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Lifetime treatment of DSM-IV mental disorders in the Saudi National Mental Health Survey

Abdullah S. Al-Subaie[1,2] | Yasmin A. Altwaijri[1,3,4] | Abdulhameed Al-Habeeb[5] | Lisa Bilal[1,3,4] | Amani Almeharish[4] | Nancy A. Sampson[6] | Howard Liu[6] | Ronald C. Kessler[6]

[1]SABIC Psychological Health Research & Applications Chair (SPHRAC), College of Medicine, King Saud University, Riyadh, Saudi Arabia

[2]Edrak Medical Center, Riyadh, Saudi Arabia

[3]King Salman Center for Disability Research, Riyadh, Saudi Arabia

[4]Biostatistics, Epidemiology and Scientific Computing Department, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia

[5]National Center for Mental Health Promotion, Ministry of Health, Riyadh, Saudi Arabia

[6]Department of Health Care Policy, Harvard Medical School, Boston, Massachusetts

Correspondence
Yasmin A. Altwaijri, Biostatistics, Epidemiology and Scientific Computing Department, King Faisal Specialist Hospital and Research Centre, P.O. Box 3354, MBC-03, Riyadh 11211, Saudi Arabia.
Email: yasmint@kfshrc.edu.sa

Abstract

Objectives: To estimate lifetime treatment rates of mental disorders in the Saudi National Mental Health Survey (SNMHS).

Methods: The SNMHS is a face-to-face community epidemiological survey in a nationally representative household sample of citizens ages 15–65 in the Kingdom of Saudi Arabia (KSA) (*n* = 4,004). The World Health Organization (WHO) Composite International Diagnostic Interview (CIDI) was used to produce estimates of lifetime prevalence and treatment of common DSM-IV mental disorders.

Results: Lifetime treatment ranged from 52.2% for generalized anxiety disorder to 20.3% for attention deficit/hyperactivity disorder, had a median (interquartile range) of 35.5% (30.6–39.5%) across disorders, and was 28.3% for people with any lifetime DSM-IV/CIDI disorder. Half (49.0%) of patients received treatment in the mental health specialty sector, 35.9% in the general medical sector, 35.2% in the human services sector, and 15.7% in the complementary-alternative medical sector. Median (interquartile range) delays in help-seeking after disorder onset among respondents who already sought treatment were 8 (3–15) years. Odds of seeking treatment are positively related to age-of-onset and comorbidity.

Conclusions: Unmet need for treatment of lifetime mental disorders is a major problem in KSA. Interventions to ensure prompt help-seeking are needed to reduce the burdens and hazards of untreated mental disorders.

KEYWORDS
mental disorders, Saudi National Mental Health Survey, treatment, WHO World Mental Health Survey Initiative

1 | INTRODUCTION

Despite the existence of effective treatments (Andrews, Issakidis, Sanderson, Corry, & Lapsley, 2004; Chisholm et al., 2016; World Health Organization, 2010) the majority of people with mental disorders continue to go untreated, even in economically advantaged societies (Alonso et al., 2018; Degenhardt et al., 2017; Thornicroft et al., 2017). One promising strategy for addressing this problem is to

invest more treatment resources early in the disease course, before disorders become severe and more difficult to treat (Goi et al., 2015; Kvitland et al., 2016). Given the early age-of-onset distributions of mental disorders seen in the Saudi National Mental Health Survey (SNMHS; Altwaijri et al., 2020), this kind of early screening and initiation of treatment in the Kingdom of Saudi Arabia (KSA) could take advantage of the fact that most people who develop mental disorders do so during their school years. This means that the infrastructure of educational institutions can be used to facilitate early screening and treatment. This early treatment could also help reduce the many deleterious life social consequences that are known to be associated with early onset untreated mental disorders, such as reduced educational attainment (Mojtabai et al., 2015), unemployment (Kaspersen et al., 2016), marital instability (Breslau et al., 2011), and suicide (Chesney, Goodwin, & Fazel, 2014).

A crucial first step in developing a plan for early treatment is to document current patterns and predictors of speed of initial professional help-seeking after first onset of a mental disorder. Little is known about these patterns and predictors, as most mental health services research focuses on recent treatment of current episodes rather than initial treatment of incident cases (Harvey & Gumport, 2015; Olfson, Blanco, & Marcus, 2016). However, the few studies that examined initial treatment found consistently that delays lasting many years after disorder onset are the norm (Stagnaro et al., 2019; ten Have, de Graaf, van Dorsselaer, & Beekman, 2013). The most extensive studies of this sort are from the World Health Organization (WHO) World Mental Health (WMH) Surveys, where median delays in seeking treatment for common mental disorders across countries were found to be in the range 1–14 years for mood disorders, 3–30 years for anxiety disorders, and 6–18 years for substance use disorders (Wang et al., 2007).

The current report examines these patterns of delay in initial help-seeking for treatment of mental disorders in the SNMHS. As noted in earlier papers in this issue, the SNMHS is a nationally representative household survey of the prevalence and correlates of common mental disorders in KSA that is carried out as part of WMH (Alonso, Chatterji, & He, 2013; Kessler & Üstün, 2008; Scott, de Jonge, Stein, & Kessler, 2018). Standardized WMH methods were used in SNMHS field implementation to provide valid data on the prevalence and distribution of mental disorders and unmet need for treatment of these disorders (Harkness et al., 2008; Heeringa et al., 2008; Pennell et al., 2008).

