

# Depressive disorders in the Arabian Gulf Cooperation Council countries: a literature review

Journal of International Medical Research

48(10) 1–22

© The Author(s) 2020

Article reuse guidelines:

[sagepub.com/journals-permissions](https://sagepub.com/journals-permissions)

DOI: 10.1177/0300060520961917

[journals.sagepub.com/home/imr](https://journals.sagepub.com/home/imr)Owiss Alzahrani 

## Abstract

**Objective:** To determine the contributions from the six Arabian Gulf Cooperation Council (GCC) countries to the national scientific literature on depressive disorders.

**Methods:** This literature review identified all of the published studies on all major depressive disorders as cited on the PubMed<sup>®</sup> and APA PsycInfo<sup>®</sup> databases from inception to 31 December 2016 from the six GGC countries. Data were extracted using a standardized form. The study compared the volume of research production between the countries by calculating an index that allowed for the country population size.

**Results:** A total of 28 studies met the inclusion criteria. Saudi Arabia headed the list of publications (10 articles) followed by the United Arab Emirates ( $n = 6$ ), Kuwait ( $n = 5$ ), Qatar ( $n = 3$ ); and Bahrain and Oman produced two articles each. Only six out of the 28 (21.4%) studies included a random sample or adopted good sampling strategies. The majority of studies (24 of 28; 85.7%) were cross-sectional in design. Only one study clearly stated the use of the DSM-4 criteria for diagnosis.

**Conclusion:** The scientific literature published by the GCC countries on depressive disorders is scant and lacking scientific depth. These findings should be considered as a wake-up call for public health researchers, mental health workers and policymakers.

## Keywords

Depressive disorders, depression, Gulf Council Countries, Arabs, Middle East

Date received: 25 June 2020; accepted: 7 September 2020

Department of Community Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

## Corresponding author:

Owiss Alzahrani, Alsulaymaneyya, 2377 Sinan Bin Thaalabah Street, PO Box 53100, Jeddah 22253, Saudi Arabia.

Email: [owiss@hotmail.com](mailto:owiss@hotmail.com)



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 License (<https://creativecommons.org/licenses/by-nc/4.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access pages (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

## Introduction

The Arabian Gulf Cooperation Council (GCC) is composed of six states: Saudi Arabia, Kuwait, Bahrain, Qatar, United Arab Emirates and Oman (in order from north to south).<sup>1</sup> All of these countries are oil-producing countries and their populations have witnessed tremendous changes in their life styles over the last few decades with the production of oil and an associated shift from a rural community to an urban modern one. They live side-by-side geographically and share similar cultural, religious, political, social and economical backgrounds. They also share similar demography as they host millions of expatriates from countries around the globe.<sup>1</sup>

The GCC countries are listed by the World Health Organization (WHO) as part of the Eastern Mediterranean Region (EMR) countries.<sup>2</sup> However, unlike the EMR countries that vary in several socio-economic factors and diseases, the GCC countries have many similarities in health systems and patterns of diseases,<sup>2</sup> which make them homogenous when it comes to direct comparisons of each country to any of the remaining five countries. One of the main objectives of the GCC is to formulate similar regulations in the various fields including social and health affairs (article-3.D),<sup>1</sup> as the GCC states have similar chronic noncommunicable diseases patterns and more or less similar health systems and health problems.<sup>1</sup>

Similar to other countries in the world, the EMR countries are witnessing an increase in noncommunicable illnesses including mental illness. For example, according to a recent study that quantified the burden of mental disorders in the EMR over the period 1990–2013, mental disorders accounted for 5.6% of the total disease burden in the EMR region and that the burden of mental disorders increased from 1726 disability-adjusted life years

(DALYs)/100 000 in 1990 to 1912 DALYs/100 000 in 2013 (10.8% increase in EMR versus 5.5% increase globally).<sup>2</sup> Nearly all EMR countries had a higher mental disorder burden compared with the global level.<sup>2</sup> Overall, the burden of mental disorders was greater in young and middle-aged adults (25 to 49; with the peak in the 35–39 years age group) and more often observed among females.<sup>2</sup> Among the various mental disorder groups, depressive disorders accounted for most of the DALYs (44.6%) followed by anxiety disorders (19.0%).<sup>2</sup> Interestingly, the increase was more often observed in the high-income countries that include the GCC countries.<sup>2</sup>

Despite this magnitude of mental health problems, researchers have referred to the disparity between the burden of the observed mental disorders and the published research from the EMR and stressed the need for more empirical research directed toward the prevention and treatment of the increasing number of affected patients.<sup>3</sup> In this regard, the EMR states were urged to identify their research priorities, mobilize resources, develop human and infrastructure capacities, adopt a prioritized national mental health research agenda and institutionalize the use of research findings.<sup>3</sup> This gap between the burden of mental health disorders and the published research from all of the Arab countries, including those that belong to the EMR, was indirectly assessed in a previous literature review that aimed to ascertain the total number of citations for each Arab country in the PubMed® database and to correlate it to the citations under the psychiatry and psychology category.<sup>4</sup> The literature review found a very limited number of mental health research citations ( $n=338$ ) that were affiliated to all of the Arab countries over a 15-year period (1987–2002).<sup>4</sup> Interestingly, two of the GCC countries, Saudi Arabia and Kuwait, published 37%

of the Arab world's mental health publications.<sup>4</sup>

In general, there is a paucity of ongoing research on mental disorders from the GCC states and this gap extends to include common mental health research like depressive disorders.<sup>5</sup> Scientific research on common mental health problems will definitely help the attending health workers and the policy makers in defining the gaps in research and subsequently outlining future plans to handle the expected growth in the numbers of patients with all of the mental health disorders, particularly depressive disorders that may be strongly related and/or influenced by local sociocultural backgrounds, the regional political instability in the neighbouring countries, increased life expectancy and increasing prevalence rates of common noncommunicable illnesses, such as type 2 diabetes mellitus.<sup>5-9</sup>

According to the WHO, depression can affect one in 10 of the world's population and was ranked as the third cause of disability in 2004 and is expected to move to first place by 2030.<sup>9</sup> The WHO has already predicted that 350 million people globally will be affected by depressive disorders and this alarming figure is a wakeup call for all of the public health workers, policy makers, researchers and healthcare providers to anticipate and address its burden as a real threat to the mental health of individuals and particularly the young across the world.<sup>3,9</sup> There is no reason to believe that any country is immune from having the burden of this common noncommunicable illness.<sup>9</sup>

Several previous publications have addressed the burden of depressive disorders and the implications on the health of the Arab countries<sup>8</sup> and the EMR populations<sup>2</sup> to which the GCC region belongs geographically.<sup>4</sup> In 2014, an extensive study reported on the burden of diseases and injuries in the Arab countries for 1990, 2005 and 2010, using data from the

Global Burden of Diseases, Injuries, and Risk Factors Study 2010.<sup>8</sup> The study included the six GCC countries as part of the 22 Arab countries and found that major depressive disorder was ranked first as a cause of years lived with disability in 1990, 2005 and 2010.<sup>8</sup> Similar findings were recently reported from the EMR.<sup>2</sup> Another study found that the most dynamic fields of research on mental disorders in Arab countries was substance abuse and depression as they accounted for 26% of the total mental health publications from the region.<sup>4</sup> A recent review that included 55 studies found that there were only six suitable studies on depression from the GCC as the majority of publications ( $n=16$ , 28%) targeted mixed samples of patients.<sup>5</sup> However, the review highlighted the importance of future research that aims to fill the identified gaps in the current published work from the GCC countries.<sup>5</sup> The authors also advised that research should aim for practice and policy development in the region and take in consideration the local sociocultural context with all of its associated problems.<sup>5</sup> The authors' calls for more high quality research agreed with the WHO recommendations that were declared during World Mental Health Day 2012.<sup>9</sup> They also agreed with the 2015 EMR's call for carrying out more high quality priority research that will inform policy and service development of mental health programmes across the EMR region.<sup>10</sup>

The current scoping review aimed to identify all of the published studies on all major depressive disorders that were cited on the PubMed® and APA PsycInfo® databases in order to determine the contributions from the six GCC countries to the international scientific literature on depressive disorders. This was undertaken in order to identify the gaps in the published literature on depressive disorders from the GCC countries. The current review also aimed to

offer some recommendations to direct future regional research on this important health topic that will hopefully inform and prioritize the future development of services offered to patients with depressive disorders in the GCC countries. The findings might also provide information to mental health practitioners that provide services for Arabic people globally.

