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Social participation and depressive symptomatology among medical students

A Saudi cross-sectional study

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Abstract

Substantial evidence indicates that social participation contributes significantly to psychological well-being. Furthermore, medical students have emerged as a prominent demographic group affected by depression. This trend is mirrored locally in the Kingdom of Saudi Arabia, where medical students exhibit a higher prevalence of depressive symptoms. This cross-sectional study investigated the association between depressive symptoms and social participation among medical students. Additionally, this study examined whether different forms of social participation had varying effects on depressive symptoms among the participants. The authors measured depressive symptoms and social participation scores among 650 undergraduate medical students from the 1st to the 5th year at King Saud University and Al-Imam Muhammad Ibn Saud Islamic University, Riyadh, Kingdom of Saudi Arabia. The study tool consisted of a questionnaire developed by the research team to explore sociodemographic and other related information, the Patient Health Questionnaire-9 (PHQ-9) to assess depression severity, and the modified social participation questionnaire to assess social participation. Higher social participation was significantly associated with lower severity of depression ($P < .001$). Group activities (OR = 0.95, 95% CI, 0.92–0.97, $P < .001$) and informal interactions (OR = 0.97, 95% CI, 0.96–0.99, $P = .008$) had a stronger inverse correlation with depression levels than community-based involvement (OR = 0.78, 95% CI, 0.64–0.96, $P = .017$). A prior diagnosis of a mental health disorder was significantly associated with higher depression severity (OR = 2.04, 95% CI, 1.38–3.02, $P < .001$). A significant association between sex and depression levels was observed ($P = .043$), with females experiencing severe depression at higher proportions (65.4%) than males (34.6%). Female students had significantly lower social participation scores than male students (beta = –6.62, 95% CI, –8.84 to –4.40, $P < .001$). The results of this study support the notion that social participation is significantly correlated with lower depressive symptoms among medical students, highlighting its role in enhancing mental well-being and reducing depression burden.

Abbreviations: GPA = grade point average, IMSIU = Al-Imam Muhammad Ibn Saud Islamic University, KSA = Kingdom of Saudi Arabia, KSU = King Saud University, PHQ-9 = Patient Health Questionnaire-9, SPQ = Social Participation Questionnaire, YLDs = years lived with disability.

Keywords: depressive symptoms, medical students, Saudi Arabia, social participation

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The datasets generated during and/or analyzed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

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1. Introduction

Depression is a common, profound mental health disorder characterized by persistent sadness and loss of interest, among other symptoms.[1,2] In 2021, it was estimated that there were 332 million cases of depressive disorders globally, and their prevalence has continued to rise.[3,4] Furthermore, in 2021, the burden of depression was ranked as the second leading reason for disability as estimated by years lived with disability, accounting for 56.3 million years lived with disability in 2021.[4] The prevalence of depression is higher in the Middle East than in other regions globally.[5,6] Among different groups, nearly one-third of medical students worldwide experience depression, with the highest rates found in the Middle East, particularly among females and first-year students, and a decline in prevalence among senior students.[7,8] In Saudi Arabia, the national screening for anxiety and depression in 2022 indicated that the prevalence of depression was 12.7% among the general population.[9] Furthermore, among medical students in Saudi Arabia, the mean prevalence is 51%, which is significantly higher than that among other university students.[10] Despite the availability of many treatment options for depression, the global percentage of individuals with depressive symptoms receiving treatment remains relatively low, with only one-third of those diagnosed receiving treatment and half of them not receiving adequate treatment.[11] This trend seems to be even worse in Saudi Arabia, where only 1.5% of individuals with depressive symptoms are diagnosed and on treatment.[9]

Social participation is the social connection or ties that an individual forms with people, ranging from intimate to extended, and engagement with others in informal and formal events for enjoyment or sharing experiences with others.[12] Social participation can manifest in different forms, with such forms being categorized into 4 main categories, depending on the type of activity. These categories include informal social contact, such as visiting a family member or a friend; social contact through activities in public spaces, such as going to the cinema; participation in group activities, such as playing a sport; and participation in community groups, such as volunteering in an awareness campaign.[13] These social interactions play key roles in physical and mental health, especially depression.[14,15] Additionally, their positive impact on physical well-being is significant.[15] On the other hand, a decrease in participation in the social environment, such as living alone, social isolation, and loneliness, is a risk factor for coronary heart disease.[16] A decline in social participation also negatively affects cognitive health, because social isolation is a significant contributor to the development of depression.[17] Social participation has been established as a protective factor against depression, and a decrease in social participation is a predictor of depression.[18,19]

The social participation categorizations become imperative when examining the frequency and the effect of a type of participation compared to other types in a specific population.[13,20] For example, engaging with the social environment when playing sports or exercising has a higher negative association with depression than online engagement among a middle-aged to old population.[21,22] A longitudinal study conducted on 3005 American adults showed that loneliness and a lack of social support (perceived loneliness) were positively associated with depressive symptoms.[23] However, having a small social network and engaging in fewer social interactions, which is referred to as social disconnectedness, is not directly linked to depression.[23] This suggests that social interaction type may play a more important role in shaping the effect of social participation on depressive symptoms. In another cohort study conducted in Europe, researchers examined data from 9000 adults aged 50 years and older across 10 countries, primarily in southern Europe.[20] They found that participation in religious organizations, as a form of social engagement, was negatively associated with depression.[20] In contrast, involvement in political or community organizations such as protests and rallies was linked to an increase in depressive symptoms.[20] Furthermore, a longitudinal study in China found that neighborhood social participation and physical activity were negatively associated with depression in adults.[24]

It is important to investigate the associations among medical students' demographics, as they are at risk of developing depression.[7,8,10] Additionally, although some Saudi studies examined the risk factors associated with depression, such studies did not examine the role of social participation. For instance, a systematic review conducted in 2020 had a great representation of medical students in Saudi Arabia, with 18 studies, which explored some factors associated with depression, such as grade point average, illicit drug use, and smoking. Yet, this systematic review did not explore the association with social participation, as data in this regard was lacking.[10] It is also important to investigate the types of social participation and determine the one that has the best effect on mental health. To the best of our knowledge, research on the association between social participation and depression among medical students is lacking, and no study has explored this topic in the Kingdom of Saudi Arabia. The findings of this study will contribute to the growing body of literature on depression and social participation by addressing a notable gap specific to medical students in Saudi Arabia. By identifying the forms of social participation that are most strongly associated with improved mental health outcomes, our results may inform future interventions, support programs, and policy decisions aimed at reducing depression among medical students both locally and in similar contexts globally. Moreover, understanding these associations could help universities and health authorities design more targeted well-being initiatives that foster protective social environments within academic institutions.

