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# Prevalence of depressive symptoms and depression literacy (D-Lit) among Saudi postgraduate students

Asem Abdualziz S. Alageel<sup>1\*</sup>

## Abstract

**Introduction** The prevalence of any disorders listed in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) is 34.2% in Saudi Arabia over the course of a person's lifetime. Young Saudis are more likely to develop major depressive disorder than older Saudis. Globally, postgraduate students are more vulnerable to developing depression compared to the general population. According to a national study carried out in Saudi Arabia, a small proportion of individuals experiencing psychiatric disorders over a period of 12 months receive any kind of treatment. This highlights the importance of community education aimed at enhancing mental health awareness.

**Methods** A web-based Arabic cross-sectional survey was conducted among Saudi postgraduate students from October 2019 to August 2020. The survey included questions related to sociodemographic characteristics, sources of information, depression literacy (D-Lit), the Patient Health Questionnaire-9 (PHQ-9) for depression, and the participants' attitudes toward depression.

**Results** A total of 517 participants took part in the survey, with 46% of them screened positive for depression. The mean D-Lit score was 10.65, which was lower than that reported in studies conducted among medical students and hospital staff. No significant differences were found in D-Lit scores across all sociodemographic characteristics, except for gender and specialty ( $p = 0.002$  and  $<0.001$ , respectively). The Internet, awareness posters, a doctor (previously diagnosed with depression), and awareness activities related to depression showed significant differences in the mean score of D-Lit ( $p < 0.001$ ,  $0.005$ ,  $< 0.001$ , and  $< 0.001$ , respectively).

**Conclusion** In Saudi Arabia, this study found that postgraduate students have a notably higher occurrence of depression compared to the general population. However, despite their higher educational level, these students lacked sufficient awareness and understanding of depression to recognize it and seek help. Consequently, it is important to initiate awareness campaigns aimed at enhancing the mental well-being of postgraduate student

**Keywords** postgraduate, depression literacy, depression, awareness

## Background

The prevalence of any disorders listed in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) is 34.2% in Saudi Arabia over the course of a person's lifetime [1]. With a prevalence rate of 6%, major depressive disorder (MDD) stands as one of the most prevalent psychiatric disorders [1]. Young Saudi respondents are more likely to develop MDD than older Saudis. Findings from a national study in Saudi Arabia

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indicated that only a small proportion of individuals with 12-month psychiatric disorders receive any form of treatment [2]. Furthermore, according to systematic reviews only 20% of individuals diagnosed with major depressive disorder (MDD) receive treatment that meets the minimum adequacy criteria in affluent nations, while the percentage is even lower in impoverished countries (1 in 27) [3]. Insufficient treatment is a prevalent issue, even in severe cases, as only a minority of individuals receive limited or no treatment for their condition, regardless of whether they reside in low-income or high-income countries across the globe [4].

MDD is a chronic, recurrent, and treatable disorder [5]. It is characterized by a duration of two weeks during which individuals experience a persistent depressed mood, diminished interest or pleasure in activities, sleep disturbances, changes in appetite, fatigue, feelings of guilt, and thoughts of self-harm or suicide [6]. MDD can also impact cognitive function [7]. Therefore, MDD is expected to be the primary cause of disability in 2030 [8]. Depression is associated with increased mortality, morbidity, job loss, societal disability, increased suicidal rates, and an increased risk of Medical illness [9–13].

Depression literacy (D-Lit) is closely linked to knowledge about depression and attitudes toward it as a disorder, as well as knowledge about antidepressant medications and mental health professionals [14, 15]. Research studies have indicated that patients suffering from depression often lack knowledge about the etiologies and biological aspects of depression. Stress and negative life events are commonly suggested as etiological factors for depression [16, 17]. However, the lack of understanding of depression and its causes has been shown to negatively impact the decision to seek professional help and influence treatment choices [15, 18, 19]).

