Exploring the Relationship Between Alexithymia, Smartphone Addiction, and Psychological Distress Among University Students: A Multi-Country Study

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Abstract

Objectives: Increasing dependence on smartphones results in the appearance of psychological problems, which are especially present among young people. This study aims to determine the rates of alexithymia and its relationship with smartphone addiction and psychological distress in university students.

Methods: A total of 2616 students (average age 22.59 ± 3.54 years, 73% female) from universities in Egypt, Oman, and Pakistan were included in a cross-sectional and comparative study conducted through a web survey during the COVID-19 pandemic. The following scales were used: Toronto Alexithymia Scale (TAS-20), Depression Anxiety Stress Scale (DASS-21), and Smartphone Addiction Scale-Short Version (SAS-SV). The survey also included questions related to sociodemographic and smartphone usage patterns. Regression analysis and chi-square distribution were used in the statistical analysis.

Results: Those students scoring above the TAS-20 cutoff point are significantly associated with smartphone addiction ($\chi^2(1) = 45.42$, $p < 0.01$), and psychological distress ($\chi^2(1) = 246.31$, $p < 0.01$). Likewise, smartphone addiction is significantly associated with psychological distress ($\chi^2(1) = 57.46$, $p < 0.01$). However, at each of the TAS-20, SAS-SV, and DASS-21 variables, there are significant differences between the students of the three countries ($p<0.05$, $p < 0.01$, and $p < 0.01$ respectively); the highest severity of smartphone addiction was amongst students in Oman, while the highest severity of alexithymia and psychological distress was amongst students in Egypt. Women had higher mean values on the SAS and TAS scales than men ($p<0.001$). Students relying frequently on social media usage are more prone to smartphone addiction.

Conclusions: Cultural and socioeconomic factors (like living standards, technology accessibility, and social interaction patterns) are crucial when creating a strategy for improving young generations' psychological well-being across regions and countries. Hence, there is no 'one-size-fits-all' approach to mental health that needs to be addressed via systematic assessment and customized interventions.

Further, this study confirms the findings of recent studies indicating the heightened university students' psychological vulnerability during epidemiological crises.

Introduction

In 1973, Peter Sifneos originally coined the term alexithymia.[1] Translated from Greek origins- a = lack, lexis = word, and thymos = mood or emotion—, Alexithymia which is literally translated as "no words for mood," is a multidimensional personality trait described by difficulties identifying and characterizing feelings, trouble recognizing emotions from physical sensations, restricted mental images processes with insufficiency of imaginations, and a lack of concrete and inadequate analytical thinking.[2-4]

Likewise, alexithymia has been defined as a general impairment in emotional processing as well as trouble distinguishing personal emotional states and a restricted ability to transmit these feelings to others.[2, 5-7] Alexithymia has been associated with problems dealing with challenging situations of anxiety and depression[8,9]. It is linked to a higher risk of mortality from a variety of causes (suicide, disasters, trauma, or aggression). Extant evidence also indicates that alexithymia is linked with multiple psychological psychosomatic disorders like affective dysregulation,[10-14] low self-esteem, traumatic experiences,[15,16] low supportive content,[17] sleep problems,[18] and challenges forming and sustaining interpersonal connections.[19]

Furthermore, many recent studies have confirmed the relation between alexithymia and addictive behaviors such as gaming addiction, smartphone addiction,[5,20,21] substance abuse, excessive drinking,[22,23] and eating disorders,[24-25]. One explanation for this association is that alexithymic people will attempt to self-regulate their emotional expressions by indulging in addictive behaviors.[15,26,27]

Smartphones, on the other hand, are information-processing devices that incorporate Internet and social networking access, texting, and multimedia in addition to their primary function as a form of communication. As a result, there is growing concern that frequent smartphone use could indicate that cell phones are becoming a behavioral addiction. Smartphone addiction is not recognized as a condition in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5).[28]

Despite the benefits of giving information and communication options, smartphone usage or addiction is assumed to have harmful health consequences.[29] It has been linked to physical health issues such as vision impairment, nerve pain,[30] auditory pain, headaches, and sleep disturbances.[31,32] Similarly, several mental health issues, such as depression and anxiety, have been related to smartphone addiction.[28,33]

Internet use has become easier and more accessible because of the rapid emergence of smartphones.[34] Meanwhile, individuals suffering from alexithymia may utilize the Internet to regulate their feelings due to difficulty identifying and explaining them.[35] Consequently, this group's usage of smartphones, and perhaps dependence on them, may be higher. Only a few prior studies investigated the link between alexithymia and smartphone addiction, and the findings were intriguing. Alexithymia was associated with psychiatric issues as well as smartphone addiction.[36,37] To the best of our knowledge, few researchers have investigated this relationship in Arab countries. This gap may generally pertain to the insufficient understanding of the construct of alexithymia and the related gradual shift from the "Pre-TAS" era (phase of defining the construct) to the "Post-TAS" era (phase of investigating the construct).[38,39] Therefore, the present study investigates alexithymia and its relationship to smartphone addiction, among college students belonging to different ethnicity from Egypt, Sultana of Oman, and Pakistan. This investigation aims to provide a basis for a scientific debate and an insight into the risk factors, prevalence, and interrelations of smartphone problematic usage-associated psychological disorders, distinctively in the context of Arab countries. Concisely and precisely, the main objective of the study is to determine the rates of alexithymia and its relationship with smartphone addiction and psychological distress in university students through a multi-country comparative approach.