2. Materials and methods

2.1. Study design, setting, and participants

This was an observational cross-sectional study. Data were collected from February to November 2024. The sample size was calculated by using the n = zα/2^2 P (1-p)/ d^2 equation, where $P = .272$,[8] d = 5%, zα/2 for 95%=1.96, n = zα/2^2 P (1-p)/ d^2 = 304.27, approximated to 305. Assuming a nonresponse rate of 20%, the sample size was approximately 366. This study used a convenience sampling technique to recruit participants, targeting male and female undergraduate medical students from the 1st to the 5th academic year, who were between the ages of 18 and 25 years and attending King Saud University (KSU) and Al-Imam Muhammad Ibn Saud Islamic University (IMSIU) in Riyadh, Saudi Arabia. Nonmedical students, postgraduates, interns, residents, and students from other colleges and universities were excluded. The participants were contacted by the research team through social media, namely WhatsApp, in which invitations to participate were sent to the students' groups, ensuring that the collected responses were only from the targeted population. Students' responses were collected via an online survey using Google Forms. Data from 650 students were gathered and analyzed: 423 from KSU and 227 from IMSIU.

2.2. Study instruments

Our study instrument consisted of 3 parts: a questionnaire developed by the research team to assess sociodemographic characteristics; the Patient Health Questionnaire (PHQ-9) to assess depression,[25] and a version of the Social Participation Questionnaire (SPQ) modified by the research team (Modified-SPQ) to measure social participation.[13,20]

The sociodemographic section, which was developed by the research team, gathered information about sex, income status,

whether the participant has ever been diagnosed with a mental health illness, if yes, what type of illness, academic year, and residency status (living with parents, alone, etc).

The PHQ-9 is widely used for assessing depressive symptoms and their severity.[25] It consists of 9 items that measure the frequency of depressive symptoms over the past 2 weeks. Each item was scored on a 4-point scale ranging from 0 ("Not at all") to 3 ("Nearly every day"), with a total possible score ranging from 0 to 27. The severity of depressive symptoms was categorized as minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27).[25]

Social participation was measured using the SPQ, which is a set of items covering various forms of engagement in social, recreational, and community activities. These items were grouped into 3 domains: informal and public social participation, group activities, and community group participation. Permission to use the SPQ was obtained from the author for this study.[13,20] Furthermore, some modifications were made by the research team to suit the participants' cultural background. These modifications included rephrasing 2 questions (Q4 and Q11) and deleting 3 (Q8, Q23, and Q24). For those rephrased, Q4, "Attended church or a religious group," was changed to "Attended a mosque or a religious group," while Q11, "Gone to a party or dance," was changed to "Gone to an organized event or festival." The 3 that were deleted included Q8 "Gone to a club, pub, or bar," Q23 "Service club (e.g., Lions, Country Women's Association, CWA)," and Q24 "Ethnic group (e.g., Croatian, Italian club)." Responses for 2 domains (informal and public social participation and group activities) were recorded on a 6-point scale ranging from 0 ("Never") to 5 ("Once a week or more"), whereas the responses for community group participation were coded as 0 (No) or 1 (Yes). Scores for each domain were acquired by summing the responses within the respective categories, with higher scores indicating higher levels of social participation.[13] The research team categorized social participation into 5 categories. The categories were distributed equally, and each category had its own range of Modified-SPQ scores. The categories were very low social participation (0–20), low social participation (21–40), moderate social participation (41–60), high social participation (61–80), and very high social participation (81–102). Since the authors of the original SPQ only indicated that higher scores reflect higher levels of social participation,[13] the research team in this study opted to follow a categorical division of the scores to enhance clarity and allow easier comparisons across different groups and to present the findings in a more transparent and easier-to-understand manner. However, the research team did not conduct a pilot study to evaluate the validity and reliability of the modified-SPQ after the reported modifications.

2.3. Ethical considerations

This study was approved by the Institutional Review Board of the College of Medicine, KSU (Research Project No. E-24-8473). The research team ensured that the study followed ethical guidelines by receiving consent from the participants, and their participation was voluntary. In addition, the research team maintained the confidentiality of the participants in accordance with ethical research standards.

2.4. Statistical method

Data were analyzed using RStudio (version 2024.9.1.394, Boston) with R version 4.4.2. Descriptive statistics were presented as frequencies and percentages for categorical variables, and median (IQR) or mean (±SD) for continuous variables. Differences in depression severity across demographic and social participation variables were assessed using Pearson chi-squared test, Fisher exact test, or the Kruskal–Wallis rank sum test, as appropriate. Ordinal logistic regression was used to identify the predictors of depression severity, and multiple linear regression was conducted to examine the factors influencing social participation scores. Statistical significance was set at $P < .05$.