Prior to the current report, the only data on delays in help-seeking for lifetime mental disorders in the Arab world came from the WMH survey in Lebanon (Karam et al., 2019). Results of that survey showed that only 19.7% of the Lebanese population with a history of mental disorders ever sought professional treatment and that median delays among those who eventually obtained treatment were in the range 6–28 years across disorders. We examine patterns and predictors of comparable data on lifetime treatment and delays in seeking such treatment among people with a lifetime history of mental disorders in the SNMHS. Although most Saudi citizens have free access to psychoactive medications, nondrug psychological treatments and

social services, 78% of the national budget for the treatment of mental disorders goes to mental hospitals (Qureshi, Al-Habeeb, & Koenig, 2013). Other than for acute-onset severe disorders like schizophrenia and mania, hospital treatment typically occurs only late in the course of anxiety disorders, mood disorders, and substance use disorders. Our initial expectation, then, was that the SNMHS data would show that delays in initial help-seeking for common mental disorders are pervasive.

2 | METHODS

2.1 | Sample

As detailed elsewhere (Shahab et al., 2017) and in earlier papers in this issue, the SNMHS is a nationally representative household survey of Saudi citizens ages 15–65 exclusive of those living in the two administrative areas involved in political conflict at the time of the survey (Jazan and Najran). Respondents were selected from a multistage clustered area probability household sample. Face-to-face interviews were carried out by trained lay interviewers. The estimated response rate was 61% using the American Association of Public Opinion Research RR2 definition (American Association for Public Opinion Research, 2016). (The response rate was "estimated" because we had to estimate resident eligibility data for households in which we were not able to obtain a listing. We assumed that the eligibility rate in these households was comparable to that of households in the same area in which we were able to obtain a household listing for purposes of calculating the estimated response rate.) We attempted to interview one randomly selected male and one randomly selected female in households that contained both males and females in the age range 15–65 and only one randomly selected respondent in households in which eligible residents were either all male or all female. A total of 4,004 interviews were completed. All interviews were conducted face-to-face by trained lay interviewers. The 61% response rate is comparable to the response rates in other WMH surveys in high-income countries (e.g., 60% in Australia and 57.8% in Germany; Kessler, Heeringa, Pennell, Sampson, & Zaslavsky, 2018).

As in other WMH surveys, a two-part case–control sampling design was used in the SNMHS to reduce the interview burden on respondents who did not meet criteria for any of the core mental disorders assessed in the survey. All respondents completed Part I of the interview, which assessed core disorders. All Part I respondents who met lifetime criteria for any of these disorders plus a probability subsample of other Part I respondents were then administered Part II, which assessed disorders of secondary interest and a wide range of correlates. A total of $n = 1,981$ respondents were administered the Part II interview, whereas the remaining $n = 2,023$ (i.e., 4,004 − 1,981) Part I respondents were terminated after completing Part I. The Part I sample was weighted to adjust for differential probabilities of selection within and between households and to match sample distributions to population distributions on the cross-classification of key socio-demographic and geographic data. The Part II sample was then

additionally weighted for the undersampling of Part I respondents without core disorders, resulting in the prevalence estimates of core disorders in the weighted Part II sample being identical to those in the Part I sample.

2.2 | Measures

2.2.1 | Field procedures

All interviews were carried out face-to-face by trained lay interviewers. The interview schedule and all training materials were translated and adapted using a standardized WHO translation protocol (Harkness et al., 2008; Shahab et al., 2019). Interviewer training procedures and field quality control procedures were used consistent with those in other WMH surveys (Heeringa et al., 2008; Pennell et al., 2008). Interviewers followed a strict fieldwork protocol to guarantee data quality. Details of these quality assurance and quality control procedures are described elsewhere (Hyder et al., 2017). Study procedures conformed to the international standards set by the Declaration of Helsinki. Written informed consent was obtained from respondents prior to beginning each interview. These consent procedures were approved by the Institutional Review Board committee at the King Faisal Hospital and Research Center.

2.2.2 | Mental disorders

Diagnosis was based on the WHO Composite International Diagnostic Interview Version 3.0 (CIDI 3.0; Kessler & Üstün, 2004), the same diagnostic interview schedule used in all other WMH surveys. The CIDI is a fully structured interview that is designed to be used by trained lay interviewers and that generates both ICD-10 (World Health Organization, 1991) and DSM-IV (American Psychiatric Association, 2000) diagnoses. DSM-IV criteria are used here. As discussed in more detail elsewhere in this issue (Kessler et al., 2020), diagnoses based on the CIDI have been shown to have good concordance with diagnoses based on blinded clinician interviews in previous WMH surveys (Haro et al., 2006). However, we modified the diagnostic thresholds for three disorders thought to be of special relevance to KSA: obsessive–compulsive disorder, separation anxiety disorder, and social phobia. Prevalence estimates of these disorders are likely to be conservative in the SNMHS. As a result, subthreshold manifestations of these disorders will be the focus of separate attention in subsequent analyses that will be reported as results become available. Patterns of treatment for the 19 disorders considered in the SNMHS were examined separately and also grouped into broad categories of anxiety disorders (i.e., panic disorder, agoraphobia without panic disorder, social phobia, generalized anxiety disorder, post-traumatic stress disorder, obsessive–compulsive disorder, and separation anxiety disorder), mood disorders (i.e., major depressive disorder, bipolar I–II disorder [BPD]), eating disorders (i.e., anorexia nervosa, bulimia

nervosa, binge-eating disorder), disruptive behavior disorders (i.e., attention-deficit/hyperactivity disorder, conduct disorder, oppositional defiant disorder, intermittent explosive disorder), and substance use disorders (i.e., alcohol and drug abuse and dependence). Organic exclusion rules and hierarchy rules were used to make all diagnoses. Retrospective age-of-onset (AOO) information was obtained for all disorders by asking a series of questions designed to avoid recall bias and maximize response rates.

