

Substance Use among Medical Students in Jordan: Prevalence, Predictive Factors, and Mental Health Correlates

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Introduction

The prevalence of substance use among medical students represents a significant public health concern worldwide. However, it is unknown what factors directly contribute to this growing phenomenon. By investigating the prevalence, predictive factors, and mental health correlates of substance use, this study aims to explain the complex interplay of individual, social, and environmental factors that influence distress and substance use behaviors among medical students in Jordan.

Some interesting background:

- There are clear regional differences in primary drugs reported by people entering drug treatment. (1)
- WHO estimates that 0.7% of the Jordanian population suffers from alcohol use disorder including alcohol dependence and harmful use of alcohol. (2)
- Depression affects approximately one-third of medical students worldwide. (3)
- Two literature reviews have shown that, in comparison to other countries, medical students from the Middle East have a higher prevalence of depression and higher levels of burnout. (4)
- Previous studies in Jordan showed that almost 8% of medical students has issues associated to alcohol abuse a rate much higher than the prevalence of alcohol use disorder in the country and region as a whole. (5)

Materials and methods

A descriptive cross-sectional approach was used to conduct this study. A total of 386 participants from six Jordanian medical schools were included. Data collection was completed using a self-administered online questionnaire. Statistical analysis was completed using SPSS version 26.

To investigate differences in means across variables, the Mann-Whitney U test and Kruskal-Wallis tests were conducted. A multiple linear regression analysis was performed to examine the relationship between several independent variables and the MSWBI total score. The analysis showed a moderate positive correlation ($R = 0.529$) between the MSWBI score and independent variables. The coefficient of determination (R Square) was 0.279, indicating that 27.9% of the variance in the MSWBI total score was explained by the independent variables. The adjusted R^2 was 0.234. The Durbin-Watson statistic was 1.971, suggesting potential autocorrelation in the residuals.

Literature cited

- (1) World Health Organization. (2023). World Drug Report 2023. <https://www.unecdc.org/uncdc/en/data-and-analysis/world-drug-report-2023.html>
- (2) World Health Organization. (2020, January). Jordan: WHO Special Initiative for Mental Health Situational Assessment. https://cdn.who.int/media/docs/default-source/mental-health/special-initiative-country-brief-report-jordan-2020-01-31-hsif.pdf?sfvrsn=587ca9f_4
- (3) Paltan R, Zhang MW, Tam WW, Ho RC. Prevalence of depression amongst medical students: a meta-analysis. *Med Educ*. 2016 Apr;50(4):456-65. DOI: 10.1111/medc.12952. PMID: 26995884.
- (4) Mirza, A. A., Baig, M., Beyari, G. M., Halakawi, M. A., & Mirza, A. A. (2021). Depression and Anxiety Among Medical Students: A Brief Overview. *Advances in medical education and practice*, 12, 393-398. <https://doi.org/10.2147/AMEP.S302827>
- (5) Masri, R., Kadhum, M., Farrell, S. M., Khameses, A., Al-Tajer, H., & Molodynski, A. (2019). Wellbeing and mental health amongst medical students in Jordan: a descriptive study. *International review of psychiatry (Abingdon, England)*, 31(7-8), 619-625. DOI: 10.1080/09530102.2019.1620402.
- (6) Tyagi, K., Chaudhari, B., Ali, T., & Chaudhury, S. (2024, January 09). Impact of COVID-19 on medical students' well-being and psychological distress. *Industrial Psychiatry Journal*. Advance online publication. https://doi.org/10.4103/ipj.ipj_125_23
- (7) Baldwin, D. C., Jr., Hughes, P. H., Conrad, S. E., Storr, C. L., & Sheehan, D. V. (1991). Substance use among senior medical students. A survey of 23 medical schools. *JAMA*, 265(16), 2074-2078. PMID: 2013226.