3. Results

3.1. Demographic characteristics

Data from 650 students were analyzed. Almost half of the students were males (n = 333, 51.2%). The majority of participants were from KSU (n = 423, 65.1%), while 227 (34.9%) were from IMSIU. The distribution across academic years was 112 (17.2%) in the 1st year, 119 (18.3%) in the 2nd year, 170 (26.2%) in the 3rd year, 134 (20.6%) in the 4th year, and 115 (17.7%) in the 5th year. A mental health disorder diagnosis was reported by 103 (15.8%) participants, with the most common conditions being anxiety (37, 48.1%) and depression (33, 42.9%). The majority of students resided with their parents (521, 80.2%), and most had a family income exceeding 20,000 SAR (393, 60.5%; Table 1).

Table 1

Demographic characteristics of the participants n = 650.

Characteristic	Description
Sex	
Male	333 (51.2%)
Female	317 (48.8%)
University	
IMSIU	227 (34.9%)
KSU	423 (65.1%)
Academic year	
1st yr	112 (17.2%)
2nd yr	119 (18.3%)
3rd yr	170 (26.2%)
4th yr	134 (20.6%)
5th yr	115 (17.7%)
Ever diagnosed with a mental health disorder (depression, anxiety, etc)	103 (15.8%)
If yes, the type of the mental health disorder*	
Anxiety	37 (48.1%)
Depression	33 (42.9%)
ADHD	4 (5.2%)
OCD	3 (3.9%)
Bipolar disorder	2 (2.6%)
Panic disorder	2 (2.6%)
OCPD	2 (2.6%)
Depersonalization/derealization disorder	2 (2.6%)
Tourette syndrome	1 (1.3%)
Body dysmorphia	1 (1.3%)
PTSD	1 (1.3%)
Disruptive behaviors	1 (1.3%)
Dysthymia	1 (1.3%)
Eating Disorder	1 (1.3%)
Schizophrenia	1 (1.3%)
Did not specify	28 (36.4%)
Current resident	
With parents	521 (80.2%)
With other family members	83 (12.8%)
With friends	8 (1.2%)
Live alone	38 (5.8%)
Family income (SAR)	
<10,000	53 (8.2%)
10,000 to 15,000	80 (12.3%)
15,000 to 20,000	124 (19.1%)
>20,000	393 (60.4%)

IMSIU = Imam Mohammad Ibn Saud Islamic University, KSU = King Saud University.
n (%).
* Descriptive data are based on 103 participants who reported having a mental health disorder (a multiple-choice item).

3.2. Characteristics of scores and domains

The median PHQ-9 depression score was 7.0 (IQR = 4.0 to 11.0) out of a total of 27.0, with a Cronbach alpha of 0.855, indicating high internal consistency (Table 2). Figure 1 shows the distribution of depression levels among participants, with the majority experiencing mild (34.2%) or minimal depression (32.8%), followed by moderate (18.9%), moderately severe (10.2%), and severe depression (4.0%).

The detailed responses of the participants regarding the PHQ-9 items are presented in the supplementary data (Table S1, Supplemental Digital Content, https://links.lww.com/MD/Q314). The most commonly reported symptoms were little interest or pleasure in doing things and feeling down, depressed, or hopeless, experienced at least several days by 70.3% and 65.2% of participants, respectively. Symptoms such as feeling tired or having little energy (78.9%), trouble sleeping (66.0%), and poor appetite or overeating (57.1%) were also frequently reported. Notably, 24.3% of participants reported having thoughts of self-harm or being better off dead at some frequency, and 34.5% experienced psychomotor disturbances (Table S1, Supplemental Digital Content, https://links.lww.com/MD/Q314).

Regarding social participation, the median overall SPQ score was 41.0 (IQR = 31.0 to 51.0) out of 102, with a Cronbach alpha of 0.834, reflecting good reliability. The overall SPQ score had a median of 41.0 (IQR = 31.0 to 51.0), with a Cronbach alpha of 0.834, indicating good internal consistency across the 22 items. Within the subdomains, informal and public social participation had the highest median score of 30.0 (IQR = 23.0 to 36.0) and a Cronbach alpha of 0.794 (13 items). The group activities subdomain had a median of 10.0 (IQR = 5.0 to 15.0) and a Cronbach alpha of 0.657 across 7 items. The community group participation domain had the lowest median score of 1.0 (IQR = 0.0 to 2.0) and a Cronbach alpha of 0.509 based on 2 items (Table 2).

Detailed responses to the social participation items are shown in Tables S2 and S3, Supplemental Digital Content, https://links.lww.com/MD/Q314. Regarding the frequency of participants' engagement in various informal, public, and group-based social activities, when combining the response categories "A few times a month" and "Once a week or more," the highest levels of participation were reported for using the internet for social communication (79.5%), talking to friends or family on the phone (74.5%), visiting family (56.9%), going to a café or restaurant (62.6%), and praying in the mosque or attending religious gatherings (51.4%). Among group activities, students most frequently went to a class (66.1%), played sports (32.6%), and went to the gym or an exercise class (32.1%, Table S2, Supplemental Digital Content, https://links.lww.com/MD/Q314). Concerning the participation in community group activities, 60.0% reported involvement in school-related groups, whereas 53.5% participated in a volunteer organization or group (Table S3, Supplemental Digital Content, https://links.lww.com/MD/Q314).

3.3. Association between depression levels and demographic characteristics and social participation scores

A significant association between sex and depression levels was observed ($P = .043$), with females (65.4%) experiencing severe depression at higher proportions than males (34.6%). Depression levels also varied significantly by academic year ($P < .001$), with the highest proportion of severe depression in 3rd-year (38.5%) and 2nd-year students (34.6%). Additionally, a prior diagnosis of a mental health disorder was significantly associated with higher depression severity ($P < .001$), with 30.8% of students with a diagnosed disorder experiencing severe depression compared with 8.5% among those without a diagnosis (Table 3).