## Materials and methods

### Search strategy

The electronic databases PubMed® and APA PsycInfo® were searched from inception to 31 December 2016 to identify relevant studies using a combination of key words including depression, depressive disorders and major depressive disorder. The term depressive disorder was defined according to the WHO ICD-10 Classification of Mental and Behavioural Disorders and/or the DSM-4 criteria accordingly.<sup>11</sup> The following search string was developed with the assistance of the librarian to search the PubMed® database: (“Depressive Disorder”[Mesh] OR “Depressive Disorder, Major”[Mesh] OR “Depression”[Mesh]) AND (“Saudi Arabia”[Mesh] OR “United Arab Emirates”[Mesh] OR “Oman”[Mesh] OR “Qatar”[Mesh] OR “Bahrain”[Mesh] OR “Kuwait”[Mesh] OR “Middle East” [Mesh]). Another string was used to search the APA PsycInfo® database: (“Eastern Mediterranean” OR “Middle East” OR “Saudi Arabia” OR Kuwait OR Oman OR Bahrain OR “United Arab Emirates” OR Qatar) AND (DE “Depression (Emotion)”) OR (DE “Major Depression”). Studies undertaken in one of the six GCC countries and/or in Arab, EMR or Middle Eastern countries were also considered for inclusion. However, the review focused on those articles that were conducted on adults in primarily public or primary care settings,

particularly those that targeted the preventive, epidemiological and public health policy aspects.

### Inclusion/exclusion criteria

Inclusion criteria were as follows: (i) all articles that were published on the electronic databases PubMed® and APA PsycInfo® up to the 31 December 2016; (ii) studies that were conducted on depression, depressive disorders and/or major depressive disorder in one of the six GCC countries and/or in Arabs, EMR or Middle Eastern countries; (iii) studies that were conducted on adults in a primarily public or primary care setting, particularly those studies that targeted the policies of prevention, epidemiology and public health. Exclusion criteria were as follows: (i) studies that were conducted on children or adolescents or very old subjects (>74 years);<sup>12</sup> (ii) substance abuse, anxiety disorders: including general anxiety disorders (social anxiety disorders, phobias) and other mental disorders like obsessive compulsive and personal disorders; (iii) animal studies, basic sciences studies, studies on the pharmaceutical management aspects and/or that targeted inpatients in a tertiary care hospital setting; (iv) duplicate studies.

### Screening strategy

The initial database search produced article titles that were screened for eligibility according to the inclusion/exclusion criteria, duplication and irrelevance on each database separately starting with PubMed® and then APA PsycInfo®. All of the irrelevant titles, duplicate studies and those that did not meet the inclusion criteria were excluded. The titles and abstracts of those articles that were considered eligible for inclusion were then screened again for eligibility and this resulted in a selection of articles to be

read in full. Following further screening of the full-text articles, those studies that did not fit the scope and/or the inclusion criteria were excluded.

The study compared the volume of research production between the countries by calculating an index that allowed for the country population size by multiplying the number of published articles  $\times$  1 000 000  $\div$  total population number of each country. Similar to a previous study on diabetic foot research in Arab countries,<sup>13</sup> this ratio was used as an index of the research publication on depressive disorders per million in the different countries to limit the bias that may occur on using the total crude number of studies for comparisons between the various countries in view of the wide range in population numbers in GCC countries (31 540 000 in Saudi Arabia, Kuwait 3 892 000, Bahrain 1 377 000, Qatar 2 235 000, UAE 9 157 000 and Oman 4 490 000).<sup>14</sup>

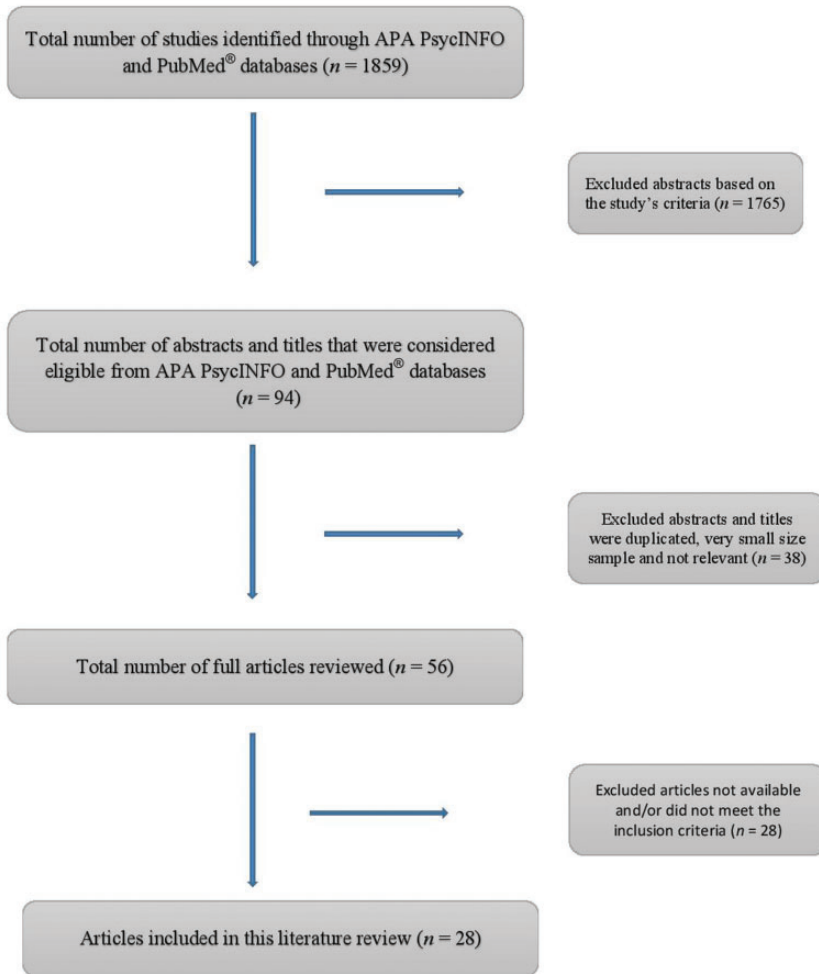
### Data extraction

The final list of articles that met the inclusion/exclusion criteria was used for data extraction and analysis. A structured extraction table was designed. The extracted data was tabulated under the following categories: last name of the first author and year of publication, country name, design/setting (including epidemiological, cohort, cross-sectional, clinical trials, systematic reviews), theme of the publication (including location of the study e.g. community or hospital-based), study population, main objectives, main results, conclusions and any comments including limitations, strengths and weaknesses. Another table was designed to correlate the numbers of articles and the population number in millions of each country. The index was used to review the research volume among the six GCC countries.