2.2.3 | Lifetime treatment

All Part II respondents were asked if they ever obtained treatment from each of 14 different types of professionals for problems with emotions, nerves, mental health or use of alcohol or drugs. If so, questions were asked about age at first obtaining treatment, treatment in the past 12 months, and, when 12-month treatment was reported, number of visits from each of these types of professionals. Summary measures of 12-month treatment were created separately for the *healthcare* sector and the *non-healthcare* sector. Healthcare sector treatment was further divided into treatment in the *general medical sector* (family physicians, general practitioners, and other medical doctors, such as cardiologists or gynecologists–urologists, nurses, occupational therapists, and other general healthcare professionals) and the *mental health specialty sector* (psychiatrists and other mental health professionals such as psychologists, counselors, psychotherapists, mental health nurses, and social workers in a mental health specialty setting). *Non-healthcare* sector was classified into *human services* (including social workers or counselors in any setting other than a specialty mental health setting, and religious or spiritual advisors, such as a minister, priest, or rabbi) and *complementary-alternative medicine (CAM)* (including internet use, self-help groups, any other healer, such as an herbalist, a chiropractor, or a spiritualist, and other alternative therapy). We did not distinguish between inpatient and outpatient treatment, but all inpatient treatment was coded as mental health specialty treatment.

2.2.4 | Disorder-specific first treatment

A smaller number of treatment questions was also administered at the end of each diagnostic section, when respondents are asked whether they ever in their life saw a medical doctor or any other professional about the disorder assessed in that section of the interview and, if so, their age when they first sought treatment for the disorder. No information was collected about the kind of professional seen, but the term "other professional" was defined to include psychologists, counselors, spiritual advisors, herbalists, acupuncturists, and any other healing professionals. Responses to these disorder-specific questions and the more general treatment questions were combined in our descriptive analyses of treatment prevalence but only disorder-specific responses were used to make projections of eventual lifetime treatment.

2.2.5 | Socio-demographic predictors

Predictor variables include AOO of the focal disorder (coded into the categories early, early average, late average, and late, which were defined so as to divide the AOO distribution into rough quartiles using separate age cut points for each disorder), cohort (defined by age at interview in the categories 15–24, 25–34, 35–49, 50–65), and gender as female and male.

2.3 | Analysis methods

The data were weighted to adjust for differences in within-household and between-household probabilities of selection as well as for discrepancies between sample and population distribution due to random error and differential response across segments of the population defined by census variables known for the population. The Part II sample was additionally weighted by the inverse of probability of selection into Part II, resulting in weighted prevalence estimates of Part I disorders being the same in the Part II sample as in the larger Part I sample. Lifetime treatment rates for each disorder were then estimated separately among respondents with the disorders in question. As noted above, we did not limit these estimates to instances when respondents reported obtaining treatment for the specific disorders in question, as it is often the case that patients have multiple emotional problems when they seek treatment and obtain treatment for all of these problems at once even though they sought treatment for only one problem.

Projected lifetime probability of treatment up through age 65 was estimated using the two-part actuarial method implemented in SAS 8.2 (SAS Institute, 2001), but in this case we limited analysis to respondents who reported receiving treatment for the specific disorder in question and used the age of first treatment of that disorder in making the projections. The actuarial method differs from the more familiar Kaplan–Meier method (Kaplan & Meier, 1958) in using a more accurate way of estimating the timing of first treatments within a given year (Halli & Rao, 1992) but, like the Kaplan–Meier method, assumes constant conditional odds of initial treatment occurring at a given year of life across cohorts. Note that respondents were censored at the age of recency of the disorder in calculating conditional probability of seeking treatment in a year beyond the AOO of the disorder.

Predictors of lifetime treatment were examined using discrete-time survival analysis with a logistic link function and person-year treated as the unit of analysis (Efron, 1988). We did this separately for each of the disorders assessed in the SNMHS and then, as with prevalence, estimated separate models for all respondents with any disorder in a given category beginning with AOO of the first disorder and defining initial treatment as the age when treatment first occurred for any disorder in the category.

Standard errors (SEs) of prevalence estimates and logits were obtained using the Taylor series linearization method (Wolter, 1985) implemented in the SUDAAN software system (Research Triangle Institute, 2002). Logits and logits ±2SE were exponentiated to produce odds ratios (ORs) and 95% confidence intervals (95% CIs). Multivariate significance tests of predictor sets were made with Wald χ^2 tests using Taylor series design-based coefficient variance–covariance matrices. Statistical significance was evaluated consistently at the .05 level with two-sided tests.

3 | RESULTS

3.1 | Probability of lifetime treatment by disorder

Among respondents with any lifetime DSM-IV/CIDI disorder, 28.3% reported receiving some type of treatment in their life either for one or more of the specific disorders we assessed or for any "problems with emotions, nerves, mental health or problems with alcohol or drug use." (Table 1) The highest treatment rates among respondents with specific lifetime disorders (limiting the analysis to disorders in which a minimum of n = 30 respondents met lifetime criteria) are for generalized anxiety disorder (52.2%), panic disorder (49.7%), drug abuse (48.4%), binge-eating disorder (45.7%), post-traumatic stress disorder (PTSD; 39.5%), and obsessive–compulsive disorder (OCD; 38.1%). The lowest rates are for attention-deficit/hyperactivity disorder (ADHD; 20.2%), agoraphobia (23.7%), social phobia (26.1%), and intermittent explosive disorder (27.9%). The median and interquartile range (IQR; defined as the 25th–75th percentiles of the distribution across disorders) of treatment percentages across disorders are 35.5% and 30.6–39.5%.