Notably, levels of social participation were significantly associated with depression severity across all domains ($P < .001$). Participants with minimal depression had the highest median scores for informal and public social participation (33.0, IQR = 27.0–39.0), group activities (11.0, IQR = 8.0–17.0), and community group participation (1.0, IQR = 1.0–2.0). In contrast, participants with severe depression had the lowest median scores for informal and public social participation (21.5, IQR = 16.0–31.0), group activities (5.0, IQR = 2.0–7.0), and community group participation (0.5, IQR = 0.0–2.0). Similarly, the overall social participation scores decreased progressively with increasing depression severity, with a median score of 46.0 (IQR = 38.0 to 55.0) among participants with minimal depression and 27.0 (IQR = 19.0–36.0) among those with severe depression (Table 3).

3.4. Predictors of increased depression severity

Multivariable ordinal logistic regression was performed to identify the predictors of increased depression severity. The proportional odds assumption of the ordinal logistic regression model showed no significant violations (*P*-values of all the independent variables were >.05), indicating that the assumption was reasonably satisfied. No correction for multiple comparisons was applied. Results of the regression analysis showed that students in the 4th year (OR = 0.36, 95% CI, 0.22–0.57, $P < .001$) and 5th year (OR = 0.36, 95% CI, 0.22–0.60, $P < .001$) had lower odds of severe depression than 1st-year students. A prior diagnosis of a mental health illness with significantly higher odds of severe depression was associated (OR = 2.04, 95% CI, 1.38–3.02, $P < .001$). Increased participation in informal and public social activities (OR = 0.97, 95% CI, 0.96–0.99, $P = .008$), group activities (OR = 0.95, 95% CI, 0.92–0.97, $P < .001$), and community group participation (OR = 0.78, 95% CI, 0.64–0.96, $P = .017$) was an independent predictor of lower depression severity (Table 4).

3.5. Predictors of social participation

Multiple linear regression analysis identified several factors that influenced the social participation scores. Female students had significantly lower social participation scores than male students (beta = −6.62, 95% CI, −8.84 to −4.40, $P < .001$). Depression severity was also a significant predictor, with students experiencing mild (beta = −3.35, 95% CI, −6.05 to −0.65, $P = .015$), moderate (beta = −8.89, 95% CI, −12.1 to −5.65, $P < .001$), moderately severe (beta = −12.0, 95% CI, −16.0 to −8.03, $P < .001$), and severe depression (beta = −14.6, 95% CI, −20.5 to −8.73, $P < .001$)

Table 2

Characteristics of scores and domains of the current study.

Characteristic	Median (Q1–Q3)	Mean ± SD	Min–Max	Cronbach Alpha	No. of items
Depression (PHQ-9)	7.0 (4.0–11.0)	7.9 ± 5.7	0.0–27.0	0.855	9
Social participation (SPQ)	41.0 (31.0–51.0)	41.8 ± 15.1	0.0–102.0	0.834	22
Social participation-mix of informal and public spaces	30.0 (23.0–36.0)	30.1 ± 10.1	0.0–65.0	0.794	13
Social participation-group activities	10.0 (5.0–15.0)	10.5 ± 6.6	0.0–35.0	0.657	7
Community group participation-mix of social and civic	1.0 (0.0–2.0)	1.1 ± 0.8	0.0–2.0	0.509	2

SD = standard deviation, PHQ-9 = Patient Health Questionnaire-9, SPQ = Social Participation Questionnaire.

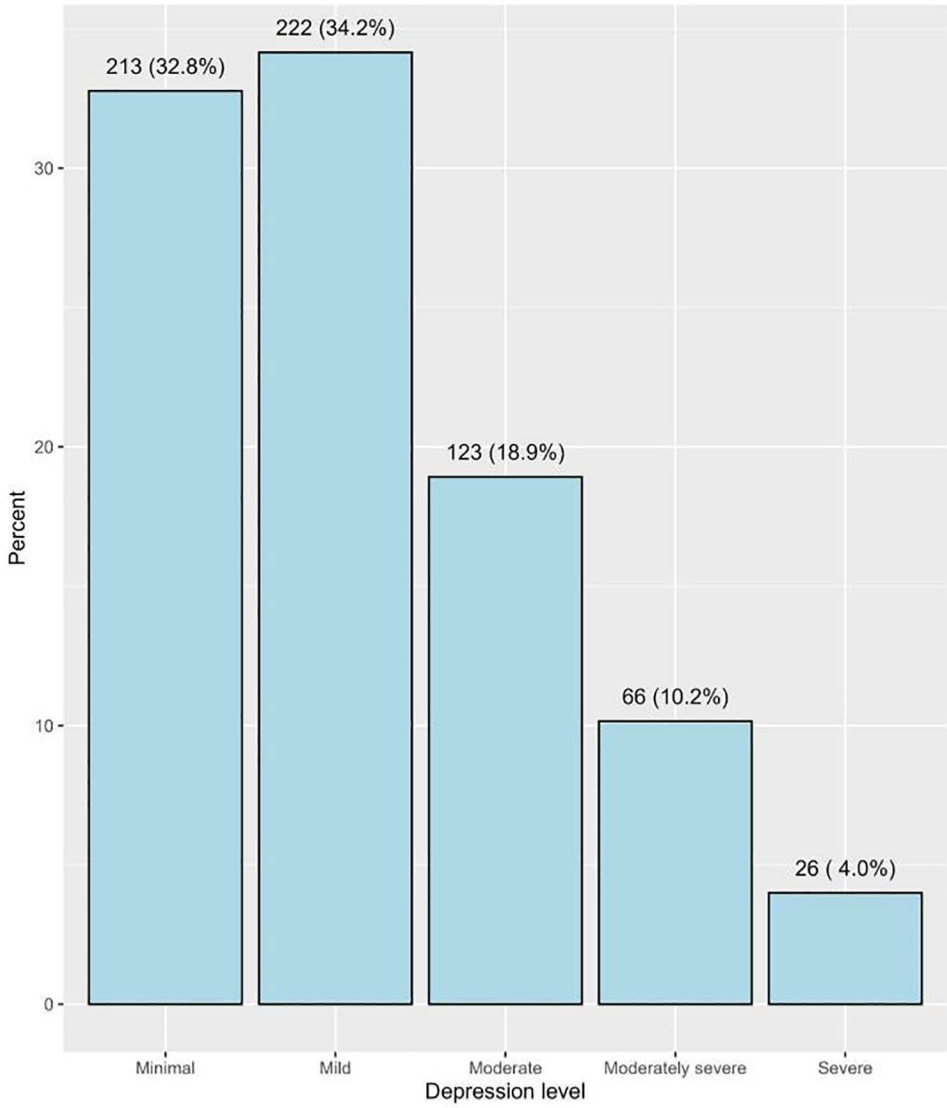

Figure 1. Description of depression levels among the participants.

reporting significantly lower social participation scores than those with minimal depression (Table 5).