## Results

As of 31 December 2016, a total of 56 articles were published on depressive disorders on the PubMed® and APA PsycInfo® databases by researchers from GCC countries and were considered eligible according to the inclusion criteria (Figure 1). After reviewing the full articles for eligibility and exclusion of any duplicates, only 28 studies were found to be eligible for inclusion in this literature review.<sup>15-42</sup> Numerically, Saudi Arabia headed the list of publications having published 10 articles followed by the United Arab Emirates with six, Kuwait with five, Qatar with three, and Bahrain and Oman with two articles each (Table 1). However, this order was different when the absolute numbers of articles were correlated with the total population numbers for each country (Table 2). In this regard, the publication index per million for the studies published on depressive disorders was the lowest in Saudi Arabia (0.32). The publication index per million was similarly low in Oman (0.45). Saudi Arabia and Oman scored indices below the cumulative index for all six GCC countries (0.53). In contrast, Bahrain recorded the highest index (1.45) followed by Qatar (1.34) and Kuwait (1.28). The UAE scored an index of (0.66), which was low but slightly higher the cumulative index for all six GCC countries (0.53). The higher indices were reported in the less populated countries like Bahrain, Qatar and Kuwait.

Chronologically, researchers from Saudi Arabia were relatively ahead of their colleagues in the GCC region as the first study included in this review was published in 1988 (Figure 2).<sup>24</sup> The UAE followed in 1997.<sup>40</sup> The remaining studies included publications from the other countries conducted during the last decade (Table 1) Overall, the majority of the publications were published after 2000.



**Figure 1.** Flow diagram of eligible studies showing the number of citations identified, retrieved, screened and included in the final review.

On reviewing the designs of the studies (Table 1), only six out of the 28 (21.4%) included a random sample or adopted good sampling strategies.<sup>16,19,25,28,30,33</sup> The majority (24 of 28; 85.7%) were cross-sectional studies.<sup>15–24,26–28,30–40</sup> Approximately half of the studies (13 of 28; 46.4%) were designed to be conducted in community and/or primary health care settings.<sup>15,18,19,22,24,25,28,30–34,37</sup> Of the remaining studies, six were limited to well-defined populations or cohorts of

outpatients such as university students,<sup>16,17,20,26,41,42</sup> four were undertaken on patients with diabetes mellitus and two on postpartum females.<sup>18,30–32,36,40</sup> Two studies aimed to compare patients with depressive disorders in Kuwait and the UAE with other nationalities, namely the USA<sup>27</sup> and South Korea,<sup>35</sup> respectively. One study was a mail survey that aimed to compare the findings from 8538 students in 17 Muslim countries and included students from the GCC.<sup>29</sup> The largest sample size in



**Table 1.** Summary data from the publications ( $n = 28$ ) on depressive disorders that were cited on the PubMed® and APA PsycInfo® databases from inception to 31 December 2016 from the six Arabian Gulf Cooperation Council countries. 15-42

Study year	Author and year	Country	Design/setting/population	Main study objectives	Main results and conclusion	Notes
1	Alrahili et al. 2016 <sup>15</sup>	Saudi Arabia	Cross sectional study/ random sample/ $n = 137$ (80 males, 57 females) hospital visitors in Riyadh.	To examine attitudes to depression using a self-designed questionnaire	87% believed that depression is a medical illness; 75% believed that it does not occur if one is close to God; 57% blamed black magic. Most subjects believed that depression could be caused by supernatural fac- tors, they also believed that it was an illness requiring treatment.	Sample was drawn from visitors to a hospital. Study did not use any structured instruments and rating scales.
2	AlFaris et al. 2016 <sup>16</sup>	Saudi Arabia	Cross-sectional study/ stratified proportion- ate sampling strategy/ $n = 1186$ university health professional (HP) students in Riyadh.	To compare the prevalence of depressive symptoms among HP students and to explore the asso- ciation between sociodemo- graphic factors and depressive symptoms.	The overall prevalence rate of depressive symptoms was 47.0%; it was highest among dentistry students (51.6 %), followed by medicine (46.2 %), applied medical sciences (45.7 %) and lowest among nursing students (44.2 %). A statistically significant associa- tion was found between the presence and severity of depressive symptoms and the female sex.	Well-designed study that indicated an alarming rate of depressive symp- toms among HP university stu- dents particularly females and dentistry students. the third year for all schools and the fifth year for medicine and dentistry have the highest association with depressive symptoms. Limitations included the use of self- administered inventories rather than structured interviews and it involved a single institution.
3	Abosalshamat et al. 2015 <sup>17</sup>	Saudi Arabia	Cross-sectional, descrip- tive study/ $n = 422$ medical and dental students (53.3% females) in Makkah.	To assess the psychological well- being among medical and dental students in a single university. To identify the high-risk groups and assess the association between the psychological well-being and the academic performance using the 21-item Depression Anxiety Stress Scale, General Self-Efficacy Scale and Satisfaction With Life Scale.	High levels of depression (69.9%). Female medical students had higher psy- chological distress in contrast to dental students. Attention should be directed toward reducing the alarming levels of depression, anxiety and stress among medical and dental students.	Single institution, so the results cannot be generalized.

(continued)

**Table 1.** Continued.

Study year	Author and year	Country	Design/setting/population	Main study objectives	Main results and conclusion	Notes
4	Gemeay et al. 2015 <sup>18</sup>	Saudi Arabia	Cross-sectional, representative sample, at a primary care centre in Riyadh/100 patients with diabetes mellitus.	To evaluate the frequency of depression among Saudi Arabian patients and to correlate the presence of depression and types of diabetes using part 2 of the Beck Depression Inventory.	More than 37% with type 1 and 37.9% with type 2 diabetes mellitus had significant depression. The findings suggest a nonsignificant correlation between the types of diabetes and the level of depression. Patients with diabetes should be screened for depression, referred to appropriate social services and psychosocial support, and mental health professionals should be involved when needed.	The sample size was relatively small and representative.
5	Al-Qadhi et al. 2014 <sup>19</sup>	Saudi Arabia	Cross-sectional study at three large primary care centres in Riyadh/ n = 477 visitors, 66.2% were females.	To estimate the point prevalence of depression and the screening cost among adult primary care patients. To compare Patient Health Questionnaire-2 (PHQ-2) with PHQ-9.	Based on PHQ-9, 49.9% of patients exhibited depressive symptoms, of which 31% were mild, 13.4% were moderate and 4.4% were moderate-severe. The PHQ-2 and PHQ-9 were strongly correlated. The cost-analysis showed savings of up to 500 SAR (\$133) per adult patient screened once a year.	Well-designed study that indicated high prevalence of depression and the cost-effectiveness of screening in the primary care setting. Study did not use DSM criteria for diagnosis.
6	Al-Faris et al. 2012 <sup>20</sup>	Saudi Arabia	Cross-sectional, descriptive study/n = 797 medical students (74% male) in Riyadh.	To estimate the prevalence of depressive symptoms among the medical students of a large school in Riyadh using the 21-item Beck Depression Inventory.	A high prevalence of depressive symptoms (48.2%) was found, it was either mild (21%), moderate (17%) or severe (11%). A significant association was found with early academic years and female sex. The high prevalence of depressive symptoms is an alarming sign and calls for remedial action, particularly for the junior and female medical students.	The high prevalence of depressive symptoms is an alarming sign and calls for remedial action, particularly for the junior and female medical students. Single medical school, so results cannot be generalized.

