi^2_4$</td>
<td>6.95</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>0.83</td>
<td>(0.42–1.62)</td>
</tr>
<tr>
<td>Low average</td>
<td>0.35</td>
<td>(0.09–1.33)</td>
</tr>
<tr>
<td>High average</td>
<td>1.55</td>
<td>(0.77–3.14)</td>
</tr>
<tr>
<td>High</td>
<td>1.00</td>
<td>—</td>
</tr>
<tr>
<td>$\chi^2_3$</td>
<td>5.87</td>
<td></td>
</tr>
</tbody>
</table>

Note: Part II weights were used (N = 1981). Anorexia nervosa (AN) was not included in 12-month disorders due to no cases.

<sup>a</sup>p value <.05.

<sup>b</sup>p value <.001.
2.3 | Analysis

The SNMHS used a complex sample design that required weights to be assigned to Part I and Part II sample (Mneimneh et al., 2020). These weights were created to adjust for the population distribution by gender, age and region, according to the 2010 census data. Since the data analyzed in this study included variables from only Part II, all the sample-related information and weights pertain to Part II. The data were analyzed using SAS 9.4 (SAS Institute Inc., Cary, NC, USA) for Windows. The PROC SURVEYFREQ procedures were adopted to create cross-tabulations of 12-month and lifetime disorder prevalence, mental health comorbidities, role impairment, number of days out of role, BMI-related risk factors, and treatment. Lifetime and 12-month treatment prevalence were calculated across the treatment sectors based on the information provided by the respondents, who obtained treatment for at least one disorder during their lifetime and within the preceding 12 months. Logistic regression models were applied to the 12-month and lifetime EDs data to generate odds ratios (ORs) with 95% confidence intervals for socio-demographic variables, using the PROC LOGISTIC procedures. The significance was calculated using the Wald chi-squared test with \( p < .05 \).

3 | RESULTS

3.1 | Prevalence of EDs

The 12-month prevalence of any of the three EDs was 3.2%, where 2.1% was attributed to BED and 1% to BN. Overall lifetime prevalence of any of the EDs was 6.1%, including 2.6% respondents with BED, 2.8% with BN and 0.6% with AN. The mean age-of-onset was 19.73 years (IQR 20.0 [16.0–23.0]) for BN, 21.32 years (IQR 20.0 [17.0–24.0]) for BED, and 14.4 years (IQR14.0 [14.0–14.0]) for AN.

3.2 | Socio-demographic correlates of EDs (i.e., AN, BN, or BED)

As shown in Table 1, education and marital status were significantly associated with both 12-month and lifetime EDs prevalence. Respondents with high level of education were significantly more likely than respondents with lower levels of education to have had an ED (AN, BN, or BED) in the preceding 12 months. In addition, those who were separated/widowed/divorced (OR 3.29) were more likely than those who were married or never married to have an ED in the preceding 12 months.

3.3 | Mental health comorbidities

As shown in Table 2, there was an overall significant association between EDs and almost all other DSM-IV disorders. In particular, 12-month ED prevalence was significantly related to anxiety disorders (OR 4.29), mood disorders (OR 5.18), and impulse-control disorders (OR 5.09). Lifetime EDs were also significantly related to all DSM-IV disorders.

3.4 | Role impairment

As shown in Table 3, role impairment was assessed only for respondents who reported AN, BN, or BED in the last 12 months. Some role impairment (mild, moderate, or severe) was reported in at least one role domain (36.4%–64.8%) irrespective of the ED type. However, only 3.5%–20.7% of individuals with any ED reported severe role impairment, compared to those with BN (3.0%–19.7%) or BED (3.8%–21.1%).

3.5 | Body mass index

As shown in Table 4, there was a statistically significant relationship between BMI category and lifetime diagnosis of BED or
Respondents classed as overweight or obese were more likely to be diagnosed with BED, compared to underweight individuals or those with normal weight. Overweight individuals were more likely to be diagnosed with BN, compared to those in the underweight, normal, or obese BMI categories. Similarly, individuals with overweight or obese classification were significantly more likely to be diagnosed with BED in the preceding 12 months.

### 3.6 Seeking treatment

As shown in Table 5, a similar percentage of respondents, who reported seeking ED treatment at some point in their lifetime, utilized healthcare and nonhealthcare sector (59.6% and 54.4%, respectively). The majority relied on human services (50.9% for BN, and 49.2% for BED), followed by general medical care (40.6% for BN, and 38.3% for BED), mental health specialists (44.5% for BED, and 23.7% for BN), and the CAM sector (30.8% for BED and 6.5% for BN).