Some studies have revealed that a significant number of individuals with depression do not seek help. For instance, a study found that 55% of individuals meeting the Research Diagnostic Criteria of Major Depression did not seek help [15]. The reasons for not seeking help included not perceiving the episode as serious or identifying it as a disorder and thinking that they could manage the illness on their own. Numerous studies have examined the relationship between D-Lit and behavioral changes, such as help-seeking and adherence to antidepressants, among individuals with depression [14, 15, 18, 19]. These studies support the notion that a lack of knowledge and negative attitudes toward depression contribute to the stigmatization of individuals with depression and influence their treatment choices, particularly regarding the use of antidepressants.

Perceived and self-stigmatizing responses to seeking help for depression are common in the community and

can lead to hesitation in seeking help. The stigma surrounding depression negatively impacts patients' willingness to seek help and adhere to antidepressant treatment [16]. Conversely, individuals who have a lower perception of psychiatric stigma and attribute the disorder to biological factors rather than personal characteristics tend to hold positive attitudes toward seeking professional help. Furthermore, research has shown that better adherence to antidepressants is linked to a lower perceived stigma about the disorder [20].

The occurrence of major depressive disorder (MDD) among postgraduate students appears to be elevated in comparison to the general population. A study conducted among bioscience graduate students revealed a prevalence of 43%–46% for major depression [21]. In a separate study, the prevalence of major depressive disorder (MDD) was found to be 39% among the postgraduate population, in stark contrast to the 6% prevalence observed in the general population [22]. Moreover, studies have indicated that graduate students in nursing school encounter significant levels of stress [23]. Based on the aforementioned findings, the objective of this study was to examine the prevalence of **depressive symptoms** and (D-Lit) among postgraduate students in Saudi Arabia. Additionally, the study aimed to investigate the attitudes of these students toward depression.

## Methods

### Study design

The Institutional Review Board of Imam Mohammad ibn Saud Islamic University in Riyadh, Saudi Arabia, granted approval for this study. A cross-sectional survey in Arabic was conducted online to evaluate depressive symptoms and (D-Lit) among postgraduate students in Saudi Arabia. The survey was administered to participants between October 2019 and August 2020. The target population consisted of Saudi postgraduate students, and the survey was distributed via email, Twitter, and the instant messaging service WhatsApp. The Inclusion criteria are Saudi, Arabic speaker, master and phd students and adult over 18–64. The exclusion criteria are non Saudi, undergraduate student, holder of master and phd student and non Arabic speakers.

To calculate Sample size, The sample size required = 396

The sample size was calculated by using the following formula

$$n \text{ (sample size)} = N / \left( 1 + N * e^2 \right)$$

n = sample size

N = population (4500)

e = margin of error (5%)

The type of sample is simple random sampling. To ensure the inclusion of Saudi participants, individuals were directly asked about their country of origin and the universities or colleges they attended. Informed consent was obtained from the participants, who were required to provide their consent by checking a box, indicating their willingness to anonymously share their data for the survey.

The survey encompassed five sections. The first section collected sociodemographic data, including age, gender, educational level, specialty, and scholarship status. The second and third sections focused on the source of information and utilized the validated Arabic version of the D-Lit Scale. The fourth section employed the Arabic-validated version of the PHQ-9. Finally, the fifth section assessed participants' attitudes toward depression. The second section of the survey utilized D-Lit as a means to assess participants' knowledge and awareness regarding depression [24]. This scale consists of 22 questions, with participants selecting one of three responses: true, false, or I don't know. Each correct answer received one point, resulting in a score range of 0–22. A higher score indicated a higher literacy toward depression. The Arabic-validated version of D-Lit demonstrated good reliability, with a Cronbach's alpha of 0.78 and a test-retest reliability of 0.92 [25].

The PHQ-9, a screening scale used to identify MDD and assess symptom severity, was employed in this study. It combines the nine items from the DSM-IV MDD criteria with additional leading symptoms to create a brief self-report instrument. A cutoff score of 10 has been determined to possess a sensitivity of 88% and a specificity of 88% in detecting depression [26]. An Arabic-validated version of the PHQ-9 was used [27], with an internal consistency reliability of 0.857, as calculated using Cronbach's alpha. A cutoff point of 10 was employed to identify depression, with further classification of depressed participants into depression (score 10–14), moderately severe depression (score 15–19), and severe depression (score  $\geq 20$ ).