(continued)



**Table 1.** Continued.

Study year	Author and year	Country	Design/setting/population	Main study objectives	Main results and conclusion	Notes
7	Bassiony 2005 <sup>21</sup>	Saudi Arabia	Cross-sectional, case-control study/n = 98 consecutive patients with generalized social anxiety disorder (SAD) in Khamis Mushait.	To estimate the prevalence of depression in patients with SAD and to assess the relationship between the severity of SAD symptoms and depression using the Structured Clinical Interview for DSM-IV Axis I Disorders, Clinical Version (SCID-I-CV) and the Liebowitz Social Anxiety Scale.	A total of 40 (41%) patients had current depression and 37 (92.5%) of them had it after SAD onset. Patients with severe SAD were four-times more likely to have depression than patients with mild or moderate SAD.	Generalized SAD was diagnosed according to DSM-IV criteria. Study included a clinical sample (predominantly males) from a psychiatric outpatient clinic, which limit the generalizability of its findings.
8	Becker 2004 <sup>22</sup>	Saudi Arabia	Cross-sectional study/primary care setting/n = 431 primary care patients in Riyadh.	To investigate the ability of primary care physicians to correctly detect and diagnose somatization and depression in Saudi Arabian patients using the Patient Health Questionnaire (PHQ).	Primary care physicians identified 35.7% of the sample with somatization as compared with 19.3% identified by the PHQ screening instrument. Physicians identified depression in 18.1% of patients while the PHQ identified depression in 20%.	Psychiatric training should be supported in the continuing education of primary care physician.
9	Turkistani 2004 <sup>23</sup>	Saudi Arabia	Cross-sectional study/representative sample/n = 125 males in Jeddah.	To identify risk factors for sexual dysfunction associated with depression using the Montgomery/Asberg Depression Rating Scale and BSFQ (Brief Sexual Functioning Questionnaire).	Seventy-seven (62%) presented with sexual dysfunction. The majority of doctors do not take a sexual history despite its high prevalence.	Subjects were recruited as a representative sample from the outpatient clinic of a hospital.
10	el-Rufaiie et al. 1988 <sup>24</sup>	Saudi Arabia	Pilot study/representative sample/cross-sectional/n = 100 in Dammam.	To get preliminary prevalence data of anxiety and depressive disorders among a sample of Saudi Arabian patients attending a primary care health centre using the Arabic Version of the Hospital Anxiety and Depression Scale.	The total prevalence rate of depression was 17% and 7% of the sample suffered both depression and anxiety.	The study has many limitations but is included as it is one of the first ones conducted in Saudi Arabia.

(continued)

**Table 1.** Continued.

Study year	Author and year	Country	Design/setting/population	Main study objectives	Main results and conclusion	Notes
11	Alkhadhari et al. 2016 <sup>25</sup>	Kuwait	A randomized, prospective study over a 5-month period/ $n = 1046$ of primary clinic attendees in all the five governorates of Kuwait.	To determine the point prevalence of, and identify risk factors for, depression, anxiety and somatization disorder using the Physical Health Questionnaires (PHQ-SADs)	42.7% of the patients suffered from psychiatric disorders including depression (22.9%), anxiety (17.7%) and somatization (33.4%) disorder. The Kuwaiti nationals, female sex, older age group and those with lower levels of education were more likely to suffer from psychiatric disorders.	Large well-designed randomized study. However, it had some limitations such as the inter-rater reliability variations and the study did not include eating and substance-abuse disorders.
12	Al-Turkait et al. 2011 <sup>26</sup>	Kuwait	Cross-sectional study/ $n = 624$ Kuwaiti national college students.	To explain the relationship between the symptoms of anxiety and depression. This issue has not been investigated in an Arab setting using the Hopkins Symptom Checklist 25.	The relationship between symptoms of anxiety and depression probably has dimensional and hierarchical elements. The findings broaden the evidence base of the cross-cultural validity of the tripartite model.	Although the sample size was fairly large, this was a cross-sectional study that could not address the issue of stability of the factors across time and in clinical populations.
13	Abdel-Khalek et al. 2010 <sup>27</sup>	Kuwait	A cross-sectional, comparative study/ $n = 192$ (Kuwait) and $n = 158$ (USA).	To explore the associations between religiosity with subjective well-being and psychopathology (anxiety and depression) among college students recruited from two different cultures using scales in their native languages, Arabic and English, respectively: the Oxford Happiness Questionnaire, the Love of Life Scale, the Kuwait University Anxiety Scale and the Centre for Epidemiological Studies – Depression Scale.	The Kuwaiti students obtained higher mean scores on religiosity, religious belief and depression than did their American counterparts, whereas American students had higher mean scores on happiness and love of life. Based on the responses of the present two samples, it was concluded that those who consider themselves as religious experienced greater well-being.	Very interesting study that compared two cultures. However, it had some limitations such as limited age range of college students. Therefore, an important next step would be to replicate and extend the current investigation using older age groups.
14	Al-Oraibi et al. 2007 <sup>28</sup>	Kuwait	A cross-sectional survey/ $n = 2320$ Kuwaiti subjects randomly selected from 18 primary health care centres covering all Kuwait governorates.	To estimate the prevalence of depressive disorders and the influence of socio-demographic characteristics in a primary healthcare setting using the Beck Depression Inventory second	A total of 1082 (46.8%) male and 1237 (53.2%) female; 860 (37.1%) screened positive for depressive symptoms. 163 (7.0%) were severely depressed, 314 (13.5%) moderately depressed and 383 (16.5%) mildly depressed. Depressive disorder was more	A large study that was well-designed and concluded that depressive disorder is a highly prevalent condition among Kuwaiti patients attending a primary health care setting.

(continued)

**Table 1.** Continued.

Study year	Author and year	Country	Design/setting/population	Main study objectives	Main results and conclusion	Notes
15	Alansari 2006 <sup>29</sup>	Kuwait	A mail survey sent to either university rec-tors or colleagues in the selected countries/ <i>n</i> = 8538.	edition questionnaire as a screen- ing instrument.  To investigate sex differences in depression among volunteer undergraduates recruited from 17 Islamic countries. The Beck Depression Inventory II was used in its Arabic form for all groups except the Pakistani group.	prevalent among women than men, young than old, more among highly educated individuals, working partici-pants, married individuals, and parents with three or more children.  Primary health care physicians should be adequately trained to recognize and initiate the management of this disorder.	However, the study population was defined by those who scored positive on a screening instrument rather than those who were truly depressed by standard diagnostic criteria since any screening instrument is not 100% sensitive and specific.  A large study but used poor methodology.
16	Al Dallal and Grant 2012 <sup>30</sup>	Bahrain	A cross-sectional, descriptive study/ <i>n</i> = 237 mothers/from all five governorates of Bahrain through 20 randomly chosen pri-mary health care centres and two clinics.	To estimate the prevalence of post-natal depressive symptoms and the associated risk factors among a random sample of Bahraini women attending primary health care centres using the Arabic ver-sion of the Edinburgh Postnatal Depression Scale.	The prevalence of postnatal depressive symptoms was 37.1%.  However, several psychosocial risk fac-tors were significantly associated with postnatal depression: history of depressive symptoms and perceived lack of support from the husband remained significant factors.	Small sample but well-designed study. Considerable effort and resources would be needed to mount both prevention and treatment programmes.
17	Almawi et al. 2008 <sup>31</sup>	Bahrain	A cross-sectional, study/ primary health care centre/ <i>n</i> = 143 patients with type 2 diabetes mellitus (T2DM) and 132 healthy controls.	To examine the association between depression, anxiety and stress with T2DM in Bahrain, an island-country with a very high preva-lence of T2DM using Depression Anxiety Stress Scale-21 structured depressions, anxiety and stress scale.	Prevalence of depressive disorders was 55.9% in the T2DM group. A higher proportion of T2DM patients were found to have mild-moderate and severe-extremely severe depression ( <i>P</i> = 0.002).  Results suggested a positive contribution of T2DM to increased depressive and/	A larger sample size study that examines the sizes of the associa-tions/differences will be useful in further assessing the interaction between T2DM and comorbid depression, anxiety and stress disturbances is recommended.