### DISCUSSION

The aim of the present study—which marks the first attempt to use nationally representative household probability samples in the KSA—was to assess the prevalence of AN, BN, and BED in Saudi Arabia. Our findings revealed that 6.1% of the analyzed sample had experienced one of these EDs during their lifetime, and 3.2% in the last 12 months. These estimates could not be compared with the

<table>
<thead>
<tr>
<th>TABLE 3</th>
<th>Impairment in role functioning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bulimia nervosa</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Impairment (mild, moderate, severe)</td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>16</td>
</tr>
<tr>
<td>Work</td>
<td>13</td>
</tr>
<tr>
<td>Relationships</td>
<td>13</td>
</tr>
<tr>
<td>Social</td>
<td>11</td>
</tr>
<tr>
<td>Any</td>
<td>21</td>
</tr>
<tr>
<td>Severe impairment</td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>4</td>
</tr>
<tr>
<td>Work</td>
<td>3</td>
</tr>
<tr>
<td>Relationships</td>
<td>3</td>
</tr>
<tr>
<td>Social</td>
<td>5</td>
</tr>
<tr>
<td>Any</td>
<td>9</td>
</tr>
</tbody>
</table>

Note: Part II weights were used. Anorexia nervosa (AN) was not included because no cases were diagnosed in 12-month disorders.

<table>
<thead>
<tr>
<th>TABLE 4</th>
<th>Current body mass index class among respondents with bulimia nervosa and binge-eating disorder in the Saudi National Mental Health Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Binge-eating disorder</td>
</tr>
<tr>
<td></td>
<td>OR</td>
</tr>
<tr>
<td>Underweight</td>
<td>0.26</td>
</tr>
<tr>
<td>Normal</td>
<td>1</td>
</tr>
<tr>
<td>Overweight</td>
<td>3.38</td>
</tr>
<tr>
<td>Obese</td>
<td>2.51</td>
</tr>
</tbody>
</table>

Note: Anorexia nervosa (AN) was not included due to low case numbers; low cases for lifetime (n = 5) and no cases for 12-month disorders (n = 0). 12-month disorders: binge-eating disorder (n = 51) and bulimia nervosa (n = 40). Lifetime disorders: binge-eating disorder (n = 86) and bulimia nervosa (n = 78).

*a p value <.05.
*b BMI: <18.5.
*c BMI: 18.5–24.9.
*e BMI: >30.
<table>
<thead>
<tr>
<th>Healthcare treatment</th>
<th>Non-healthcare treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mental health specialty</td>
</tr>
<tr>
<td></td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>95% CI</td>
</tr>
<tr>
<td>Binge-eating disorder</td>
<td>44.51</td>
</tr>
<tr>
<td></td>
<td>38.32</td>
</tr>
<tr>
<td>Bulimia nervosa</td>
<td>23.65</td>
</tr>
<tr>
<td></td>
<td>40.62</td>
</tr>
<tr>
<td>Total</td>
<td>37.22</td>
</tr>
</tbody>
</table>

Note: Part II sample, prevalence calculated using part II weights. CAM includes internet use, self-help groups, any other healer, such as an herbalist, a chiropractor, or a spiritualist, and other alternative therapy. Human Services includes social workers or counselors in any setting other than a specialty mental health setting, and religious or spiritual advisors, such as a Shaikh or Imam. Some respondents were treated in multiple sectors; thus, the sum exceeds 100%. Anorexia nervosa (AN) was not included because of the low cases for lifetime disorders ($n = 5$).

Number of respondents with lifetime disorder who had any treatment.
Total includes both binge-eating disorder and bulimia nervosa.
EDs prevalence reported in previous studies because our study did not include the EDs not otherwise specified (EDNOS) diagnosis, which can potentially represent the majority of EDs cases, as diagnosed by the DSM-IV (Qian et al., 2021).

In a large study that included 24,124 participants from 14 countries and used the same assessment tool, the worldwide lifetime prevalence for BN was 1% (ranging from 0% in Romania to 2% in Brazil) (Kessler et al., 2013), compared to 2.8% in the KSA, as indicated in our study. As for the 12-month BN prevalence in Saudi Arabia, the estimate was 1%, compared to 0.4% at the global level, ranging from 0% in Romania and Italy to 0.9% in Brazil (Kessler et al., 2013). These prevalence estimates were slightly higher, but comparable to findings of a recent meta-analysis of studies from across the world, where the lifetime prevalence of BN was reported as 0.63% (Qian et al., 2021).