The author designed statements of the participants' attitudes toward depression. These statements test common misconceptions and beliefs of depression and its treatment in Saudi population. Before widespread distribution, the statements were tested on a small group of participants ( $n=20$ ). Based on the feedback received from the pilot sample, certain questions underwent modifications in terms of wording and suggested answers. The participants' attitudes toward depression were assessed using a 1–5 scale to measure their responses to five statements, ranging from strongly agree to strongly disagree. The statements included in this section were as follows: "Depression is a weakness, not a disease," "Exercise can

help treating depression," "Registering my name in the psychiatric clinic as a patient may affect my career and social future," "The presence of a counseling clinic at the university may help someone with depression," and "Awareness lectures on mental health contribute to improving our understanding of depression and its treatment."

#### Data analysis

Data were analyzed using the Statistical Package of the Social Sciences (SPSS 22; IBM Corp., New York, NY, USA). Continuous variables were expressed as means and standard deviations, while categorical variables were expressed as percentages. The Mann–Whitney and Kruskal–Wallis tests were used for comparing continuous, nonnormally distributed variables. The Shapiro–Wilk test was used to assess the normality of the distribution of variables. Linear regression was used to identify factors associated with depression. A  $P$  value of less than 0.05 was considered statistically significant.

#### Results

This survey was accessed by a total of 618 individuals, out of which 517 successfully completed the questionnaire, resulting in a response rate of 83.6%. Among the participants, there were 110 men and 407 women. Regarding marital status, 285 individuals reported being single, 213 were married, and 19 were divorced. In terms of educational level, 417 participants (80.66%) were Masters students, while 100 (19.34%) were Ph.D. students. Regarding specialty, the majority of participants had a basic science specialty ( $n = 243$ , 47.0%), followed by health ( $n = 75$ , 14.51%), engineering & computer ( $n = 65$ , 12.57%), and other specialties ( $n = 134$ , 25.92%). Furthermore, 417 (80.66%) students did not have a scholarship, and 100 (19.34%) did. In terms of age, 293 participants (56.67%) were in the 20–29-year age group, 203 (39.26%) in the 30–39-year age group, and 21 participants (4.06%) in the  $\geq 40$ -year age group (Table 1).

Out of all participants, 239 individuals (46.2%) screened positive for depression, with 72 (13.9%) having moderately severe depression and 64 (12.4%) having severe depression. The linear regression analysis revealed that depression was significantly lower in males than in females ( $B = -2.411$ ,  $p = 0.002$ ) and in married participants ( $B = -1.416$ ,  $p = 0.045$ ) than in divorced ones ( $B = -3.739$ ,  $p = 0.024$ ).

Table 2 presents the responses to the items of the D-Lit Questionnaire ( $n = 517$ ), which revealed a mean score of 10.65 out of 22, with a standard deviation of 4.18.

Table 3 shows the mean score of D-Lit based on the sociodemographic characteristics of the participants. No significant differences were found in D-Lit scores across

**Table 1** Sociodemographic Characteristics of the Participants (N=517)

		Number	%
Gender	Male	110	21.28
	Female	407	78.72
Age	20–29	293	56.67
	30–39	203	39.26
	≥40	21	4.06
Marital status	Single	285	55.13
	Married	213	41.20
	Divorced	19	3.68
Specialty	Basic science	243	47.00
	Health	75	14.51
	Engineering & computer	65	12.57
	Other	134	25.92
Scholarship	Yes	109	21.08
	No	408	78.92
Education statuses	Master	417	80.66
	PHD	100	19.34

all sociodemographic characteristics, except for gender and specialty ( $p = 0.002$  and  $< 0.001$ , respectively).