(continued)

**Table 1.** Continued.

Study year	Author and year	Country	Design/setting/population	Main study objectives	Main results and conclusion	Notes
18	Burgut et al. 2013 <sup>32</sup>	Qatar	A cross-sectional study/primary health care centres of the State of Qatar/ <i>n</i> = 1379 postpartum women within 6 months of delivery.	To investigate the association between maternal complications and postpartum depression (PPD) among postpartum women in Qatar by using the Edinburgh Postnatal Depression Scale as well as a structured questionnaire.	<p>or anxiety and/or stress disorders among the T2DM patients and there-by recommended counselling for T2DM patients.</p> <p>The prevalence of PPD was 17.6% in the studied mothers (Qatari women 17.4% and other Arab women 17.9%). The risk factors for PPD included various socio-demographic risk factors such as education, occupation, consanguinity and access to transportation.</p> <p>Postpartum women, especially those with maternal complications, need close screening and have quick access to mental health care within integrated reproductive health services.</p>	Well-designed survey. The study findings will help clinicians and researchers understand the factors that affect maternal mental health.
19	Bener et al. 2012 <sup>33</sup>	Qatar	A prospective cross-sectional study/primary health care centres of the State of Qatar/ <i>n</i> = 1660	To assess the prevalence of anxiety and depressive disorders in a Qatari population and to examine their symptom patterns and comorbidity using a face-to-face interview with a designed diagnostic 14-item screening questionnaire. The Hospital Anxiety and Depression Rating Scale, which consisted of seven items for anxiety and seven for depression (HADS-D) was also used.	<p>The mean HADS-D depressive symptom scores were <math>8.0 \pm 6.3</math> for males and <math>10.8 \pm 7.5</math> for females (<math>P = 0.041</math>); with a prevalence of 26.6% among males and 30.1% among females.</p> <p>Qatari women were at higher risk for depression (53.1 versus 46.9%).</p> <p>The findings of this study revealed that depression was more prevalent in the Qatari population than anxiety disorders.</p>	<p>A well-designed study that indicated that high-risk groups of depression and anxiety disorders were female sex, being married, middle aged and highly educated.</p> <p>The growing recognition of the public health burden of anxiety and depression emphasize the importance of developing primary health care training programmes for the early detection of mental health disorders and their treatment.</p>
20	Bener et al. 2013 <sup>34</sup>	Qatar	A prospective cross-sectional study/primary health care centres of	To determine the prevalence of somatization, anxiety, depression and stress in a primary care population, explore their association	<p>The prevalence of somatization, depression, anxiety and stress was 11.7%, 11.3%, 8.3% and 18.6%, respectively.</p> <p>The prevalence of somatization and</p>	<p>A large study that indicated a strong association between depression and some psychological disorders in patients.</p>

(continued)

**Table 1. Continued.**

Study year	Author and year	Country	Design/setting/population	Main study objectives	Main results and conclusion	Notes
21	Kim et al. 2015 <sup>35</sup>	UAE	the State of Qatar/ n = 1762  A cross-sectional study/ outpatient clinic/ n = 103 UAE citizens and n = 117 Koreans.	to psychosocial stressors and determine the diagnostic overlap of these four mental disorders. The depression module Patients Health Questionnaire-8 was used to assess depression. To assess health-promoting lifestyle behaviours and psychological status, including depression, anxiety, and stress, among Korean migrants and Arab nationals in the UAE using the Health-Promoting Lifestyle Profile to measure health-promoting lifestyle behaviours and Lovibond and Lovibond's Depression, Anxiety, and Stress Scale to measure psychological status.	depression was similar, but the prevalence of stress was higher in inpatient patients. Somatization, depression, anxiety and stress disorders co-occurred at a higher rate in the study sample. Prevalence of depression was 6.39% among Arabs and 5.40% among the Korean group. Findings suggest considering cultural aspects, such as different values placed on physical fitness and social/inter-personal relationships, in developing and implementing health education and/or promotion programmes. Assessment of psychological status (i.e. depression, anxiety and stress) should also be included in health promotion programmes and related health policies.	A cross-cultural study, but the sample size was relatively small.
22	Hawamdeh et al. 2013 <sup>36</sup>	UAE	A cross-sectional study/ outpatient clinics across the six emirates/n = 182 UAE citizens (92 with diabetes mellitus).	To identify the relationship between sociodemographic characteristics of UAE women with diabetes mellitus and depression and to explore any differences between depressed and nondepressed patients in relation to glycaemic control using the Beck Depression Inventory-II and a sociodemographic questionnaire.	A positive relationship exists between diabetes mellitus and the diagnosis of depression. Prevalence of depression was 76.9% among patients with diabetes mellitus and 41.1% among those without diabetes mellitus. Early detection of depression among women with diabetes mellitus is crucial to enhance treatment regimen adherence and glycaemic control. As UAE women with diabetes mellitus are at an even greater risk than other	The study explored the association between glycosylated haemoglobin levels and depression levels. The results are generalizable to the larger UAE population considering the high number of patients in both the diabetic and nondiabetic groups, who were diverse, and from a variety of outpatient clinical sites.

(continued)

**Table 1.** Continued.

Study year	Author and year	Country	Design/setting/population	Main study objectives	Main results and conclusion	Notes
23	Sulaiman et al. 2010 <sup>37</sup>	UAE	A cross-sectional survey/primary health care centres of Sharjah/ <i>n</i> = 347 (females 65.4%).	To estimate the prevalence of psychological distress and its correlates in patients with diabetes mellitus in the UAE using structured questionnaires to gather data on sociodemographics, life-style factors, diabetes complications and medication usage. The K6 was administered as a screening tool for mental health concerns.	diabetic women, they need to be very carefully screened and evaluated for depression. The results of this study demonstrated a strong correlation between mental health status and diabetic complications. In particular, patients who were depressed tended to have poorer self-care, more severe physical symptoms and were less likely to adhere to prescribed care regimens. These findings raise the possibility that improving the mental health as part of a comprehensive management plan for diabetes mellitus may improve the overall long-term outcomes of these patients.	There were several limitations of the study including difficulty in delineating the causal relationship between the variables. Specifically, diabetes management may lead to the development of depressive symptoms and, in turn, depression may worsen diabetic management and complications.
24	Ahmed et al. 2009 <sup>38</sup>	UAE	A cross-sectional survey in Dubai/ <i>n</i> = 258.	To examine the phenomenology of depression and anxiety in medical doctors in three government hospitals, three primary health care centres and the students (all years) and staff of Dubai Medical College for Girls using the Beck Depression Inventory & Beck Anxiety Inventory.	Of medical students, 28.6% showed depression; and of medical staff, 7.8% showed depression. There was a significant correlation between depression and anxiety among medical students. The considerable amount of depression and anxiety found among doctors and students in this study should trigger further work.	Studies using more powerful designs would help to illuminate the factors leading to depression and anxiety.
25	Daradkeh et al. 2002 <sup>39</sup>	UAE	A cross-sectional community survey in Al-Ain city/ <i>n</i> = 1394.	To examine sex differences in the prevalence of depressive disorders in an Arab community using the modified version of the Composite International Diagnostic Interview and a	The lifetime rates of depression in males and females were 2.8% and 10.3%, respectively. The female:male ratio found in this study was the highest reported ratio in the literature. Sex, life events, chronic difficulties and to a certain extent age were found to be	Interesting study on sex differences in depression was a robust finding but more studies are needed to explain the high female:male ratio found in this survey in this particular community.