For BED, the lifetime prevalence in Saudi Arabia was 2.6%, compared to 1.9% globally (ranging from 0.2% in Romania to 4.7% in Brazil), and the 12-month prevalence in Saudi Arabia was 2.1%, compared to 0.8% worldwide, ranging from 0.1 in Romania to 1.8% in Brazil (Kessler et al., 2013). These findings were in line with the meta-analysis of global studies, which indicated that BED lifetime prevalence was 1.53% (Qian et al., 2021). Furthermore, in a recent study based in the United States (US) with a nationally representative sample of 36,309 adults using DSM-5 criteria, BN, and BED lifetime prevalence were 0.28%, and 0.85%, respectively (Udo & Grilo, 2018). The lower percentage of BN in this study was explained as being potentially due to methodological issues, such as the placement of ED-related questions at the end of the interview which may have resulted in fatigue (Udo & Grilo, 2018). Similarly, a European study based on data obtained from six countries (with 21,425 respondents in total)–published in 2009–yielded 0.48%, 0.51%, and 1.12% as lifetime prevalence estimates for AN, BN, and BED, respectively (Preti et al., 2009). Our findings were additionally supported by a recent systematic review and meta-analysis of data related to EDs in Western Asia (including Saudi Arabia), where relatively higher prevalence estimates (1.59%, 2.41%, and 3.51%) were reported for AN, BN, and EDNOS, respectively. These high percentages were also likely due to the methodological differences among studies, wherein screening questionnaires and semi-structured diagnostic interviews were used (Alfalahi et al., 2021).

Altogether however, it is difficult to pinpoint an explanation, or the causes of BN and BED and their high prevalence estimates in Saudi Arabia, given the lack of published literature in this regard. This is a knowledge gap that needs to be addressed by the future studies.

In our study, only five cases of AN (for lifetime; and 0 cases for the past 12 months) were identified. Consequently, correlates of AN were not reported in detail. This finding concurred with the results of a local study conducted by AlShebali et al. (2021) including female university students, where no AN cases were identified. Similarly, AN lifetime prevalence was reported to be as low as 0.16% in a meta-analysis of global studies on EDs (Qian et al., 2021). In the US, AN lifetime prevalence was reported to be 0.8%, according to the DSM-5 (Udo & Grilo, 2018). Moreover, a European study—that used the DSM-IV diagnostic criteria—reported AN lifetime prevalence as 0.48% (Preti et al., 2009). Our results showing a very small number of AN cases were also supported by other studies that suggested potential issues related to assessment of AN specifically using the CIDI (Lu et al., 2015; Thornton et al., 1998). Furthermore, using DSM-5 diagnostic criteria for disorder assessments may be related to increased prevalence estimates for EDs, compared to estimates generated using the DSM-IV (Flament et al., 2015; Lindvall-Dahlgren et al., 2017; Mancuso et al., 2015; Qian et al., 2021).

According to our findings, age was not associated with a greater risk of developing ED, in contrast to previously published data; and unlike other authors that reported greater ED prevalence among females than males, we found no gender-based differences (Hudson et al., 2007; Kessler et al., 2013; Nagl et al., 2016; Preti et al., 2009). This could be due to analyzing the three EDs (AN, BN, and BED) as a group vs. individually. Our findings on gender were also in line with a systematic review of extant research on the impact of social media on body image and disordered eating outcomes, which found that sex was not a moderating factor in this relationship (Holland & Tiggemann, 2016). Moreover, higher education and being separated/divorced/widowed (but no other demographic factors) were associated with higher risk for an ED in our sample.

Having other mental disorders was associated with a seven-fold increase in the lifetime EDs prevalence, with the strongest association among individuals with a history of mood disorders (6-fold), and the weakest for those with impulse control disorders (4-fold), in line with the available evidence (Hudson et al., 2007; Preti et al., 2009). Role impairment related to any of the three EDs was also high in our study (65%), and was associated with severity, consistent with previously reported results (Hudson et al., 2007; Kessler et al., 2013; Preti et al., 2009). Increased body weight was associated with BN and BED, concuring with previously reported findings (Hudson et al., 2007; Kessler et al., 2013; Preti et al., 2009). Indeed, obesity prevalence in Saudi Arabia is among the highest worldwide, as indicated by a recent study with 25% of the sample–comprising of 4709 participants recruited from all 13 regions in the country–falling in the BMI range of ≥30 (Althumiri et al., 2021). Based on this finding, screening for BN and BED in larger-bodied individuals is suggested.