Results

From the total sample, the lifetime prevalence of substance use was 80.1% (n=308) with caffeine being the most used at 71.8% (n=277), followed by nicotine at 31.6% (n=122). Of our population, 31.6% (n=122) had a clinically significant CAGE-AID score. Higher scores on the Patient Health Questionnaire-9 (PHQ9) and Generalized Anxiety Disorder Scale (GAD7) were found to be significantly predictive of higher Medical Student Well-Being Index (MSWBI) scores. Multiple linear regression analysis revealed that higher PHQ9, GAD7, and MSWBI scores were significantly associated with a history of substance use.

Figure 2. The interpretation of CAGE-AID score.

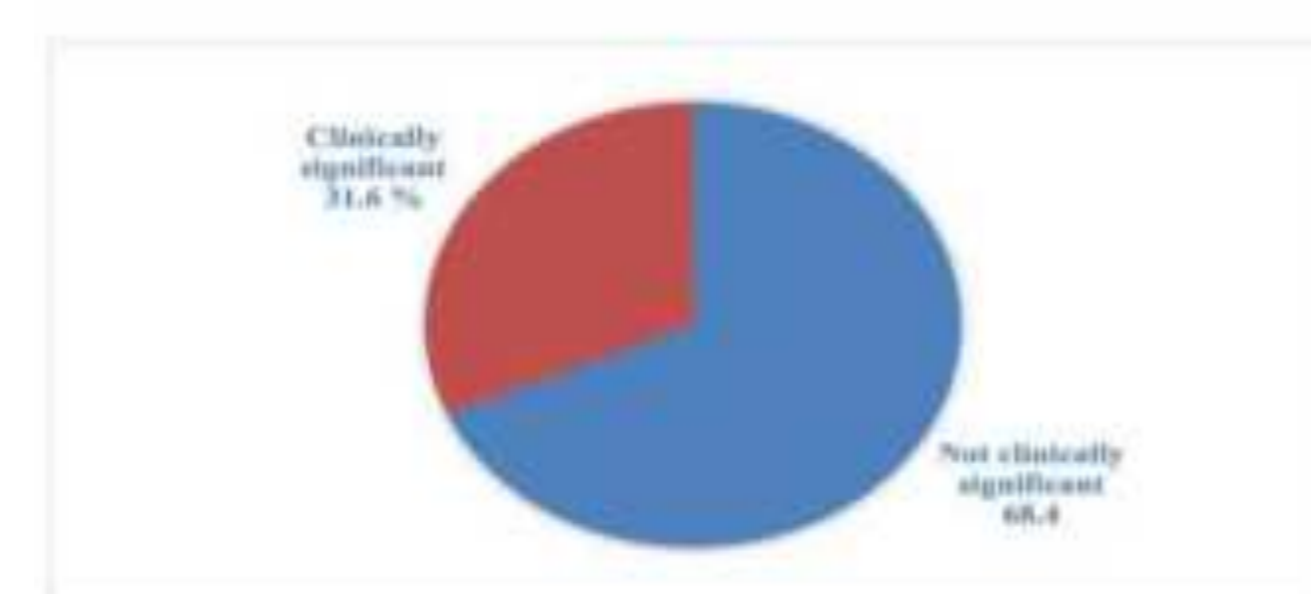


Figure 3. The interpretation of PHQ-9 scores.