(continued)



**Table 1.** Continued.

Study year	Author and year	Country	Design/setting/population	Main study objectives	Main results and conclusion	Notes
26	Ghubash et al. 1997 <sup>40</sup>	UAE	A cross-sectional, community survey in Dubai/n = 95 women.	To determine prospectively the prevalence of postpartum psychiatric disorder and its sociocultural correlates using the Self Report Questionnaire (SRQ) at day 2, the Edinburgh Postnatal Depression Scale (EPDS) at day 7, and the Present State Examination (PSE) in a consecutive series of childbearing women in Dubai; and to compare this with prevalence rates reported in studies done in Western Europe and North America.	<p>risk factors for depression in the studied community.</p> <p>The prevalence rates of depression were higher in females in all the above categories but such differences reached statistical significance in age category before 55, regardless of marital status, when the number of children was four or more and among those exposed to recent life events and chronic difficulties.</p> <p>The prevalence rate of psychiatric morbidity was 24.5% by the SRQ, 7.8% by the EPDS and 15.8% by the PSE.</p> <p>A number of psychosocial factors emerged as putative risk factors for postpartum depression.</p> <p>The prevalence rate of psychiatric morbidity and its risk factors in this Arab culture were similar to the results obtained in numerous previous studies in industrialized countries.</p>	<p>Study had several limitations including that the assessment of risk factors was made in the postpartum period and not during pregnancy.</p> <p>It was also hospital based. However, it is one of the early studies from the UAE.</p>
27	Al-Sabahi et al. 2014 <sup>41</sup>	Oman	A retrospective review of the records of the comprehensive health assessment of the population aged ≥ 60 years in Al-Dakhiliyah governorate, Oman/n = 1519.	To determine the rates and correlates of depression among community-dwelling elderly people, based on data from the comprehensive health assessment conducted in Al-Dakhiliyah governorate in Oman in 2008–2010.	<p>The rate of depression was 16.9% higher among women than men (19.3% versus 14.3%, respectively).</p> <p>Depression was independently predicted by the presence of social risk (odds ratio [OR] = 3.44), dementia (OR = 3.17), impairment in activities of daily living (OR = 2.19), joint problems (OR = 1.52) and mobility</p>	<p>A retrospective study with all of its limitations. However, it was included because of its relatively large sample size.</p>

(continued)

**Table 1.** Continued.

Study year	Author and year	Country	Design/setting/population	Main study objectives	Main results and conclusion	Notes
28	Al-Ghafri et al. 2014 <sup>42</sup>	Oman	A cross-sectional study/ n = 132 medical residents.	To examine the diagnostic validity of the PHQ-9 using an Omani medical resident population in order to establish a cut-off point. To compare sex, age and residency level among Omani Medical residents who report current depressive symptomatology versus those who report as non-depressed according to PHQ-9 cut-off threshold.	restriction (OR = 1.43). The rates of depression and severe depression were higher among women (19.3% and 11.5% respectively) than men (14.3% and 7.8%, respectively). The rate of depression, as determined by the PHQ-9, was 11.4%. The role of sex, age and residency level was not significant in endorsing depression. This study indicated that the PHQ-9 was a reliable measure among this cross-cultural population. More studies employing robust methodology are needed to confirm this finding.	A small size study that was conducted on a very specific group i.e. medical residents only.

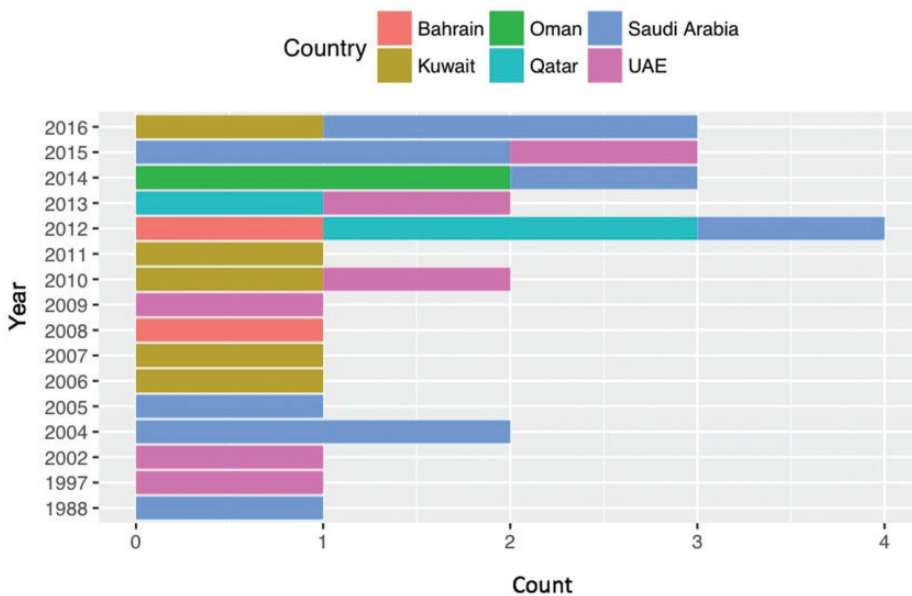
UAE, United Arab Emirates.

**Table 2.** Summary data of the contribution of each of the six Arabian Gulf Cooperation Council countries to the international literature on depressive disorders that were cited on the PubMed® and APA PsycInfo® databases from inception to 31 December 2016.<sup>15-42</sup>

Country	Total number of publications on depressive disorders	Percentage of the publications (%)	Total population numbers (2015) <sup>a</sup>	Publication index on depressive disorders per million (I) <sup>b</sup>
Saudi Arabia	10	35.7	31 540 000	0.32
Kuwait	5	17.9	3 892 000	1.28
Bahrain	2	7.1	1 377 000	1.45
Qatar	3	10.7	2 235 000	1.34
United Arab Emirates	6	21.4	9 157 000	0.66
Oman	2	7.1	4 490 000	0.45
GCC	28	100	52 691 000	0.53

<sup>a</sup>Data source for country population numbers: <http://www.who.int/countries/sau/en/>.

<sup>b</sup>The index of publications (I) on depressive disorders per million was calculated by multiplying the number of publications by 1 million and dividing it by the total population number:  $I = (\text{number of publications} \times 1\,000\,000) \div \text{total population number}$ .



**Figure 2.** Number of publications on depressive disorders per year of publication that were cited on the PubMed® and APA PsycInfo® databases from inception to 31 December 2016 in each of the six Arabian Gulf Cooperation Council countries. UAE, United Arab Emirates.

the studies was 2320 patients and the study was conducted in a primary health care setting.<sup>28</sup> Different instruments, tools and methodologies were used by

different authors. According to the inclusion criteria, only one study clearly stated the use of the DSM-4 criteria for diagnosis.<sup>21</sup>

## Discussion

This current literature review identified a large gap in the contributions of the six countries of the GCC to the international scientific literature on depressive disorders (Table 1). This gap was observed despite the high prevalence rates of mental disorders in general and the associated increasing burden of the DALYs/100 000 in the EMR.<sup>4</sup> The current study also identified the opportunities for future research on depression in the GCC countries, which have witnessed a rapid shift to more modernization and globalization over the last few decades. This literature review also demonstrates that the rates of published scientific research on depressive disorders, as recorded on two of the world's most popular research sites, namely the PubMed® and APA PsycInfo® databases, were disappointingly scant in quantity and poor in quality.

The under productivity of researchers from the GCC countries is noticed despite several ongoing calls by the WHO for giving mental health problems more attention by all countries across the world.<sup>9</sup> The results of the current literature review that focuses on depressive disorder were similar to the results of a recent scoping review study that demonstrated the paucity of research on depression as the authors only found six studies on depression from the GCC countries out of the 55 publications they reviewed.<sup>5</sup> The current literature review observed that research on depressive disorders in the GCC countries involved heterogeneous populations, used different methodologies, used a variety of research tools to diagnose depressive disorders and included small sample sizes, which prevented direct comparisons of the findings. Most of the studies that have been included in the current literature review had limitations and/or weaknesses as described briefly in the notes column of Table 1.