Even though all EDs are observed to onset at a young age, in our sample, age of onset for BN was slightly younger (19.73 years old) than that for BED (21.32 years old), concurring with the worldwide findings reported for 14 countries (Kessler et al., 2013). About 60% of our sample sought treatment for BN or BED from mental health services or the general medical sector. This was in line with previous global studies (Bohrer et al., 2017; Coffino et al., 2019; Kessler et al., 2013), but differed with a European report (Preti et al., 2009), likely due to growing awareness about EDs and seeking treatment in the KSA. Moreover, almost half of the individuals with BN or BED in our sample sought human services. This was consistent with previous studies, which observed that patients with psychiatric symptoms–in the Arabian Gulf region–visited faith-healers before seeking medical treatment. For example, in a study from the United Arab Emirates, about 60% of individuals with mood disorders visited a faith-healer before visiting medical facilities (Sherra et al., 2017). Another local study found that the majority (>70%) of faith-healer visitors had psychiatric diagnoses (Alosaimi et al., 2014). Stigma and young age have
been reported to be the main barriers to seeking treatment for EDs, in addition to the finding that individuals seek/receive treatment for BN and BED later, compared to AN (Hamilton et al., 2022).

5 | RECOMMENDATION

For future studies, we recommend the use of DSM-5 diagnostic criteria to assess the prevalence and correlates of EDs in Saudi Arabia. Prospective studies must also bear in mind that our findings cannot be compared with studies that yielded estimates using 6-months duration as a diagnostic criteria for BED.

6 | LIMITATIONS

Our findings should be interpreted with caution, given that recall bias may have affected the respondents’ answers, especially if they experienced the symptoms a long time ago (Cannell et al., 1977). However, we attempted to address this by using 3-months duration as diagnostic criteria for EDs, rather than 6-months duration for reporting symptoms. Additionally, for binge eating, the CIDI probes into the attitudes and behaviors indicative of loss of control and distress, in contrast to DSM-IV, which focuses on the actual loss of control and distress. Therefore, the CIDI may have introduced some imprecision into the assessment of binge eating in our study. With regard to blind clinical reappraisals with the Structured Clinical Interview for DSM-IV (SCID) for EDs, these were not done in the SNMHS. This was because prior clinical appraisal studies have consistently found good concordance between diagnoses based on the CIDI, and those based on blinded SCID clinical reappraisal interviews (Kessler et al., 1998; Wittchen, 1994; Wittchen et al., 1995; Wittchen et al., 1996). Finally, the questions in the CIDI do not cover other possible disorders within the EDNOS category provided in DSM-IV (APA, 2000). As such, our prevalence data pertain only to AN, BN, and BED, and do not reflect the full extent of ED pathology in Saudi Arabia.

7 | CONCLUSION

The 12-month prevalence of EDs (AN, BN, BED) in the Saudi population was higher than the worldwide rates; and was greater among younger respondents in the KSA. Moreover, mental disorders were associated with EDs lifetime prevalence as well as serious impairment in psychosocial functioning. More than half of the individuals with EDs sought treatment, where mental health services were typically provided for BN, and BED was treated in the general medical sector. These crucial findings can help the healthcare experts, and policymakers in Saudi Arabia to accelerate the implementation of initiatives aimed at raising the awareness of EDs in general population, and developing a country-wide plan for reducing the EDs prevalence. Early detection and treatment focusing on children and adolescents should be the main priority of healthcare professionals.

AUTHOR CONTRIBUTIONS

Ahmad Nayef AlHadi: Conceptualization; supervision; writing – original draft; writing – review and editing. Amani Almeharish: Conceptualization; data curation; resources; writing – original draft; writing – review and editing. Lisa Bilal: Conceptualization; project administration; supervision; writing – original draft; writing – review and editing. Abdulhameed Al-Habeeb: Data curation; funding acquisition; project administration; writing – review and editing. Abdullah Al-Subaie: Conceptualization; project administration; writing – review and editing. Mohammad Talal Naseem: Data curation; formal analysis; methodology; writing – review and editing. Yasmin Altwaijri: Conceptualization; data curation; methodology; resources; supervision; writing – review and editing.

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DATA AVAILABILITY STATEMENT

A public use dataset is not available because of restrictions in the informed consent language used to recruit respondents and WMH consortium agreements. However, a de-identified minimal dataset for quality assurance can be obtained by contacting the corresponding author at: yasmint@kfshrc.edu.sa.

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REFERENCES


SUPPORTING INFORMATION
Additional supporting information can be found online in the Supporting Information section at the end of this article.