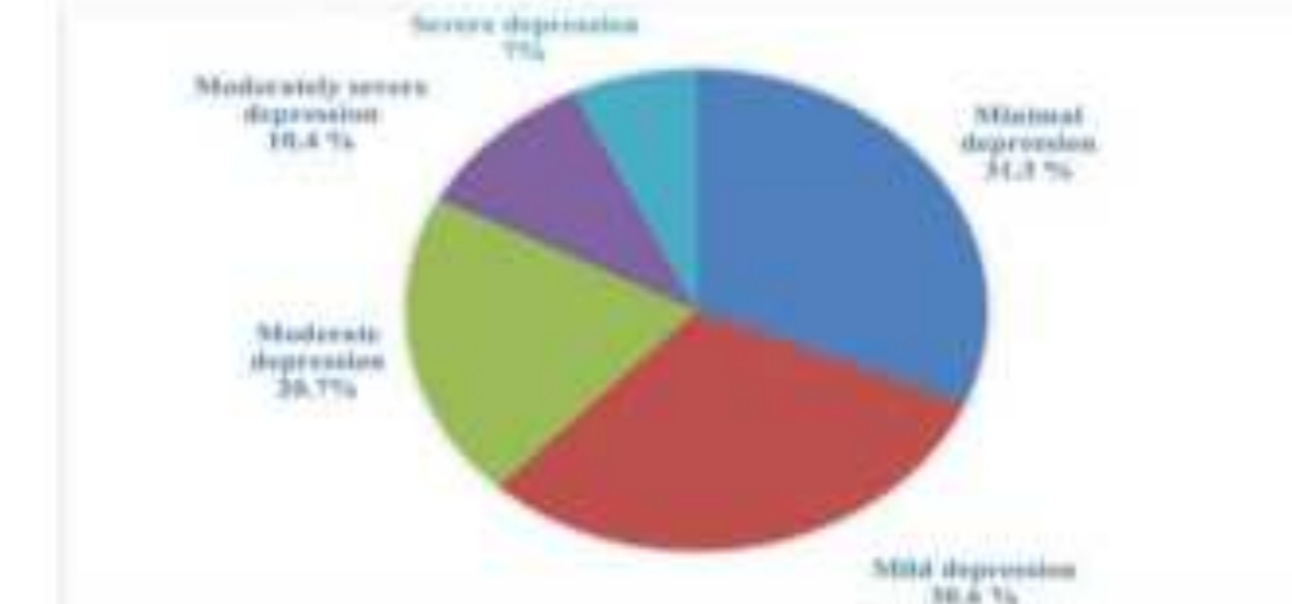
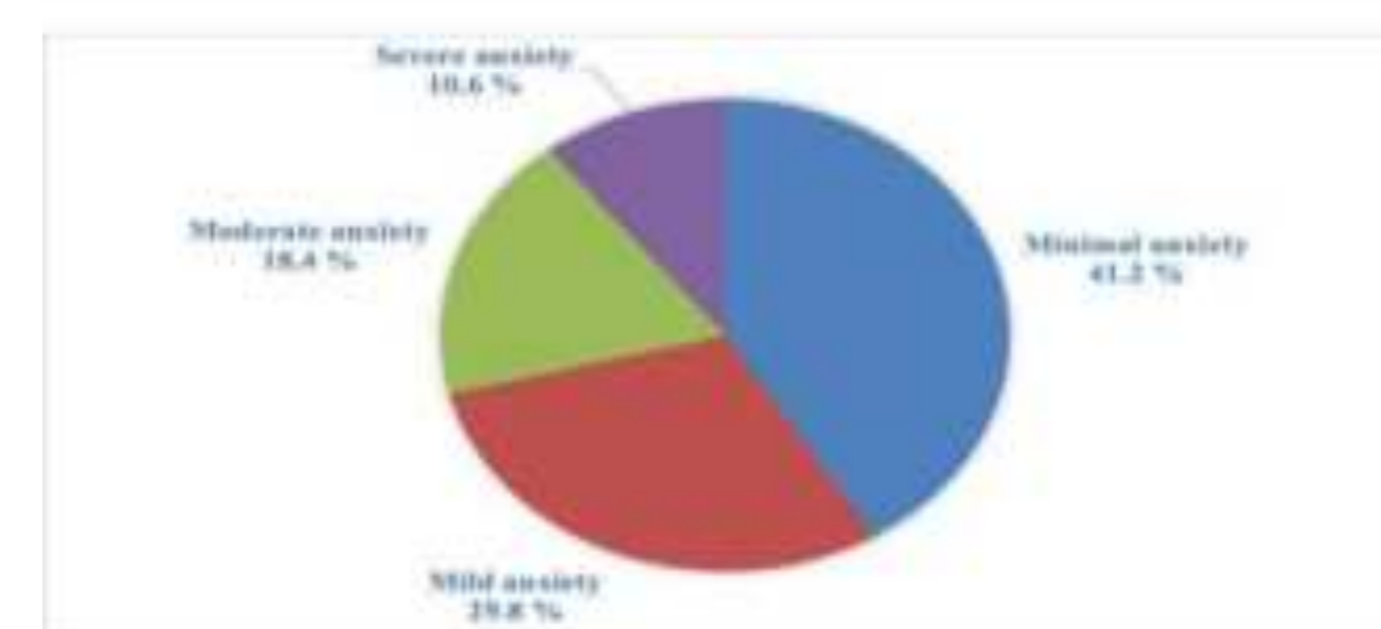