3.6. PHQ Score by demographic characteristics

Significant differences in the PHQ scores were observed across several demographic variables. Female students reported higher mean PHQ scores than male students (8.6 ± 5.8 vs 7.2 ± 5.5, $P = .001$). Students from KSU had higher mean scores than those from IMSIU (8.2 ± 5.7 vs 7.3 ± 5.5, $P = .040$). PHQ scores also differed significantly by academic year ($P < .001$), with the highest scores reported among 1st-year (9.2 ± 5.3) and 3rd-year students (9.1 ± 5.9) and the lowest among 5th-year students (6.2 ± 4.9). Students with a prior mental health diagnosis had significantly higher PHQ scores than those without (10.2 ± 6.1 vs 7.5 ± 5.5, $P < .001$). No significant differences were found in PHQ scores by current residence ($P = .056$) or family income ($P = .163$, Table 6).

3.7. SPQ score by demographic characteristics

A significant difference in social participation scores was observed by sex, with males reporting higher SPQ scores than females (45.4 ± 14.7 vs 37.9 ± 14.7, $P < .001$). Additionally, family income was significantly associated with SPQ scores ($P = .008$), with participants from the lowest income group (<10,000 SAR) scoring 40.7 ± 18.6, compared with those in the middle-income brackets, who scored 38.9 ± 15.6 and 39.9 ± 15.4. No significant differences were found based on university ($P = .725$), academic year ($P = .205$), mental health diagnosis ($P = .221$), or current residence ($P = .459$; Table 7).

3.8. Correlation between SPQ and PHQ scores

Bivariate correlations between SPQ and PHQ scores indicated a significant negative correlation between the 2 parameters (Spearman correlation coefficient = –0.34, $P < .001$, Fig. 2).

4. Discussion

This study aimed to assess the impact of different social activities on the level of depression among medical students and explore potential correlations with individual and environmental factors such as demographics and socioeconomic status.

Our study indicates a significant association between increased social participation and decreased levels of depression, which is

Table 3

Statistical differences in depression levels in terms of demographic characteristics and social participation score.

Characteristic	Minimal, N = 213	Mild, N = 222	Moderate, N = 123	Moderately severe, N = 66	Severe, N = 26	*P*-value*
Sex						
Male	125 (58.7%)	111 (50.0%)	55 (44.7%)	33 (50.0%)	9 (34.6%)	**.043**
Female	88 (41.3%)	111 (50.0%)	68 (55.3%)	33 (50.0%)	17 (65.4%)	
University						
IMSIU	84 (39.4%)	74 (33.3%)	42 (34.1%)	20 (30.3%)	7 (26.9%)	.473
KSU	129 (60.6%)	148 (66.7%)	81 (65.9%)	46 (69.7%)	19 (73.1%)	
Academic year						
1st year	20 (9.4%)	42 (18.9%)	32 (26.0%)	14 (21.2%)	4 (15.4%)	**<.001**
2nd year	37 (17.4%)	41 (18.5%)	19 (15.4%)	13 (19.7%)	9 (34.6%)	
3rd year	45 (21.1%)	55 (24.7%)	36 (29.4%)	24 (36.4%)	10 (38.5%)	
4th year	59 (27.7%)	47 (21.2%)	18 (14.6%)	8 (12.1%)	2 (7.7%)	
5th year	52 (24.4%)	37 (16.7%)	18 (14.6%)	7 (10.6%)	1 (3.8%)	
Ever diagnosed with a mental health disorder (depression, anxiety, etc)						
No	195 (91.5%)	184 (82.9%)	100 (81.3%)	50 (75.8%)	18 (69.2%)	**<.001**
Yes	18 (8.5%)	38 (17.1%)	23 (18.7%)	16 (24.2%)	8 (30.8%)	
Current resident						
With parents	176 (82.6%)	178 (80.1%)	92 (74.8%)	53 (80.3%)	22 (84.7%)	.462
With other family members	19 (8.9%)	29 (13.1%)	24 (19.5%)	8 (12.1%)	3 (11.5%)	
With friends	4 (1.9%)	4 (1.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Live alone	14 (6.6%)	11 (5.0%)	7 (5.7%)	5 (7.6%)	1 (3.8%)	
Family income (SAR)						
<10,000	17 (8.0%)	15 (6.8%)	13 (10.6%)	6 (9.1%)	2 (7.7%)	.348
10,000 to 15,000	22 (10.3%)	26 (11.7%)	19 (15.4%)	7 (10.6%)	6 (23.1%)	
15,000 to 20,000	31 (14.6%)	47 (21.2%)	26 (21.2%)	15 (22.7%)	5 (19.2%)	
>20,000	143 (67.1%)	134 (60.3%)	65 (52.8%)	38 (57.6%)	13 (50.0%)	
Social participation-mix of informal and public spaces	33.0 (27.0–39.0)	31.0 (24.0–37.0)	28.0 (20.0–33.0)	26.5 (21.0–31.0)	21.5 (16.0–31.0)	**<.001**
Social participation-group activities	11.0 (8.0–17.0)	11.0 (5.0–15.0)	8.0 (5.0–12.0)	6.0 (4.0–10.0)	5.0 (2.0–7.0)	**<.001**
Community group participation-mix of social and civic	1.0 (1.0–2.0)	1.0 (0.0–2.0)	1.0 (0.0–2.0)	1.0 (0.0–2.0)	0.5 (0.0–2.0)	**<.001**
Social participation-overall	46.0 (38.0–55.0)	43.0 (32.0–52.0)	37.0 (28.0–44.0)	32.0 (26.0–41.0)	27.0 (19.0–36.0)	**<.001**

IMSIU = Imam Mohammad Ibn Saud Islamic University, KSU = King Saud University.