3.2 | Variation in treatment across treatment sectors

Forty-nine percent (49.0%) of patients with a disorder who received treatment were treated in the mental health specialty sector, 35.9% in the general medical sector, 35.2% in the human services sector, and 15.7% in the CAM sector. (Table 2) These four proportions sum to more than 100%, indicating that some patients were treated in multiple sectors, but we do not delve into this issue in the current report. The distribution of treatment across sectors differs substantially by disorder. Proportional treatment is higher in the healthcare than non-healthcare sector for all disorders other than bulimia nervosa and highest in the mental health specialty sector for generalized anxiety disorder (73.6%), panic disorder (65.6%), agoraphobia (52.3%), social phobia (44.9%), post-traumatic stress disorder (68.8%), major depressive disorder (49.0%), BPD (66.3%), conduct disorder (60.6%), and drug abuse (70.4%). Proportional treatment is highest in the general medical sector, in comparison, for separation anxiety disorder (51.0%), OCD (46.6%), and ADHD (41.8%).

Within the healthcare sectors, 11 of the 15 disorders with enough cases to be considered separately are more likely to be treated in the mental health specialty sector than the general medical sector. In six cases these differences are substantial (i.e., greater than twice as

TABLE 1 Lifetime treatment among respondents with one or more lifetime DSM-IV/CIDI mental disorders in the Saudi National Mental Health Survey (n = 929)

	Any treatment		
	%	(SE)	(n)[a]
Anxiety disorders			
Panic disorder[b]	49.7	(8.6)	(63)
Agoraphobia[b]	23.8	(5.5)	(91)
Social phobia[b]	26.1	(4.2)	(187)
Generalized anxiety disorder[b]	52.2	(9.2)	(82)
Post-traumatic stress disorder[c]	39.5	(6.0)	(125)
Obsessive–compulsive disorder[c]	38.1	(6.0)	(133)
Separation anxiety disorder[c]	35.5	(5.0)	(197)
Any[b]	33.0	(3.0)	(588)
Mood disorders			
Major depressive disorder[b]	36.6	(3.3)	(376)
Bipolar I–II disorders[b]	32.5	(5.7)	(96)
Any[b]	35.4	(3.0)	(406)
Eating disorders			
Bulimia nervosa[a]	30.8	(7.5)	(79)
Binge-eating disorder[a,d]	45.7	(8.7)	(97)
Any	36.0	(6.8)	(167)
Disruptive behavior disorders			
Conduct disorder	30.6	(7.9)	(55)
Attention-deficit/hyperactivity disorder[c]	20.3	(3.9)	(197)
Intermittent explosive disorder[c]	27.9	(5.7)	(107)
Any[c]	21.9	(3.3)	(298)
Substance disorders			
Drug abuse[c]	48.4	(9.5)	(85)
Any[c]	45.7	(6.3)	(107)
Total			
Any disorder[c]	28.3	(2.3)	(929)

Abbreviation: CIDI, Composite International Diagnostic Interview.
[a]Number of respondents with the lifetime disorder regardless of treatment.
[b]Part I weight.
[c]Part II weight.
[d]Disorder with hierarchy.

many patients treated in the mental health specialty sector): generalized anxiety disorder, panic disorder, post-traumatic stress disorder, BPD, drug abuse, and binge-eating disorder. In none of the four cases where treatment is more likely in the general medical than the specialty mental health sector (adult separation anxiety disorder, OCD, ADHD, bulimia nervosa) are the differences substantial.

Within the nonhealthcare sector, treatment is more common in the human services sector than the CAM sector across all five classes of disorder (30.3–49.9 vs. 11.2–22.3%) and for 13 of 15 individual disorders. However, in only two of these 13 cases is the proportion treated in the human services sector greater than the proportion treated in one of the healthcare sectors: intermittent explosive

disorder (48.4 vs. 40.6–31.4% in the mental health specialty and general medical sectors) and bulimia nervosa (54.5 vs. 25.3–36.4% in the mental health specialty and general medical sectors). There were only two cases in which nonhealthcare treatment was more common in the CAM sector than the human services sector (agoraphobia without panic disorder, conduct disorder) and in both cases the proportion treated in each of the two healthcare sectors was substantially higher than in the CAM sector.

3.3 | Cumulative lifetime probabilities and median delays in treatment contacts

Treatment delays were pervasive among respondents who obtained treatment for specific mental disorders at some time in their life. (Table 3) The median (IQR) proportion of people who obtained disorder-specific treatment in the same year as onset was only 2.9% (1.4–6.3%) compared to about four times those numbers, 11.2% (4.6–24.6%), who reported obtaining disorder-specific treatment as of the time of interview. And, of course, additional people will presumably obtain disorder-specific treatment in the years after the survey. In fact, based on projections from our survival analyses, we estimate that 16.6% (6.5–27.0%) of the people whose disorders persist through age 65 will obtain treatment for these disorders by that time.

The highest rates of treatment in the year of onset are for generalized anxiety disorder and BPD (16.1–14.5%) followed by major depressive disorder and panic disorder (8.2–7.8%). These same four disorders have among the highest rates of disorder-specific treatment to date (24.6–33.7%). But two other disorders, binge-eating disorder and bulimia nervosa, also have comparatively high rates of treatment to date (21.8–27.4%) even though they are seldom treated in the year of onset (2.2–5.0%). This presumably reflects the fact that these latter disorders are *accretion* disorders; that is, disorders that are typically mild when they begin but become more seriously impairing over time.

The six disorders mentioned in the prior paragraph are also the ones with the highest projected lifetime treatment rates if they persisted to age 65 (23.0–42.7%). Some other disorders, at the other extreme, have very low projected lifetime treatment rates, including all the disruptive behavior disorders, and several anxiety disorders (separation anxiety disorder, post-traumatic stress disorder, obsessive–compulsive disorder), with projected lifetime disorder-specific treatment rates in the range 1.8–7.1%. One other noteworthy pattern in the data on projected lifetime treatment rates is that these rates are sometimes higher among people with any disorder in the class than for each of the individual disorders in the class. This is true for anxiety disorders, where the projected lifetime treatment rate is 38.4% compared to rates in the range 5.3–27.2% for individual anxiety disorders. A similar pattern is found for disruptive behavior disorders, where the projection is 11.0% for any disorder in the class compared to 1.8–6.5% for individual disorders in the class. The reason for this is that comorbidity is associated with increased odds of obtaining treatment, a finding we return to below.