Regarding the source of information, 84.5% of participants reported gaining information from the Internet, 15.5% from television channels and radio stations, 20.5% from mental health awareness posters and flyers, 10.3% from a doctor (previously diagnosed with depression), 11.6% from relatives or friends suffering from depression, and 13.7% from attending lectures and awareness activities related to depression (Fig. 1).

Figure 2 shows there is a directly correlation between the mean score of depression literacy and the mean score of depression (PHQ9) ( $r=0.071$ ) but non-significant ( $p=0.105$ ).

Table 4 presents the mean score of D-Lit based on the source of information. The Internet, mental health awareness posters and flyers, a doctor (previously diagnosed with depression), and attending lectures and awareness activities related to depression showed significant differences in the mean score of D-Lit ( $p < 0.001$ ,  $0.005$ ,  $< 0.001$ , and  $< 0.001$ , respectively). Among these sources, attending lectures and awareness activities related to depression had the highest mean score of D-Lit ( $13.55 \pm 3.78$ ).

Table 5 summarizes participants' responses to the D-Lit Questionnaire, which is divided into six subscales. The mean score for knowledge about the psychological symptoms was 3.69/5, the effectiveness of available treatment methods was 1.31/5, cognitive behavioral symptoms was 2.65/6, taking antidepressants and their adverse effects was 1.54/4, and the severity of the disease was 1.46/2.

The subscale with the lowest percentage of correction responses (26%) was Awareness regarding the efficacy of existing treatment modalities, followed by Awareness about taking medications and their side effects (38.6%).

Table 6 presents attitudes toward depression. Only 19.92% of participants agreed or strongly agreed that depression is a weakness, not a disease, while 65% disagreed or strongly disagreed with this statement. The majority of participants strongly agreed or agreed that exercise can help treat depression, with 2.69% disagreeing or strongly disagreeing. In addition, 23.41% of the sample expressed concern that registering their names in the psychiatric clinic as patients may affect their career and social future, while 54.55% either disagreed or strongly disagreed with this concern. A vast majority of respondents (80.46%) believed that the presence of a counseling clinic at the university may help someone with depression, while approximately 11% did not. Most of the participants strongly agreed or agreed that awareness lectures on mental health contribute to improving their understanding of depression and its treatment, with only 1.16% disagreeing or strongly disagreeing with this statement.

## Discussion

Education has a significant impact on health and well-being, leading to a higher life expectancy and the adoption of healthy behaviours. It is also associated with increased employment opportunities and income [28, 29]. However, stress among academics is a widespread concern [30, 31], particularly among younger researchers [32, 33]. They often face job insecurity, work-life imbalances, stressful relationships with supervisors, tight deadlines, and funding difficulties [33]. Several reports have highlighted the challenges faced by graduate students, as 85% of them spent over 41 hours per week on their postgraduate programs, 74% failed to complete their programs within the set timeframe, and 79% faced uncertainty about their job and career futures [33].

In our research, 46% of the participants exhibited positive screening results for major depressive disorder (MDD), aligning with the findings of comparable studies [21]. Nevertheless, the prevalence of major depressive disorder (MDD) observed in our study surpassed the rates reported in another study that specifically examined postgraduate students [21]. In a comprehensive meta-analysis and systematic review encompassing 36 studies, the prevalence of depressive symptoms among postgraduate students was found to vary significantly. The reported prevalence ranged from 6.2% to 85.4%, with a pooled prevalence estimate of 34% based on a total of 26,579 participants. However, it is worth noting that there was substantial heterogeneity among the studies, as