Depression levels were based on PHQ-9 scores, which ranged from 0 to 27 with the following cutoff levels: minimal depression (0–4), mild depression (5–9), moderate depression (10–14), moderately severe depression (15–19), and severe depression (20–27).

Results are expressed as n (%) or median (interquartile range).

* Pearson chi-squared test; Fisher exact test; Kruskal–Wallis rank sum test.

consistent with previous studies.[20,26] This finding suggests that active engagement in social activities serves as a protective factor against depressive symptoms. Notably, social activity type played a crucial role in understanding its impact on mental health outcomes.[27] We found that informal and public social participation was the most frequently reported form of engagement, which was consistent with previous research.[28] This can be explained by the fact that medical students tend to favor casual social interactions and public events over more structured group activities. Additionally, we found that among informal social activities, the most common forms of engagement were using the Internet for social communication and talking to friends or family members on the phone. While previous studies have suggested that excessive use of social networks may be associated with increased depressive symptoms,[29–31] our findings revealed the opposite: students who engaged in these activities reported lower levels of depression. The difference between our findings and those of previous studies may be explained by variations in the study populations. These findings can be used by clinicians to reduce depression in medical students. Regarding group-based activities, we found that attending a class and playing sports were the most commonly reported, which is consistent with a study[32] that found a strong link between physical exercise and improved mental health. Further, it is worth considering whether including religious participation items in the modified-SPQ influenced the observed patterns, as no studies in Muslim populations have examined this. Such a lack of data on this aspect may reflect the limited research on culturally specific social participation measures and the unique dual spiritual and social role of religious activities. In particular, activities such as praying in the mosque, which is both a religious obligation and a socially engaging practice in Islam, showed especially high participation in our study.

In terms of depression prevalence, approximately one-third of the medical students in our study experienced moderate-to-severe depressive symptoms, highlighting the significant mental health challenges faced by this group. This finding aligns with existing literature that consistently reports high rates of depression among medical students.[7,33] Previous studies have indicated that academic pressure, heavy workloads, sleep deprivation, and financial stress can negatively affect students' mental health.[34–36] Given the high prevalence of moderate-to-severe depression among medical students, there is a critical need for early identification and regular mental health screening.

Furthermore, in terms of social participation prevalence, approximately half of the medical students in this study reported a moderate-to-high level of participation in various social activities, a conclusion that aligns with that of previous studies.[37,38] This level of participation may reflect the students' attempts to balance the demanding nature of medical education. Clinically, this highlights the importance of promoting environments that encourage social interaction as a protective factor for students' mental health.

In terms of demographics, our study found a significant association between depression and sex; female students exhibited significantly more depressive symptoms than male students.

Table 4

Multivariable ordinal logistic regression analysis for the predictors of increased depression severity among medical students.

Characteristic	OR	95% CI	*P*-value
Sex			
Male	Reference	Reference	.601
Female	1.09	0.80, 1.48	
University			
IMSIU	Reference	Reference	.067
KSU	1.37	0.98, 1.92	
Academic year			
1st year	Reference	Reference	–
2nd year	0.74	0.46, 1.21	.230
3rd year	0.85	0.55, 1.33	.485
4th year	0.36	0.22, 0.57	**<.001**
5th year	0.36	0.22, 0.60	**<.001**
Ever diagnosed with a mental health disorder (depression, anxiety, etc)			
No	Reference	Reference	–
Yes	2.04	1.38, 3.02	**<.001**
Current resident			
With parents	Reference	Reference	–
With other family members	1.26	0.82, 1.94	.292
With friends	0.48	0.13, 1.81	.276
Live alone	1.16	0.61, 2.22	.648
Family income (SAR)			
<10,000	Reference	Reference	–
10,000–15,000	1.18	0.61, 2.30	.620
15,000–20,000	1.24	0.67, 2.30	.494
>20,000	0.98	0.56, 1.71	.930
Social participation-mix of informal and public spaces	0.97	0.96, 0.99	**.008**
Social participation-group activities	0.95	0.92, 0.97	**<.001**
Community group participation-mix of social and civic	0.78	0.64, 0.96	**.017**

CI = confidence interval, IMSIU = Imam Mohammad Ibn Saud Islamic University, KSU = King Saud University, OR = odds ratio.

Table 5

Multiple linear regression analysis for the predictors of overall social participation scores.

Characteristic	Beta	95% CI	*P*-value
Sex			
Male	Reference	Reference	–
Female	–6.62	–8.84, –4.40	**<.001**
University			
Al-Imam Muhammad Ibn Saud Islamic University (IMSIU)	Reference	Reference	–
King Saud University (KSU)	1.04	–1.33, 3.41	.388
Academic year			
1st year	Reference	Reference	–
2nd year	–1.77	–5.47, 1.94	.349
rd year	0.00	–3.45, 3.45	>.999
4th year	–2.33	–5.96, 1.30	.208
5th year	–0.95	–4.75, 2.85	.625
Ever diagnosed with a mental health disorder (depression, anxiety, etc)			
No	Reference	Reference	.797
Yes	0.40	–2.65, 3.44	
Current resident			
With parents	Reference	Reference	–
With other family members	1.46	–1.91, 4.82	.395
With friends	3.87	–6.18, 13.9	.450
Live alone	1.73	–3.04, 6.50	.476
Family income (SAR)			
<10,000	Reference	Reference	–
10,000 to 15,000	–0.44	–5.41, 4.54	.863
15,000 to 20,000	0.76	–3.88, 5.39	.748
>20,000	3.00	–1.15, 7.16	.156
Depression			
Minimal	Reference	Reference	–
Mild	–3.35	–6.05, –0.65	**.015**
Moderate	–8.89	–12.1, –5.65	**<.001**
Moderately severe	–12.0	–16.0, –8.03	**<.001**
Severe	–14.6	–20.5, –8.73	**<.001**

CI = confidence interval.