Figure 4. The interpretation of GAD-7 scores.



Our study utilized the Medical Student Well-Being Index (MSWBI) to assess distress levels among medical students in Jordan and their correlation with substance use and other mental health scores. Results revealed a moderate level of distress among participants with a mean score of 4.02 out of 7. Higher MSWBI scores were observed among female respondents and those with a history of substance use. Similarly, a recent cross-sectional study done on medical students in India found that distress levels were higher among females with a mean score of 3.68 as compared to a mean score of 2.9 for males. (6) Despite that the predictability of substance use using the MSWBI hasn't been specifically addressed in any previous studies, it has been established as a reliable predictor of psychological distress, which in turn is associated with a higher prevalence of substance use. (7) Multiple linear regression analysis identified elevated PHQ-9 and GAD-7 scores as significant predictors of increased MSWBI scores, highlighting the interplay between mental health symptoms and overall distress levels. Male students were also found to be negative predictors of higher MSWBI scores further addressing the gender differences in manifestations of distress. Furthermore, our study found a statistically significant correlation between lifetime substance use and higher MSWBI scores (p -value 0.019), which provides useful insight into the potential utility of the MSWBI in detecting students at risk of developing substance use issues.

Table 2. Comparison between demographic characteristics and the CAGE-AID, PHQ-9, GAD-7, and MSWBI mean scores.