Median (IQR) delays among respondents who obtained disorder-specific treatment after AOO were 7 (3–9) years. It is noteworthy that

TABLE 2 Proportional lifetime treatment across treatment sectors among respondents who obtained lifetime treatment for one or more DSM-IV/CIDI disorders in the Saudi National Mental Health Survey

	Healthcare treatment						Nonhealthcare treatment						
	Mental health specialty		General medical		Any		Human services		CAM		Any		
	%	(SE)	%	(SE)	%	(SE)	%	(SE)	%	(SE)	%	(SE)	(n)[a]
Anxiety disorders													
Panic disorder[b]	67.6	(9.0)	31.3	(9.3)	86.4	(6.7)	43.7	(11.0)	7.6	(5.8)	43.7	(11.0)	(29)
Agoraphobia[b]	52.3	(13.2)	52.0	(12.5)	82.4	(8.9)	18.4	(8.3)	24.5	(8.1)	40.0	(10.8)	(24)
Social phobia[b]	44.9	(9.6)	29.6	(7.4)	62.5	(10.7)	38.3	(10.6)	13.8	(5.4)	49.0	(10.5)	(51)
Generalized anxiety disorder[b]	73.6	(9.1)	35.7	(10.2)	94.2	(3.2)	39.2	(14.1)	24.0	(15.6)	40.8	(13.9)	(40)
Post-traumatic stress disorder[c]	68.8	(8.8)	33.7	(9.7)	83.9	(5.9)	23.5	(6.9)	11.5	(5.0)	32.8	(8.3)	(52)
Obsessive–compulsive disorder[c]	31.3	(7.8)	46.6	(10.7)	70.8	(10.1)	35.5	(9.6)	10.5	(4.6)	43.3	(9.6)	(55)
Separation anxiety disorder[c]	40.5	(10.6)	51.0	(11.7)	82.2	(7.2)	32.4	(11.3)	17.2	(9.8)	36.7	(11.3)	(60)
Any[c]	48.0	(5.6)	39.5	(6.0)	76.9	(4.7)	34.1	(5.6)	13.5	(4.1)	41.3	(5.9)	(194)
Mood disorders													
Major depressive disorder[b]	49.0	(6.4)	31.9	(6.4)	72.1	(5.9)	39.8	(7.4)	19.8	(6.5)	47.5	(7.3)	(130)
Bipolar I–II disorders[b]	66.3	(10.4)	20.3	(7.9)	79.7	(7.7)	45.3	(14.0)	34.8	(15.7)	52.8	(12.8)	(40)
Any[b]	49.8	(6.1)	31.9	(6.2)	72.2	(5.6)	39.2	(6.8)	20.9	(6.0)	47.5	(6.9)	(140)
Eating disorders													
Bulimia nervosa[c]	25.3	(11.6)	36.4	(16.2)	51.5	(18.3)	54.5	(17.0)	7.0	(5.1)	55.5	(16.7)	(22)
Binge-eating disorder[c,d]	43.2	(11.4)	38.5	(10.4)	60.9	(12.0)	50.9	(11.1)	31.1	(11.2)	57.6	(11.1)	(39)
Any[b,c]	39.4	(9.3)	36.9	(8.6)	59.5	(10.1)	49.9	(9.4)	22.3	(8.3)	54.5	(9.3)	(57)
Disruptive behavior disorders													
Conduct disorder	60.6	(13.4)	45.3	(14.3)	79.9	(10.0)	15.7	(8.9)	22.0	(12.0)	37.8	(13.4)	(15)
Attention-deficit/hyperactivity disorder[c]	34.5	(9.5)	41.8	(11.0)	71.0	(9.7)	30.9	(9.8)	11.7	(5.3)	38.2	(11.0)	(47)
Intermittent explosive disorder[c]	40.6	(12.1)	31.4	(10.5)	57.0	(13.9)	48.4	(13.4)	6.0	(3.5)	52.5	(12.7)	(32)
Any[c]	43.0	(7.6)	37.4	(8.4)	68.6	(8.4)	35.3	(8.5)	11.2	(4.7)	42.8	(9.1)	(73)
Substance disorders													
Drug abuse[c]	70.4	(9.5)	29.8	(9.0)	84.2	(7.8)	34.3	(11.7)	23.6	(11.7)	41.5	(11.5)	(47)
Any[c]	65.8	(9.4)	35.2	(9.5)	85.5	(6.6)	30.3	(10.3)	20.1	(10.2)	36.9	(10.4)	(57)
Total													
Any disorder[c]	49.0	(4.8)	35.9	(4.9)	73.9	(4.7)	35.2	(5.0)	15.7	(3.4)	42.7	(5.3)	(272)

Abbreviations: CAM, complementary-alternative medicine; CIDI, Composite International Diagnostic Interview.
[a]Number of respondents with the lifetime disorder who reported sector of treatment.
[b]Part I weight.
[c]Part II weight.
[d]Disorder with hierarchy.

the disorders with the shortest median delays (1–2 years) are all associated with the existence of sudden attacks of extreme fear (panic disorder, separation anxiety disorder) or anger (intermittent explosive disorder) that might be expected to be so discrepant with usual experience as to result in professional consultation. These are also disorders that would appear to have an especially high probability of resulting in immediate and substantial disruptions in relationships and ability to function. The disorders with the longest median delays (10–32 years), in comparison, are all accretion disorders that represent extreme variants of normative experiences (worry in generalized