Table 6

Statistical differences in the PHQ score in terms of demographic characteristics.

Characteristic	Mean ± SD	*P*-value
Sex		
Male	7.2 ± 5.5	**.001**
Female	8.6 ± 5.8	
University		
IMSIU	7.3 ± 5.5	**.040**
KSU	8.2 ± 5.7	
Academic year		
1st year	9.2 ± 5.3	**<.001**
2nd year	8.4 ± 6.2	
3rd year	9.1 ± 5.9	
4th year	6.4 ± 5.0	
5th year	6.2 ± 4.9	
Ever diagnosed with a mental health disorder (depression, anxiety, etc)		
No	7.5 ± 5.5	**<.001**
Yes	10.2 ± 6.1	
Current resident		
With parents	7.9 ± 5.6	.056
With other family members	8.7 ± 5.4	
With friends	3.6 ± 4.0	
Live alone	7.7 ± 6.4	
Family income (SAR)		
<10,000	8.2 ± 5.9	.163
10,000–15,000	8.5 ± 6.1	
15,000–20,000	8.6 ± 5.6	
>20,000	7.5 ± 5.5	

IMSIU = Imam Mohammad Ibn Saud Islamic University, KSU = King Saud University.

This is consistent with previous research[39] suggesting that females are more prone to reporting higher levels of emotional stress and depressive symptoms. Potential explanations include differences in coping styles and hormonal influences, among other factors,[40] all of which may contribute to their increased vulnerability to depression. Interestingly, male students in our study reported higher levels of social participation than female students, which aligns with previous findings,[38] suggesting that males are generally more likely to engage in group activities. This difference may reflect sociocultural factors in Saudi Arabia, where males generally have a wider range of opportunities and greater freedom to participate in outdoor and group activities. At the same time, females may face more restrictions due to current sociocultural norms. Recognizing sex differences in social participation may help tailor interventions to promote greater social engagement among female students.

In our study, students in the preclinical years reported the highest proportions of severe depression, whereas those in the 5th year showed significantly lower levels, suggesting that being in the later years may act as a protective factor. This differs from the findings of Baldassin et al., who reported higher levels of depression in final-year medical students.[41] One possible explanation for our findings could be that preclinical students face a difficult adjustment period marked by academic overload, lack of clinical exposure, and pressure to establish strong academic foundations. Senior students may have developed better coping mechanisms, time management skills, and emotional resilience as they adapted to the demands of medical training.[42]

Moreover, we found a significant association between a prior diagnosis of a mental health disorder and higher depression severity. Students with a history of mental health disorders were

Table 7

Social participation categories, and statistical differences in the SPQ score in terms of demographic characteristics.

Characteristic	Very low (0–20) %	Low (21–40) %	Moderate (41–60) %	High (61–80) %	Very high (81–102) %	Mean ± SD	*P*-value
Sex							
Male	11 (3.3%)	110 (33.0%)	162 (48.6%)	43 (12.9%)	7 (2.1%)	45.4 ± 14.7	**<.001**
Female	32 (10.1%)	158 (49.8%)	107 (33.8%)	17 (5.4%)	3 (0.9%)	37.9 ± 14.7	
University							
IMSIU	20 (8.8%)	93 (41.0%)	86 (37.9%)	27 (11.9%)	1 (0.4%)	41.2 ± 14.8	.725
KSU	23 (5.4%)	175 (41.4%)	183 (43.3%)	33 (7.8%)	9 (2.1%)	42.1 ± 15.3	
Academic year							
1st year	7 (6.3%)	54 (48.2%)	34 (30.4%)	15 (13.4%)	2 (1.8%)	40.6 ± 16.0	.205
2nd year	9 (7.6%)	50 (42.0%)	49 (41.2%)	11 (9.2%)	0 (0.0%)	40.6 ± 14.7	
3rd year	12 (7.1%)	71 (41.8%)	71 (41.8%)	12 (7.1%)	4 (2.4%)	42.0 ± 15.3	
4th year	8 (6.0%)	57 (42.5%)	59 (44.0%)	8 (6.0%)	2 (1.5%)	41.6 ± 14.7	
5th year	7 (6.1%)	36 (31.3%)	56 (48.7%)	14 (12.2%)	2 (1.7%)	44.0 ± 15.0	
Ever diagnosed with a mental health disorder (depression, anxiety, etc)							
Yes	7 (6.8%)	45 (43.7%)	45 (43.7%)	4 (3.9%)	2 (1.9%)	40 ± 14.4	.221
No	36 (6.6%)	223 (40.8%)	224 (41.0%	56 (10.2%)	8 (1.5%)	42.1 ± 15.3	
Current resident							
With parents	37 (7.1%)	213 (40.9%)	218 (41.8%)	46 (8.8%)	7 (1.3%)	41.6 ± 14.9	.459
With other family members	5 (6.0%)	38 (45.8%)	30 (36.1%)	9 (10.8%)	1 (1.2%)	41.2 ± 16.4	
With friends	0 (0.0%)	2 (25.0%)	5 (62.5%)	1 (12.5%)	0 (0.0%)	47.8 ± 9.9	
Live alone	1 (2.6%)	15 (39.5%)	16 (42.1%)	4 (10.5%)	2 (5.3%)	44.0 ± 16.1	
Family income (SAR)							
<10,000	5 (9.4%)	24 (45.3%)	16 (30.2%)	6 (11.3%)	2 (3.8%)	40.7 ± 18.6	**.008**
10,000–15,000	9 (11.3%)	41 (51.3%)	23 (28.8%)	6 (7.5%)	1 (1.3%)	38.9 ± 15.6	
15,000–20,000	10 (8.1%)	55 (44.4%)	44 (35.5%)	13 (10.5%)	2 (1.6%)	39.9 ± 15.4	
>20,000	19 (4.8%)	148 (37.7%)	186 (47.3%)	35 (8.9%)	5 (1.3%)	43.1 ± 14.3	
Total(=%)	43 (6.6%)	268 (41.2%)	269 (41.4%)	70 (10.8%)	10 (1.5%)	650 (100%)	