**Table 2** Responses of items of depression literacy questionnaire ( $N = 517$ )

	True		False		I don't know	
	Number	%	Number	%	Number	%
F1: Knowledge of the psychological symptoms						
People with depression may feel guilty when they are not at fault.	253	48.9	53	10.3	211	40.8
Loss of confidence and poor self-esteem may be a symptom of depression.	390	75.4	41	7.9	86	16.6
Sleeping too much or too little may be a sign of depression.	451	87.2	19	3.7	47	9.1
Eating too much or losing interest in food may be a sign of depression.	456	88.2	18	3.5	43	8.3
People may move more slowly or become agitated as a result of their depression.	357	69.1	18	3.5	142	27.5
F2: Knowledge about the effectiveness of available treatment methods						
Clinical psychologists can prescribe antidepressants.	166	32.1	116	22.4	235	45.5
Many treatments for depression are more effective than antidepressants.	225	43.5	45	8.7	247	47.8
Counseling is as effective as cognitive behavioral therapy for depression.	311	60.2	53	10.3	153	29.6
Cognitive behavioral therapy is as effective as antidepressants for mild to moderate depression.	352	68.1	13	2.5	152	29.4
Moderate depression disrupts a person's life as much as multiple sclerosis or deafness.	111	21.5	125	24.2	281	54.4
F3: Knowledge about cognitive behavioral symptoms						
People with depression often speak in a rambling and disjointed way.	157	30.4	171	33.1	189	36.6
Reckless and foolhardy behavior is a common sign of depression.	127	24.6	178	34.4	212	41.0
Not stepping on cracks in the footpath may be a sign of depression.	33	6.4	209	40.4	275	53.2
People with depression often hear voices that are not there.	76	14.7	197	38.1	244	47.2
Depression does not affect your memory and concentration.	31	6.0	408	78.9	78	15.1
Having several distinct personalities may be a sign of depression.	124	24.0	207	40.0	186	36.0
F4: Knowledge about taking medications and their side effects						
Of all the alternative and lifestyle treatments for depression, vitamins are likely to be the most helpful.	117	22.6	146	28.2	254	49.1
People with depression should stop taking antidepressants as soon as they feel better.	32	6.2	303	58.6	182	35.2
Antidepressants are addictive.	108	20.9	165	31.9	244	47.2
Antidepressant medications usually work straight away.	49	9.5	181	35.0	287	55.5
F5: Knowledge of the severity of the disease						
Most people with depression need to be hospitalized.	11	2.1	391	75.6	115	22.2
Many famous people have suffered from depression.	366	70.8	9	1.7	142	27.5

indicated by statistical measures ( $Q = 2,683.40$ ,  $p < 0.01$ ;  $\tau^2 = 0.67$ ,  $I^2 = 98.6\%$ ) [34].

The mean D-Lit score in our study was 10.65, that is higher than that found in studies among high school and university students in various countries, including Jordan [35], Saudi Arabia [25], India [36, 37], Malaysia [38], and Bangladesh [39, 40]. Previous research has shown that as the educational level increases, the Depression literacy level increases. Studies have demonstrated that individuals with higher levels of education are more commonly diagnosed with depression compared to those with lower educational attainment [41]. Furthermore, it is worth noting that higher education has been linked to enhanced well-being in both psychological and physical aspects of individuals' lives [42]. Education has been identified as a significant predictor of depression diagnosis and higher knowledge of depression [43]. However, despite the higher mean D-Lit score in our study, the results indicate that the sample had low levels of D-Lit compared to

previous studies conducted among hospital staff, medical students, professionals, and nurses [5, 44–46]. Furthermore, knowledge about the effectiveness of available treatments and awareness about taking antidepressants and their adverse effects had the lowest percentage of correct responses compared to other subscales of D-Lit.

According to the findings of this study, a noteworthy correlation was observed between D-Lit and gender, revealing that females exhibited considerably higher levels of D-Lit compared to males. Furthermore, multiple studies have consistently demonstrated that women tend to have higher D-Lit scores [47], possess greater abilities in diagnosing psychiatric disorders [48], and are more inclined than men to seek occupational psychiatric health services [49]. Additionally, women tend to actively engage in learning about mental health and interact with individuals who have mental disorders [50].