TABLE 3 Proportional treatment contact in the year of disorder onset and median duration of delay among cases that subsequently made treatment contact in the Saudi National Mental Health Survey

	% making treatment contact in year of onset	% making treatment contact by this interview	% making treatment contact by age 65[a]	Duration of delay		
				Median	(IQR)	(n)[b]
Anxiety disorders						
Panic disorder	7.8	27.3	27.2	2	(2–7)	(63)
Agoraphobia	2.9	9.3	12.3	7	(4–9)	(91)
Social phobia	1.1	11.2	19.1	9	(2–16)	(187)
Generalized anxiety disorder	16.1	33.7	23.0	11	(4–11)	(82)
Post-traumatic stress disorder[c]	1.4	3.4	5.3	3	(3–3)	(125)
Obsessive–compulsive disorder[c]	1.6	2.8	5.3	10	(10–14)	(133)
Separation anxiety disorder[c]	0.0	4.6	7.1	1	(1–1)	(197)
Any[c]	3.3	17.2	38.4	5	(2–12)	(588)
Mood disorders						
Major depressive disorder	8.2	24.6	42.7	5	(2–10)	(376)
Bipolar I–II disorders	14.5	25.9	34.4	5	(3–11)	(96)
Any	7.9	25.1	42.0	5	(2–10)	(406)
Eating disorders						
Bulimia nervosa	2.2	21.8	27.0	3	(3–12)	(79)
Binge-eating disorder	5.0	27.4	39.2	8	(2–8)	(97)
Any	1.6	22.1	36.0	6	(2–8)	(167)
Disruptive behavior disorders						
Conduct disorder[c]	0.0	2.2	1.8	32	(8–32)	(55)
Attention-deficit/hyperactivity disorder[c]	0.0	0.9	3.7	18	(18–18)	(197)
Intermittent explosive disorder[c]	3.1	5.7	6.5	1	(1–4)	(107)
Any[c]	0.7	3.2	11.0	15	(2–28)	(298)
Substance disorders						
Drug abuse[c]	6.3	11.6	16.6	7	(2–19)	(85)
Any[c]	3.8	10.9	16.1	7	(1–10)	(107)
Total						
Any disorder	4.1	24.4	57.5	8	(3–15)	(929)

Abbreviation: IQR, interquartile range.
[a]While unweighted n "at risk" of receiving treatment ≥20.
[b]Number of respondents.
[c]Assessed in the Part II sample.

anxiety disorder and obsessive–compulsive disorder, inattention in ADHD, childhood misbehavior that sometimes progresses to more serious lifelong antisocial behavior in conduct disorder).

It is instructive to compare the results regarding disorder-specific treatment to those in Table 1 for overall treatment, as the differences are striking in several cases. The most pronounced of these is treatment of ADHD, where 20.3% of cases had obtained treatment for an emotional problem at some time prior to the interview but only 0.9% had ever been treated specifically for ADHD. Other large discrepancies exist for the remaining disruptive behavior disorders (27.9–30.6% lifetime treatment of any emotional problem vs. 2.2–5.7% treatment of these specific disorders) and several anxiety disorders, including separation anxiety disorder (35.5 vs. 4.6%), PTSD (39.5 vs. 3.4%), and

OCD (38.1 vs. 2.8%). For some other disorders, in comparison, most patients who received treatment were treated specifically for that disorder. This is especially clear for BPD (32.5 vs. 25.9%) and eating disorders (30.8–45.7 vs. 21.8–27.4%, noting that only one disorder-specific question was asked about age of first obtaining treatment for any eating disorder).

3.4 | Predictors of lifetime treatment

A series of multivariate survival models was estimated for lifetime treatment of any DSM-IV/CIDI disorder among respondents who met criteria for at least one such disorder. (Table 4) The predictors in the

TABLE 4 Predictors of first treatment onset among those with DSM-IV/CIDI lifetime mental disorders in the Saudi National Mental Health Survey (n = 929)

	Model 1		Model 2[a]	
	OR	(95% CI)	OR	(95% CI)
Age-of-onset of earliest disorder	2.0[b]	(1.4–2.7)	1.9[b]	(1.4–2.7)
Gender				
Female	1.3	(0.8–2.2)	1.1	(0.7–1.7)
Male	1.0	Ref	1.0	Ref
χ^2_1	1.0		0.3	
Education, time varying[a]				
Student	0.7	(0.4–1.4)	0.9	(0.4–1.7)
Low	0.8	(0.4–1.6)	1.1	(0.6–1.9)
Low-average	0.8	(0.4–1.8)	0.9	(0.4–2.1)
High-average	0.8	(0.5–1.4)	1.0	(0.5–1.8)
High	1.0	Ref	1.0	Ref
χ^2_4	1.2		0.4	
Marital status, time varying[a]				
Previously married	1.3	(0.5–3.4)	1.1	(0.4–3.2)
Never married	0.6	(0.4–1.0)	0.6	(0.4–1.1)
Currently married	1.0	Ref	1.0	Ref
χ^2_2	4.0		3.1	

Abbreviations: CI, confidence interval; CIDI, Composite International Diagnostic Interview; OR, odds ratio.
[a]Based on a model that controlled for time-varying lifetime onset and offset of each DSM-IV/CIDI disorder assessed in the SNMHS. See Table 5 for details on the ORs associated with these disorders.
[b]Significant at the .05 level, two-sided test.

first model (Model 1) included AOO of the earliest disorder and three socio-demographic variables: gender, time-varying education, and time-varying marital status, along with controls for the time since onset patterns shown in Table 3, and cohort. (See Table S1 for distributions.) The associations of the socio-demographics with treatment are nonsignificant, but AOO has a significant and positive association with treatment (OR = 2.0, 95% CI = 1.4–2.7). The latter indicates that odds of obtaining treatment in any given year since onset are significantly higher among people whose disorders began at a later age. Before considering the implications of this finding more deeply, though, it is important to note that the kinds of disorders that begin early in life are different from those that begin later in life. It might be, then, that type of disorder rather than AOO itself accounts for the association seen in Model 1 of AOO with lifetime treatment. We investigated this possibility by estimating an expanded version of the model that included a separate time-varying control variable for each of the lifetime disorders considered in the SNMHS as well as for comorbidity (Model 2).The OR for AOO remained virtually unchanged in that expanded model (OR = 1.9), demonstrating that the association of AOO with treatment is not due to a confounding effect of disorder type or comorbidity.