Interestingly, only six out of the 28 studies (21.4%) included in this review included a random sample and/or adopted good sampling strategies.<sup>16,19,25,28,30,33</sup> This may reflect the difference in study design (controlled/cohort studies versus cross-sectional studies) rather than a lack of scientific literature published by the GCC countries. This may also explain the lack of clinical trials in the field of depression in GCC countries. The inclusion criteria of this current literature review have taken in consideration the community setting of the studies with the aim of limiting its scope to those studies that were conducted in a community or primary care setting and to avoid those studies on inpatients or those that were purely hospital-based studies. As a consequence, only 13 of 28 studies (46.4%) strictly met this condition and were designed to be conducted in a community and/or a primary health care setting. However, some of the included studies were conducted at the community level but were limited to well-defined populations or cohorts of outpatients such as university students, patients with diabetes mellitus and postpartum females which makes their results are less generalizable.<sup>16,18,32</sup> The choice of selecting the studied samples from hospitals and university students may be attributed to the feasibility of recruiting a representative sample for conducting research related to mental health problems in the GCC countries where there are sociocultural concerns that are linked to people's experience of mental disorders in general and depression in particular. However, these groups may not be representative of the general population as they only represent a selected group of young individuals from the targeted general population. The various sociocultural and religious aspects of the local culture in the GCC countries have already been addressed by several authors.<sup>5,15,27,35,43,44</sup> For example, the results of a study from Saudi Arabia showed that 75% of the

studied population believed that depression will not occur if 'one is close to God'.<sup>15</sup> In the current literature review, two studies aimed to compare patients with depressive disorders across different cultures by studying subjects from Kuwait and UAE and comparing them with other nationalities, namely subjects from the USA<sup>27</sup> and South Korea,<sup>35</sup> respectively. One mail survey study compared the subcultural differences by reporting their findings from investigating the sex differences in depression among 8538 students in 17 Muslim countries, which included students from the GCC.<sup>29</sup>

This current literature review had several limitations. First, its framework was that of a thematic or scoping review rather than a comprehensive systematic review. However, in view of the paucity of the published literature from the GCC region<sup>5</sup> and the EMR on the various mental health problems including depressive disorders;<sup>4</sup> a scoping review such as the current review may be the best option as it usually intends to map the key concepts underpinning a research area and the main sources regardless of where the research sits on the 'evidence hierarchy'.<sup>5,45,46</sup> Therefore, the current review has met these expectations. Secondly, the use of a new indicator for comparing the contributions of each country with other GCC countries could be seen as a limitation as it is not well known globally similar, for example, to the Nature index.<sup>47</sup> However, the index used in the current study has already been used in a previous publication on diabetic foot disorders in Arab countries and served its purpose in assessing the scientific contributions in a thematic literature review.<sup>13</sup> Thirdly, the current literature review was limited to searching only two important databases, the PubMed® and APA PsycInfo® databases, with no attempt being made to review the grey literature. Perhaps widening the searched data sources by increasing the

number of the databases might be a worthwhile strategy in future studies. Nonetheless, the current review highlighted the literature coming out of an area with peculiar sociocultural backgrounds to the international scientific literature.<sup>4,5,13,47</sup>

The observations and results of the current literature review support the need for better designed, larger, national and community-based studies on depressive disorders in all of the GCC countries to overcome the current deficiencies in the quantity and quality of the available literature. Future studies should take into consideration the effects of local influences of the peculiar regional factors including the sociocultural context on the combined results. Future studies will hopefully assess the epidemiology of depressive disorders in depth and inform policy makers and health care providers on appropriate actions to be implemented based on the best scientific evidence. With the growing numbers of individuals with depressive disorders, the priority should be given to dealing with high risk groups, such as females, particularly pregnant and postpartum women, and young adults, particularly the students attending health colleges and medical residents. In addition, special attention should be given to the growing numbers of patients with diabetes mellitus in the Gulf region that are more likely to have associated depressive disorders.<sup>18,31,37</sup> To enhance the early detection rates of depression, it may be advisable to encourage all adults to use the screening tools for depression and/or other mental illnesses routinely as this may help primary physicians in the early detection of the disease and subsequent referrals to psychiatrists. Early referral will eventually lead to reduced complications, improved treatment outcomes and give an overview of the burden of the disease.<sup>48</sup> Furthermore, researchers, psychiatrists and mental health promotion providers should look at the impact of the

sociocultural context in the GCC region and educate the community about the importance of gaining valuable mental health knowledge linked to the symptoms of depression or other mental illnesses so that they can seek help from a qualified physician first; and not from a spiritual healer as it is commonly practiced currently. Access to mental health care should be provided without the fear of negative views from other members of their community or the placing of some kind of stigma upon them.<sup>5</sup> Finally, a national and interdisciplinary approach should be adopted to assess the magnitude of the problem of depressive disorders within the general population in order to eliminate the increasing functional impairment, which can lead to declining work productivity among patients suffering from mental health illnesses that impact the overall social and economic aspects.<sup>49,50</sup>

In conclusion, there is no reason to believe that any country including the GCC countries is immune from having the burden of depressive disorders as it is already known that depression can affect one in 10 of the world's population and was ranked as the third cause of disability in 2004 and is expected to move to the first place by 2030.<sup>9</sup> Despite of this, the available scientific literature published by the GCC countries is scant and lacking scientific depth. The findings of the current literature review on depressive disorders in the GCC countries should be considered as a wake-up call for the public health researchers, mental health workers, health care providers and policy makers in the GCC region to start dealing with the burden of poor mental health as it is a real threat to their communities particularly the younger ones. The first step on the long road to managing depressive disorders will be the launching of better designed, community-based and national studies. Such research will benefit the populations in the Arabian

Gulf region, perhaps people with similar cultural sociocultural backgrounds around the globe and will guide the health care providers who deal with multi-cultural patients with mental health issues.

### Acknowledgement

The author would like to thank Dr Michelle C Carlson and the Welch Medical Library informationist Mrs Donna Hesson from Johns Hopkins University for their kind guidance and expert assistance of the author in designing the methods and search strings used in this study and reviewing the article.

### Declaration of conflicting interest

The author declares that there are no conflicts of interest.

### Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

### ORCID iD

Owiss Alzahrani  <https://orcid.org/0000-0002-3316-7363>

### References

1. Secretariat General of the Gulf Cooperation Council. Member States, <https://www.gcc-sg.org> (2017, accessed 9 March 2017).
2. Charara R, Forouzanfar M, Naghavi M, et al. The Burden of Mental Disorders in the Eastern Mediterranean Region, 1990–2013. *PLoS One* 2017; 12: e0169575.
3. Regan M, Gater R, Rahman A, et al. Mental health research: developing priorities and promoting its utilization to inform policies and services. *East Mediterr Health J* 2015; 21: 517–521.
4. Afifi MM. Analysis of mental health publications from Arab countries in PubMed, 1987–2002. *Neurosciences (Riyadh)* 2004; 9: 113–118.
5. Hickey JE, Pryjmachuk S and Waterman H. Mental illness research in the Gulf