The gender disparity observed in D-Lit levels could be attributed to the lower prevalence of Major Depressive

**Table 3** Mean score of depression literacy by sociodemographic characteristics of the participants

		Mean	SD	P value
Overall score (out of 22)		10.65	4.18	
Gender	Male	9.46	4.13	0.002*
	Female	10.97	4.14	
Age	20–29	10.52	4.02	0.584
	30–40	10.85	4.36	
	≥40	10.52	4.70	
Marital status	Single	10.67	4.28	0.660
	Married	10.72	3.96	
	Divorced	9.47	4.98	
Specialty	Basic science	11.19	4.10	<0.001*
	Health	11.56	4.27	
	Engineering & computer	9.20	4.37	
	Other	9.86	3.89	
Scholarship	Yes	10.28	4.27	0.382
	No	10.75	4.15	
Education statuses	Master	10.58	4.20	0.510
	PHD	10.93	4.08	

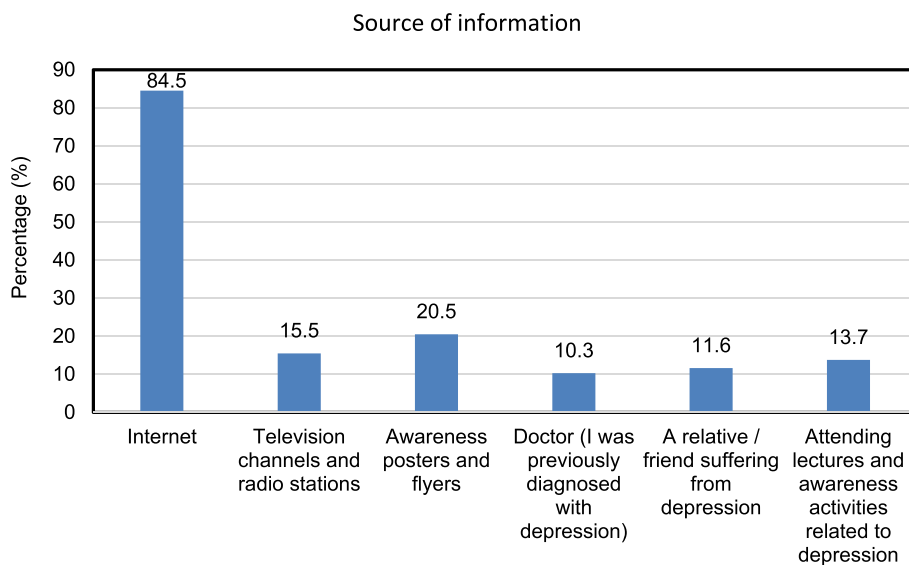
\*Significant P value

Disorder (MDD) in males and their limited exposure to the illness. However, this lack of recognition may also contribute to fewer males seeking help for depression. Additionally, males often associate depression with a weak personality and may turn to alcohol as a means of relaxation [51]. Targeted interventions may be necessary to enhance mental health literacy and increase support specifically for men.