We saw above that lifetime treatment is more prevalent for some disorders than others, but this was examined only when considering overall treatment for any disorder among respondents with specific disorders (in Tables 1 and 2) and for disorder-specific treatment

(in Table 3). We also commented above in the context of Table 3 that comorbidity is associated with elevated odds of treatment. We can examine the latter directly by examining the ORs associated with individual disorders and comorbidity in Model 2 of Table 4. Results show that five disorders are associated with significantly elevated relative odds of treatment compared to respondents with the other disorders controlling for number of disorders. (Table 5) Two of these five are anxiety disorders (panic disorder, generalized anxiety disorder; OR = 3.1–3.9), another is substance use disorder (drug dependence, which was too uncommon to be considered in earlier analysis, but is nonetheless associated with a significantly elevated odds of treatment; OR = 4.9), and the final two are the eating disorders (OR = 2.0–2.3).

It is noteworthy that the most serious disorder considered here, BPD, is not significant in Model 2 (OR = 1.0, 95% CI = 0.4–2.5). It helps make sense of this nonsignificant OR to note that other than for agoraphobia and the disruptive behavior disorders, all of which have very low treatment rates, the ORs for all disorders under consideration other than BPD have elevated ORs even though most of these ORs are nonsignificant (OR = 1.2–1.7). We also see that the ORs associated with comorbidity are elevated, but again nonsignificantly so (OR = 1.2–1.5). This last result might seem inconsistent with our observation above in conjunction with Table 3 that comorbidity is associated with *significantly* increased odds of obtaining treatment. However, this is the case only in the gross model that does not control for the ORs for each specific disorder. We show this in Model

TABLE 5 Associations of time-varying lifetime DSM-IV/CIDI disorders with the subsequent first occurrence of mental disorder treatment among respondents with one or more active DSM-IV/CIDI disorders in the Saudi National Mental Health Survey

	Model 2[a]		Model 3[b]	
	OR	(95% CI)	OR	(95% CI)
Anxiety disorders				
Panic disorder	3.9[c]	(2.1–7.4)	—	
Agoraphobia	0.8	(0.4–1.6)	—	
Social phobia	1.4	(0.8–2.4)	—	
Generalized anxiety disorder	3.1c	(1.2–7.6)	—	
Post-traumatic stress disorder	1.7	(0.9–3.0)	—	
Obsessive–compulsive disorder	1.7	(0.9–3.0)	—	
Separation anxiety disorder	1.7	(0.8–3.7)	—	
χ^2_7	27.1[c]		—	
Mood disorders				
Major depressive disorder	1.2	(0.7–2.1)	—	
Bipolar I–II disorders	1.0	(0.4–2.5)	—	
χ^2_2	0.7		—	
Eating disorders				
Bulimia nervosa	2.0c	(1.0–4.0)	—	
Binge-eating disorder	2.3c	(1.1–4.9)	—	
χ^2_2	6.4[c]		—	
Disruptive behavior disorders				
Conduct disorder	1.3	(0.5–3.5)	—	
Attention-deficit/hyperactivity disorder	0.8	(0.4–1.4)	—	
Intermittent explosive disorder	1.0	(0.5–2.1)	—	
χ^2_3	1.0		—	
Substance disorders				
Drug dependence with/without abuse	4.9[c]	(2.6–9.5)	—	
Drug abuse without dependence	2.3	(0.9–5.7)	—	
χ^2_2	26.9		—	
Number of active disorders				
Exactly two	1.5	(0.9–2.5)	2.4[c]	(1.6–3.7)
Three or more	1.2	(0.5–3.2)	3.6[c]	(2.2–6.1)
χ^2_2	2.9		27.5[c]	

Note: Based on a person-year survival analysis starting with AOO of the first lifetime disorder and treating all disorders as time-varying covariates that turn on at AOO and turn off in the year after age of recency. Controlling AOO, time since onset, age at interview, gender, time-varying education, and time-varying marital status. Dummy predictors for each lifetime disorder were treated as time-varying covariates that turn on at AOO and turn off in the year after age of recency. Values of the education and marital status variables were also changed for each respondent across person-years to take into consideration the respondent's age when finishing education, when first marrying, and when first experiencing a marital termination.

Abbreviations: CI, confidence interval; CIDI, Composite International Diagnostic Interview; OR, odds ratio.

[a]This is the same model as Model 2 in Table 4 but we report here only the ORs associated with the mental disorders, whereas in Table 4 we present only the ORs associated with AOO and the socio-demographics.

[b]This is a reduced version of Model 2 in which we drop the individual disorders as predictors.

[c]Significant at the .05 level, two-sided test.

3, where the individual disorders are deleted as predictors and the ORs for comorbidity become significant (OR = 2.4, 95% CI = 1.6–3.7 for exactly two disorders; OR = 3.6, 95% CI = 2.2–6.1 for more than three disorders).