Variable	CAGE-AID	PHQ-9	GAD-7	MSWBI				
	Mean ± SD	P-value	Mean ± SD	P-value	Mean ± SD	P-value	Mean ± SD	P-value
Gender	1.19 ± 0.94	0.229*	7.67 ± 3.89	0.522*	6.09 ± 2.76	0.628*	3.67 ± 2.12	0.881*
Female	1.21 ± 0.97		8.01 ± 3.76		7.29 ± 2.79		3.52 ± 1.99	
Male	1.17 ± 0.91		7.33 ± 3.99		4.89 ± 3.13		3.72 ± 2.24	
Place of Residence		0.426*		0.688*		0.222*		0.766*
Health Jordan	1.47 ± 0.97		8.23 ± 3.77		7.28 ± 3.08		3.89 ± 2.16	
Central Jordan	1.43 ± 0.95		8.01 ± 3.68		6.94 ± 3.42		4.07 ± 2.02	
South Jordan	1.42 ± 0.99		8.56 ± 3.77		7.72 ± 3.89		4.69 ± 2.17	
University		0.229*		0.720*		0.001*		0.242*
University of Jordan	1.43 ± 0.95		7.93 ± 3.89		6.63 ± 3.29		3.94 ± 2.09	
University of Science and Technology	1.28 ± 0.84		6.72 ± 3.49		6.99 ± 3.44		4.11 ± 2.25	
University of Jordan - Irbid	1.42 ± 1.00		8.59 ± 3.92		6.89 ± 3.97		3.43 ± 2.04	
University of Jordan - Zarqa	1.28 ± 0.89		6.59 ± 3.26		6.94 ± 3.21		4.09 ± 2.11	
Al-Balqa Applied University	1.31 ± 0.94		8.02 ± 3.25		6.07 ± 4.71		4.54 ± 2.05	
University of Jordan - Amman	1.47 ± 0.99		8.79 ± 3.76		6.79 ± 3.71		4.23 ± 2.19	
Year		0.617*		0.622*		0.094*		0.213*
1 st year	1.19 ± 1.00		6.99 ± 3.96		6.36 ± 3.94		3.62 ± 2.17	
2 nd year	1.32 ± 0.91		6.57 ± 3.80		6.32 ± 3.19		3.94 ± 2.12	
3 rd year	1.47 ± 0.88		6.61 ± 3.68		7.02 ± 4.09		4.11 ± 2.19	
4 th year	1.29 ± 0.96		6.77 ± 4.03		7.09 ± 4.09		4.19 ± 1.92	
5 th year	1.39 ± 0.97		6.94 ± 3.96		6.90 ± 3.79		4.19 ± 1.96	
6 th year	1.37 ± 0.99		7.96 ± 3.87		6.83 ± 4.03		4.46 ± 2.08	
Age		0.296*		0.266*		0.001*		0.266*
18-23	1.39 ± 0.88		7.57 ± 3.90		6.94 ± 3.97		3.81 ± 2.09	
24-29	1.39 ± 1.00		8.56 ± 4.04		6.62 ± 3.69		3.91 ± 2.18	
30-35	1.21 ± 0.91		6.95 ± 3.19		7.09 ± 3.89		4.49 ± 1.83	
36-41	1.37 ± 0.79		6.81 ± 3.48		6.89 ± 3.89		4.42 ± 2.09	
42-49	1.49 ± 0.89		7.92 ± 3.89		7.02 ± 4.09		3.99 ± 1.89	
Marital Status		0.007*		0.022*		0.001*		0.289*
Married	1.38 ± 0.87		7.99 ± 3.92		6.89 ± 3.69		3.77 ± 2.09	
Single	1.46 ± 1.00		8.28 ± 4.01		7.19 ± 4.77		4.28 ± 1.94	
Age		0.881*		0.648*		0.254*		0.121*
18-23	1.40 ± 0.89		6.61 ± 3.43		6.54 ± 3.97		4.14 ± 2.14	
24-29	1.40 ± 1.00		6.62 ± 3.43		6.79 ± 4.09		3.72 ± 2.13	
30-35	1.37 ± 0.96		6.92 ± 3.12		6.72 ± 3.62		3.81 ± 2.42	
36-41	1.41 ± 0.91		8.41 ± 3.41		7.12 ± 3.79		4.12 ± 1.92	

A: Mann-Whitney U test, B: Kruskal-Wallis test.

MSWBI scores.