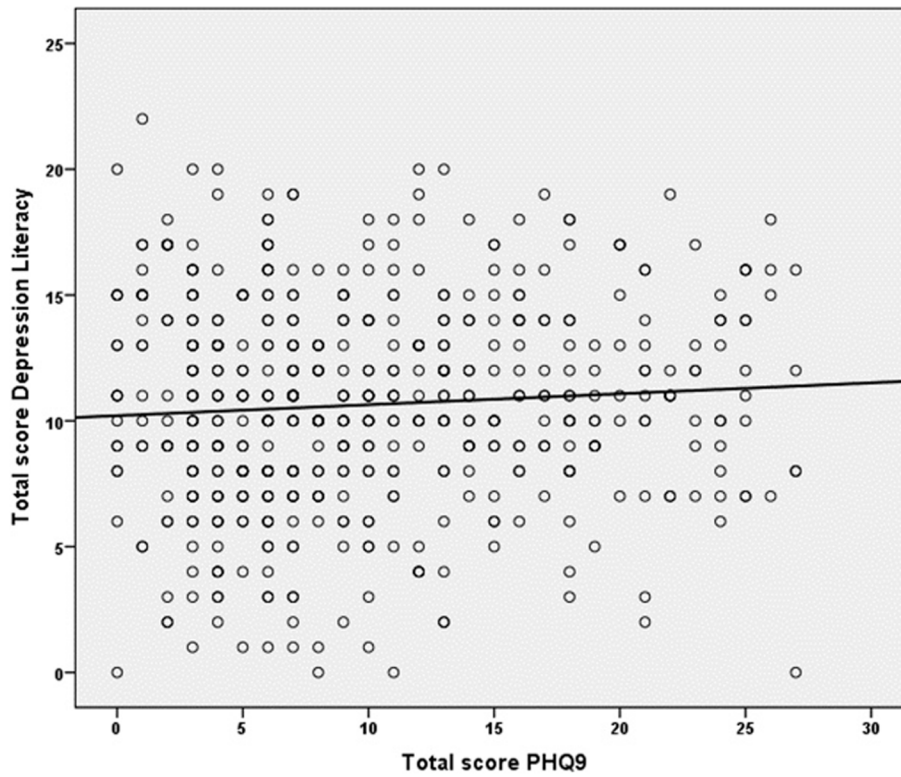
Furthermore, the study’s findings indicated that there was no significant relationship between age groups and D-Lit levels. However, the younger age group exhibited higher rates of D-Lit compared to the older age groups [14].

In this study, compared to other sources of information, the highest mean scores of D-Lit were observed among participants who had previously been diagnosed with depression by doctors, those who attended lectures and awareness activities related to depression, and those who were exposed to awareness posters and flyers, with mean scores of 13.55, 13.45, and 11.74, respectively. To put it differently, individuals who indicated seeking assistance from a psychologist for their psychological concerns exhibited significantly higher levels of D-Lit compared to those who did not seek such help. However, participants who reported a family history of mental illness or having family members referred to a psychologist for psychological issues did not demonstrate significantly higher D-Lit levels compared to others.

According to the findings of this study, individuals who obtained information about mental disorders from the Internet displayed significantly higher levels of D-Lit compared to those who did not rely on online sources. However, it is crucial to acknowledge that information found on the Internet may not always be reliable or accurate. Therefore, it is of utmost importance to emphasize that psychiatrists, psychologists, and healthcare professionals are the most trustworthy and credible sources of mental health information [52]. Seeking professional help from these sources is vital for the prevention, early detection, diagnosis, treatment, and complete recovery of psychiatric disorders, and timely referral to these professionals is essential [53]. Reluctance to seek help from a



**Fig. 1** Source of information



**Fig. 2** Correlation between mean score of depression literacy and mean score of depression (PHQ9) ( $r=0.071$ ,  $p=0.105$ ).  $r$  is Pearson correlation coefficient

**Table 4** Mean score of depression literacy by source of information

	Mean	SD	P value
Internet	10.34	4.11	<0.001*
Television channels and radio stations	10.30	3.75	0.368
Mental health awareness posters and flyers	11.74	3.80	0.005*
A Doctor (I was previously diagnosed with depression)	13.45	3.39	<0.001*
A relative / friend suffering from depression	11.63	4.13	0.115
Attending lectures and awareness activities related to depression	13.55	3.78	<0.001*

\*Significant P value

**Table 5** Descriptive statistics of the D-Lit questionnaire subscale scores and PHQ9 among participants

	Item	Range	Mean	SD
D- Lit				
	Knowledge of the psychological symptoms (out of 5)	0-5	3.69	1.30
	Knowledge about the effectiveness of available treatment methods (out of 5)	0-5	1.31	1.01
	Knowledge about cognitive-behavioral symptoms (out of 6)	0-6	2.65	1.70
	Knowledge about taking medications and their side effects (out of 4)	0-4	1.54	1.36
	Knowledge of the severity of the disease (out of 2)	0-2	1.46	0.67
	Total Score of D- Li (out of 22)	0-22	10.65	4.18
PHQ9				
	Total_score_PHQ9 (out of 27)	0-27	10.17	6.87