This difference in the ORs for comorbidity reflects the fact that the observed ORs among respondents with two or more disorders versus only a single disorder in Model 2 are captured by the fact that the composite ORs implied by the logistic model involve complex products of the ORs associated with individual disorders in conjunction with nonsignificant elevations in these products associated with comorbidity. For example, Model 2 predicts that the OR for a respondent with, say, a combination of generalized anxiety disorder, social

phobia, and major depressive disorder (which, as it happens, more in-depth analysis shows is a relatively common pattern of multimorbidity in the SNMHS) is OR = 6.2, which is given by $3.1 \times 1.4 \times 1.2 \times 1.2$. When we remove the separate disorders from the predictor set, we see the weighted average of composite ORs of this sort across all observed patterns of comorbidity and multimorbidity in the data. And these composite ORs, as shown in Model 3, are significant. This gets us indirectly back to the observation that the OR associated with BPD in Model 2 is nonsignificant. The reason for this is that BPD is not only a very serious disorder, but also a highly comorbid disorder. That is, the vast majority of people with BPD also meet criteria for a number of other lifetime DSM-IV/CIDI disorders. When we adjust for this extreme multimorbidity, as we do in Model 2, the net effect on odds of treatment associated with having BPD becomes non-significant.

4 | DISCUSSION

Two potential methodological limitations should be kept in mind when interpreting these results. One is that respondents who failed to seek treatment might have been more likely than those who sought treatment to forget or normalize past lifetime symptoms, in which case we would be underestimating lifetime prevalence of disorders and overestimating the proportion of lifetime cases that received treatment. We have no way to evaluate this possibility with our cross-sectional data. If this problem exists, though, it means that the problem of unmet need for treatment is even larger than we estimated it to be here in that there are even more people with untreated lifetime mental disorders than shown here.

The second potential methodological limitation is that lifetime prevalence of disorder and treatment, even if recalled and reported accurately, might have been dated inaccurately. The most common form of such a dating error is known as *telescoping*, which leads to past experiences being recalled as having occurred more recently than they did (Janssen, Chessa, & Murre, 2006). Questions are embedded in the WMH surveys to focus memory search and bound recall uncertainty to help respondents recall AOO accurately (Kessler & Üstün, 2004). To the extent these efforts were not successful, though, it is again likely that delays in initial treatment seeking were underestimated here. These methodological limitations are likely to mean that the results reported here are conservative. That is, the true lifetime treatment rates are likely to be lower than estimated and the problem of unmet treatment is likely to be even larger than estimated.

Keeping these limitations in mind, our results suggest that fewer than one third of people in Saudi Arabia with lifetime mental disorders have ever sought treatment for these disorders. This is a considerably lower treatment rate than found in WMH surveys in other high-income countries (Stagnaro et al., 2019; ten Have et al., 2013; Wang et al., 2007). Treatment rates vary by type of disorder. The lowest treatment rates are for some anxiety disorders and disruptive behavior disorders. Disorders with early ages-of-onset are more likely to go untreated than disorders

with later ages-of-onset. Furthermore, we find that delays are pervasive even among people who eventually seek treatment.

We noted earlier that the disorders with the shortest median delays (1–2 years) are all associated with the existence of sudden attacks of extreme fear (panic disorder, separation anxiety disorder) or anger (intermittent explosive disorder) that might be expected to be so discrepant with usual experience as to result in professional consultation. The disorders with the longest median delays (10–32 years), in comparison, are all accretion disorders that represent extreme variants of normative experiences (worry in generalized anxiety disorder and obsessive–compulsive disorder, inattention in ADHD, childhood misbehavior that sometimes progresses to more serious lifelong antisocial behavior in conduct disorder). Most of the latter disorders begin in childhood, which is noteworthy given the finding that early AOO is associated with low odds of lifetime treatment. A similar pattern has been found consistently in prior WMH surveys (Stagnaro et al., 2019; ten Have et al., 2013; Wang et al., 2007).

Another result in the SNMHS that is consistent with prior WMH research is that early onset disorders are associated with lower odds of treatment than later onset disorders. As noted earlier in the article, one possible explanation for this finding is that minors need the help of parents or other adults to seek treatment, and recognition is often low among these adults unless symptoms are severe (Pereira & Barros, 2019). However, this does not explain why early AOO continues to be associated with low odds of seeking treatment in adulthood. As we noted earlier in the paper, this might be associated with symptoms becoming normalized over time. Another possibility is that coping strategies are developed over time that reduce the distress caused by symptoms even though they might interfere with help-seeking, as when social withdrawal occurs among people with social phobia.

One other very consistent finding in earlier WMH surveys is not found in the SNMHS: that women have significantly higher rates of treatment than men (Cia et al., 2019; ten Have et al., 2013; Wang et al., 2007). It is not clear why this gender difference does not exist in the SNMHS, but it is a striking result that needs to be the subject of future investigation. We plan to explore this in subsequent analyses of the data.

Given the enormous burden of mental disorders and the existence of effective treatments for these disorders, the results presented here show clearly that efforts are needed to increase timely treatment of mental disorders. While KSA has begun to implement strategies to reduce stigma, increase detections, and make people aware of the existence of effective treatments for mental disorders, healthcare policymakers need to accelerate these efforts and ensure timely screening and effective treatment of mental disorders. Useful models exist in other countries (McGorry, Trethowan, & Rickwood, 2019; McMahon et al., 2019; Moller, Ryan, Rollings, & Barkham, 2019), but adaptation to the unique circumstances of KSA will doubtlessly be needed before these models or some blending of their elements can be implemented successfully to address the challenges facing the Saudi healthcare system in addressing this important problem.

ORCID

Yasmin A. Altwaijri https://orcid.org/0000-0001-8826-3224
Lisa Bilal https://orcid.org/0000-0002-7574-4210
Amani Almeharish https://orcid.org/0000-0003-3539-0857
Ronald C. Kessler https://orcid.org/0000-0003-4831-2305

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SUPPORTING INFORMATION

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