IMSIU = Imam Mohammad Ibn Saud Islamic University, KSU = King Saud University, SPQ = Social Participation Questionnaire.

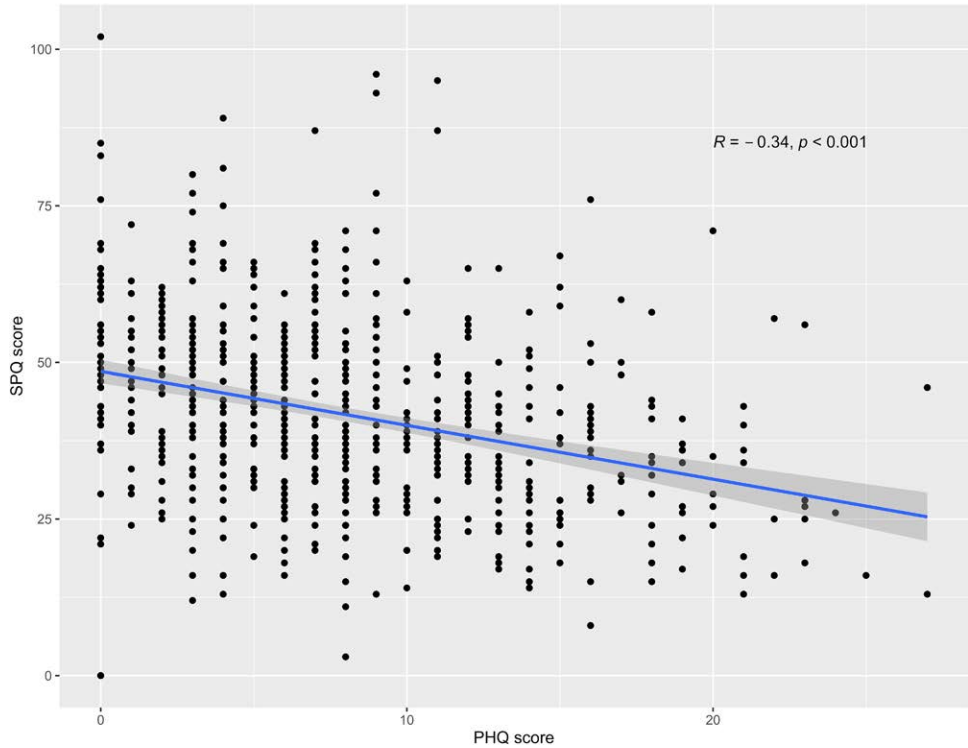

Figure 2. Correlation between SPQ and PHQ scores (correlation coefficient = –0.34, *P* < .001). PHQ = Patient Health Questionnaire, SPQ = Social Participation Questionnaire.

significantly more likely to experience severe depressive symptoms than their peers without such a diagnosis. This finding is consistent with previous research, such as a study conducted at Albaha University in Saudi Arabia, which reported that students with a history of psychiatric events or trauma had a higher prevalence of severe or extreme depression.[43] This indicates that individuals with preexisting mental health vulnerabilities may have reduced psychological resilience, making it more difficult for them to cope with the high academic demands of medical training.

Regarding socioeconomic status and living arrangements, while previous studies consistently reported a strong correlation between lower socioeconomic status and an increased risk of depression,[44] our study did not establish a significant relationship. Similarly, Humphris et al.[45] suggested that students living with their families experienced lower burnout than those living independently, but this association was not statistically significant in our sample. This can be explained by the discrepancies in cultural or familial dynamics.

5. Conclusion

The topic of our research was explored because of the alarming rates of depression among medical students[8] and the lack of studies that have specifically examined the relationship between social engagement and mental health in Saudi Arabia. Our results support the notion that social participation plays an important role in the reduction of depressive symptoms. Our study has several clinical implications that underscore the significance of implementing interventions aimed at increasing the social participation of medical students. Furthermore, given the high prevalence of depressive symptoms among medical students in general, routine mental health screening programs in educational settings are crucial for early identification and intervention. Additionally, various institutions, such as schools and universities, could implement targeted programs and educational campaigns to actively promote accessible and socially engaging activities from an early stage, promoting healthier social habits and well-being.

Our study has certain strengths, including the use of the PHQ-9 to screen for depression and an efficient sample size. However, this study has several limitations. First, it had a cross-sectional design. Future research could use a longitudinal approach to understand the relationship between social participation and depressive symptoms. Second, our sample was drawn exclusively from 2 universities in Riyadh, and future research could expand to include multiple universities across different regions. Third, the survey was self-reported and distributed via WhatsApp, which may have attracted more socially active students. As such, there might be potential for underreporting mental health history and selection bias; future research could use more rigorous sampling techniques and recruitment processes to minimize these limitations. Finally, the research team used a modified, yet unvalidated version of the SPQ; future studies validating the SPQ through pilot testing and reliability checks would address this issue.

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