- Cooperation Council: a scoping review. *Health Res Policy Syst* 2016; 14: 59.
6. Abou Abbas L, Salameh P, Nasser W, et al. Obesity and symptoms of depression among adults in selected countries of the Middle East: a systematic review and meta-analysis. *Clin Obes* 2015; 5: 2–11.
  7. Lin EH, Von Korff M, Alonso J, et al. Mental disorders among persons with diabetes—results from the World Mental Health Surveys. *J Psychosom Res* 2008; 65: 571–580.
  8. Mokdad AH, Jaber S, Abdel Aziz MI, et al. The state of health in the Arab world, 1990–2010: an analysis of the burden of diseases, injuries, and risk factors. *Lancet* 2014; 383: 309–320.
  9. World Health Organization. Depression: A Global Crisis, [https://www.who.int/mental\\_health/management/depression/wfmh\\_paper\\_depression\\_wmhd\\_2012.pdf](https://www.who.int/mental_health/management/depression/wfmh_paper_depression_wmhd_2012.pdf) (2012, accessed 16 September 2020).
  10. World Health Organization. A new agenda for mental health in the Eastern Mediterranean Region, <https://apps.who.int/iris/handle/10665/255236> (2015, accessed 16 September 2020).
  11. American Psychiatric Association. Depressive Disorders, in Diagnostic and Statistical Manual of Mental Disorders, <https://www.psychiatry.org/psychiatrists/practice/dsm> (2013, accessed 16 September 2020).
  12. Reynolds K, Pietrzak RH, El-Gabalawy R, et al. Prevalence of psychiatric disorders in U.S. older adults: findings from a nationally representative survey. *World Psychiatry* 2015; 14: 74–81.
  13. Alzahrani OH, Badahdah YS, Bamakrid MS, et al. The Diabetic Foot Research in Arabs' Countries. *Open J Endocr Metab Dis* 2013; 3: 157–165.
  14. Al-Shehri AH, Taha AZ, Bahnassy AA, et al. Health-related quality of life in type 2 diabetic patients. *Ann Saudi Med* 2008; 28: 352–360.
  15. Alrahili N, Almatham F, Haamed HB, et al. Attitudes to depression in Saudi Arabia: a preliminary study. *Int J Cult Ment Health* 2016; 9: 255–260.
  16. AlFaris E, Irfan F, Qureshi R, et al. Health professions' students have an alarming prevalence of depressive symptoms: exploration of the associated factors. *BMC Med Educ* 2016; 16: 279.
  17. Aboalshamat K, Hou XY and Strodl E. Psychological well-being status among medical and dental students in Makkah, Saudi Arabia: a cross-sectional study. *Med Teach* 2015; 37(Suppl 1): S75–S81.
  18. Gemeay EM, Moawed SA, Mansour EA, et al. The association between diabetes and depression. *Saudi Med J* 2015; 36: 1210–1215.
  19. Al-Qadhi W, Ur Rahman S, Ferwana MS, et al. Adult depression screening in Saudi primary care: prevalence, instrument and cost. *BMC Psychiatry* 2014; 14: 190.
  20. Al-Faris EA, Irfan F, Van der Vleuten CPM, et al. The prevalence and correlates of depressive symptoms from an Arabian setting: a wake up call. *Med Teach* 2012; 34(Suppl 1): S32–S36.
  21. Bassiony MM. Social anxiety disorder and depression in Saudi Arabia. *Depress Anxiety* 2005; 21: 90–94.
  22. Becker SM. Detection of somatization and depression in primary care in Saudi Arabia. *Soc Psychiatry Psychiatr Epidemiol* 2004; 39: 962–966.
  23. Turkistani IY. Sexual dysfunction in Saudi depressed male patients. *Int J Psychiatry Clin Pract* 2004; 8: 101–107.
  24. el-Rufaie OE, Albar AA and Al-Dabal BK. Identifying anxiety and depressive disorders among primary care patients: a pilot study. *Acta Psychiatr Scand* 1988; 77: 280–282.
  25. Alkhadhari S, Alsabbri AO, Mohammad IHA, et al. Prevalence of psychiatric morbidity in the primary health clinic attendees in Kuwait. *J Affect Disord* 2016; 195: 15–20.
  26. Al-Turkait FA, Ohaeri JU, El-Abbasi AHM, et al. Relationship between symptoms of anxiety and depression in a sample of Arab college students using the Hopkins Symptom Checklist 25. *Psychopathology* 2011; 44: 230–241.
  27. Abdel-Khalek AM and Lester D. Constructions of religiosity, subjective well-being, anxiety, and depression in two cultures: Kuwait and USA. *Int J Soc Psychiatry* 2012; 58: 138–145.

28. Al-Otaibi B, Al-Weqayyan A, Taher H, et al. Depressive symptoms among Kuwaiti population attending primary healthcare setting: prevalence and influence of sociodemographic factors. *Med Princ Pract* 2007; 16: 384–388.
29. Alansari BM. Gender differences in depression among undergraduates from seventeen Islamic countries. *Social Behavior and Personality: An International Journal* 2006; 34: 729–738.
30. Al Dallal FH and Grant IN. Postnatal depression among Bahraini women: prevalence of symptoms and psychosocial risk factors. *East Mediterr Health J* 2012; 18: 439–445.
31. Almawi W, Tamim H, Al-Sayed N, et al. Association of comorbid depression, anxiety, and stress disorders with Type 2 diabetes in Bahrain, a country with a very high prevalence of Type 2 diabetes. *J Endocrinol Invest* 2008; 31: 1020–1024.
32. Burgut FT, Bener A, Ghuloum S, et al. A study of postpartum depression and maternal risk factors in Qatar. *J Psychosom Obstet Gynaecol* 2013; 34: 90–97.
33. Bener A, Ghuloum S and Abou-Saleh MT. Prevalence, symptom patterns and comorbidity of anxiety and depressive disorders in primary care in Qatar. *Soc Psychiatry Psychiatr Epidemiol* 2012; 47: 439–446.
34. Bener A, Al-Kazaz M, Ftouni D, et al. Diagnostic overlap of depressive, anxiety, stress and somatoform disorders in primary care. *Asia Pac Psychiatry* 2013; 5: E29–E38.
35. Kim HJ, Choi-Kwon S, Kim H, et al. Health-promoting lifestyle behaviors and psychological status among Arabs and Koreans in the United Arab Emirates. *Res Nurs Health* 2015; 38: 133–141.
36. Hawamdeh S, Almahzoumy I and Hayajneh Y. Screening and correlates of depression and HbA1 C in United Arab Emirates (UAE) women with diabetes. *Perspect Psychiatr Care* 2013; 49: 262–268.
37. Sulaiman N, Hamdan A, Tamim H, et al. The prevalence and correlates of depression and anxiety in a sample of diabetic patients in Sharjah, United Arab Emirates. *BMC Fam Pract* 2010; 11: 80.
38. Ahmed I, Banu H, Al-Fageer R, et al. Cognitive emotions: depression and anxiety in medical students and staff. *J Crit Care* 2009; 24: e1–e7.
39. Daradkeh TK, Ghubash R and Abou-Saleh MT. Al Ain community survey of psychiatric morbidity II. Sex differences in the prevalence of depressive disorders. *J Affect Disord* 2002; 72: 167–176.
40. Ghubash R and Abou-Saleh MT. Postpartum psychiatric illness in Arab culture: prevalence and psychosocial correlates. *Br J Psychiatry* 1997; 171: 65–68.
41. Al-Sabahi SM, Al Sinawi HN, Al-Hinai SS, et al. Rate and correlates of depression among elderly people attending primary health care centres in Al-Dakhiliyah governorate, Oman. *East Mediterr Health J* 2014; 20: 181–189.
42. Al-Ghafri G, Al-Sinawi H, Al-Muniri A, et al. Prevalence of depressive symptoms as elicited by Patient Health Questionnaire (PHQ-9) among medical trainees in Oman. *Asian J Psychiatr* 2014; 8: 59–62.
43. al-Krenawi A and Graham JR. Culturally sensitive social work practice with Arab clients in mental health settings. *Health Soc Work* 2000; 25: 9–22.
44. Fakhr El-Islam M. Arab culture and mental health care. *Transcult Psychiatry* 2008; 45: 671–682.
45. Mays N, Pope C and Popay J. Systematically reviewing qualitative and quantitative evidence to inform management and policy-making in the health field. *J Health Serv Res Policy* 2005; 10: 6–20.
46. Anderson S, Allen P, Peckham S, et al. Asking the right questions: scoping studies in the commissioning of research on the organisation and delivery of health services. *Health Res Policy Syst* 2008; 6: 7.
47. Nature Index tables. *Nature* 2015; 522: S34–S44. <https://doi.org/10.1038/522S34a>.
48. Jin J. Screening for Depression. *JAMA* 2016; 315: 428.
49. McLaughlin KA. The public health impact of major depression: a call for interdisciplinary prevention efforts. *Prev Sci* 2011; 12: 361–371.
50. Unützer J and Park M. Strategies to improve the management of depression in primary care. *Prim Care* 2012; 39: 415–431.