**Table 6** Attitude of the participants toward depression

		Number	%
Depression is a weakness, not a disease	Strongly agree	35	6.77
	Agree	68	13.15
	Neutral	78	15.09
	Disagree	163	31.53
	Strongly disagree	173	33.46
Exercise can help treat depression	Strongly agree	195	37.79
	Agree	262	50.78
	Neutral	45	8.72
	Disagree	12	2.33
	Strongly disagree	2	0.39
Registering my name in the psychiatric clinic may affect my career and social future	Strongly agree	32	6.19
	Agree	89	17.21
	Neutral	114	22.05
	Disagree	169	32.69
	Strongly disagree	113	21.86
The presence of a counseling clinic at the university may help someone with depression	Strongly agree	213	41.20
	Agree	203	39.26
	Neutral	45	8.70
	Disagree	35	6.77
	Strongly disagree	21	4.06
Awareness lectures on mental health contribute to improving our understanding of depression and its treatment	Strongly agree	296	57.25
	Agree	195	37.72
	Neutral	20	3.87
	Disagree	3	0.58
	Strongly disagree	3	0.58

psychiatrist or psychologist may indicate a lack of knowledge regarding psychiatric services or a misunderstanding of the effective treatments offered by these specialists.

Regarding to Arabic studies, the results of a study of a total of 650 students aged 16 to 24 years in Jordan indicate that the participants demonstrated low levels of literacy. These findings align with previous research conducted on the stigma surrounding depression among students in Jordan [54]. However, the elevated levels of stigma surrounding depression observed in our sample could be attributed to Arab culture. In Arab communities, individuals tend to be reserved and prefer not to discuss personal matters, such as mental health issues, even with healthcare providers [55, 56]

### Limitations

Although cross-sectional studies have some advantages, such as being relatively cheaper and less time-consuming, they also have several disadvantages. Firstly, the findings may not be generalizable to the entire population as the sample might not accurately represent the broader population. Secondly, these studies are unable

to track changes in population behavior over time, providing only a snapshot of information at a specific moment. Thirdly, they do not establish a causal relationship between variables, only revealing associations or correlations. Lastly, there is a possibility of recall bias, whereby participants may inaccurately remember or report information, potentially affecting the validity of the results. Moreover, self-administered questionnaires have their own drawbacks, including low response rates, lack of control over the environment, no opportunity for clarification, potential misconceptions of questions, language barriers, and difficulty in verifying responses. Given that this study was conducted online and distributed through email and various social media platforms, there is a possibility of excluding individuals who lack access to social media or who choose not to participate due to social stigmas associated with mental health. Consequently, future research should strive to involve participants who are more receptive to discussions about mental health and illness. Furthermore, this recruitment method carries the risk of overestimating the prevalence of Major Depressive Disorder (MDD).



## Conclusion

In this study, it was observed that postgraduate students in Saudi Arabia had a higher incidence of depression compared to the general population. Specifically, female Saudi postgraduate students were found to be more susceptible to developing depression compared to their male counterparts. Additionally, these female students exhibited higher levels of D-Lit scores. However, despite their higher educational level, these students lacked sufficient awareness and understanding of mental health to recognize their own depressive symptoms and seek help. The lack of knowledge about depression plays an important role in stigmatizing individuals with depression and influences the choice of treatment options and their willingness to seek help. Based on the implications of these findings, it is recommended to initiate awareness campaigns focused on depression and implement wellness programs aimed at promoting and safeguarding the mental health of postgraduate students.

## Abbreviations

D-Lit	Depression Literacy
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition
DSM-5	Diagnostic and Statistical Manual of Mental Disorders—Fifth Edition

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## Authors' contributions

The author participating in the research have contributed to the manuscript and approved the last version of the manuscript

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## Availability of data and materials

The data and material used during the current study are available from the corresponding author on reasonable request.

## Declarations

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

A written informed consent was obtained from the participants, ensuring the confidentiality of the participants in all respects, before publishing the data.

### Competing interests

The author declares no competing interests.

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