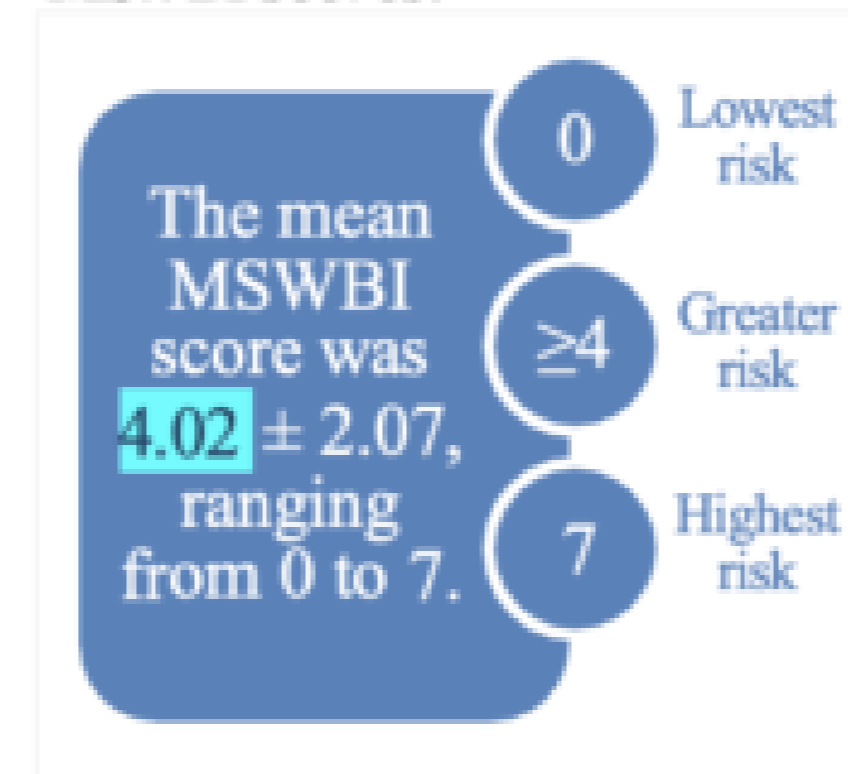


Table 4. Multiple linear regression analysis for the MSWBI score.

Year	B	SE	Lower Bound	Upper Bound	P-value
Gender	0.107	0.112	-0.112	0.326	0.340
Age	-0.007	0.002	-0.009	-0.005	0.001
Place of Residence					
Health Jordan	0.422	0.166	0.104	0.740	0.002
Central Jordan	0.417	0.173	0.140	0.694	0.002
South Jordan	0.417	0.173	0.140	0.694	0.002
University					
University of Jordan	-0.268	0.106	-0.380	-0.156	0.001
University of Science and Technology	-0.407	0.124	-0.553	-0.261	0.001
University of Jordan - Zarqa	-0.407	0.124	-0.553	-0.261	0.001
University of Jordan - Amman	-0.271	0.109	-0.384	-0.158	0.001
Al-Balqa Applied University	0.409	0.171	0.140	0.694	0.001
MSWBI scores					
1 st year	-0.232	0.080	-0.332	-0.132	0.001
2 nd year	-0.422	0.149	-0.609	-0.235	0.001
3 rd year	0.136	0.023	0.090	0.182	0.001
4 th year	0.002	0.007	0.000	0.004	0.001
5 th year	0.199	0.075	0.049	0.349	0.001
6 th year	0.002	0.007	0.000	0.004	0.001
Age					
18-23	0.027	0.026	0.000	0.054	0.001
24-29	-0.006	0.017	-0.026	0.014	0.001
30-35	0.002	0.007	0.000	0.004	0.001
36-41	0.002	0.007	0.000	0.004	0.001
42-49	0.002	0.007	0.000	0.004	0.001
MSWBI scores					
Married	0.022	0.047	0.001	0.043	0.001
Single	0.000	0.000	0.000	0.000	0.001
PHQ-9	0.022	0.001	0.019	0.025	0.001
GAD-7	0.006	0.001	0.004	0.008	0.001

A = The reference category.

Conclusions

These findings underscore the importance of comprehensive well-being assessments and the need for targeted interventions to address the complex challenges faced by medical students including substance use and mental health issues.

This study highlights the increasing prevalence of licit and illicit substance use among Jordanian medical students. A wide range of mental health correlates such as depression, anxiety and psychological wellbeing are linked to substance use. This showcases how essential it is for medical schools to prioritize early recognition and prevention of substance use disorders by screening for depression and anxiety among other mental health issues, especially those of higher relevance among medical students. Furthermore, it is essential for medical educators to destigmatize the issue of substance use and implement preventative teaching curriculums. The data established in this study could be used to fuel future awareness campaigns and pave the ground for more comprehensive studies to provide further information on this understudied population.

To the best of our knowledge, this is the first paper of its kind to explore the usage of MSWBI, and the specific problems it screens for, in the context of substance abuse. These findings underscore the importance of comprehensive well-being assessments and the need for targeted interventions to address the complex challenges faced by medical students including substance use and mental health issues. This also highlights the potential for the MSWBI to be used as a future screening tool to identify students at significant risk for substance use problems and introduce interventions early.

Further information

Feel free to reach out to Saif AlNassarwin for any questions or if you would like to collaborate on any future projects!
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