Methods

This cross-sectional survey was done on a convenience sample of 2616 university students in October, November, and December 2021. Two researchers were responsible for performing and supervising the data collection; one oversaw approaching respondents in both Egypt and Oman, while the other addressed subjects in Pakistan.

Ethical permission was provided through Ethics Committee at Menoufia University for the conduct of this study. The study was carried out in accordance with the Declaration of Helsinki and adherence to APA ethical standards of research conduct. All participants provided written informed consent prior to study participation. Participants were given a participant information e-sheet outlining the research team's responsibilities and their rights as participants (e.g., confidentiality, right to withdraw without penalty). The electronic questionnaire was randomly distributed through different universities across Egypt (i.e., Menoufia University, Cairo University, Banha University); In the Sultanate of Oman (i.e., Sultan Qaboos University, Nizwa University, and Sohar University); And in Pakistan (i.e., University Comsats, University Islamabad, University of Karachi, University of Punjab). Adults above the age of 18 and current social media users had been considered as meeting the inclusion requirements for participation (this entailed having an account on any social media platform). By also adopting the snowball technique, participants were advised to forward the link to their peers and colleagues studying at the same university. This was applied by inaugurating a web-based message that appears by default upon the completion of the e-survey and basically encourages the extension of the invitation.

The Toronto Alexithymia Scale (TAS-20), The Depression, Anxiety and Stress Scale - 21 Items (DASS-21), and Smartphone Addiction Scale-Short Version (SASS-SV) are the three scales that were included in the questionnaire. The survey language in Egypt and the Sultanate of Oman is Arabic, while Urdu is used in Pakistan. Age, gender (Females (n = 1911) and Males (n = 705)), faculty, and academic year are among the demographic data collected. To gain a wider insight into factors that may be associated with problematic smartphone use, the questionnaire also included items about smartphone use patterns like frequency of accessing social media platforms, paying for App subscriptions, and frequency of changing smartphones.

Toronto Alexithymia Scale (TAS-20) is organized into three scales: DIF - difficulty identifying feelings (7 items), DDF - difficulty describing feelings (5 items), and EOT - externally oriented thinking (8 items).[40] Moreover, the scale demonstrated good internal consistency (Cronbach's alpha = .80) for the university student sample examined by the scale developers.[41] Convergent and concurrent validity are adequately demonstrated by research using the TAS-20. The three-factor structure was discovered to be theoretically compatible with the alexithymia construct. Furthermore, it was found stable and replicable in clinical and nonclinical populations.[41] In this study, the Cronbach's Alpha score for TAS-20 was 0.82 (> 0.8), demonstrating good reliability level. Further, an adequate KMO (Kaiser-Meyer-Olkin) value and significant Bartlett's test of sphericity for TAS-20 were found in this study (0.88, $\chi 2$ = 11540.6, p < 0.001). Thus, the scale showed psychometric adequacy and sufficient levels of reliability and validity.[42] On the other hand, the Urdu version has a good reliability value (Cronbach's alpha = .82) according to the results of confirmatory factor analysis (CFA). The convergent validity of the scale was proved by finding a positive correlation between the TAS-20 and anxiety (r = .51, p < .001), and a negative relationship with emotional intelligence (r = -.35, p < .001), which revealed its divergent validity.[43] Further, the Arabic translated scale applied to university students showed good internal consistency reliability, test-retest reliability, convergent, discriminant, and concurrent validity.[28]

SAS-SV demonstrated excellent reliability (Cronbach's alpha = .91) in studies aimed at developing and validating its short version.[44] The SAS-SV scale is made up of ten items. Participants must respond on a Likert scale of 1 to 6, "strongly disagree" to "strongly agree". In this study, the Cronbach's Alpha score for SAS-SV was 0.87 (> 0.8), demonstrating good reliability level. Further, an adequate KMO (Kaiser-Meyer-Olkin) value and significant Bartlett's test of sphericity for SAS-SV were found in this study (0.90, $\chi 2$ = 9748.31, p < 0.001). Thus, the scale showed psychometric adequacy and sufficient levels of reliability and validity.[42]

The Arabic version of SAS-SV used in this study was translated and validated by Sfendla et al. which demonstrated excellent reliability based on (Cronbach's alpha = .94).[45] Studies in Pakistan for Urdu

translated scale on university students showed good inter-item reliability (α = 0.81) and adequate construct validity (P<0.001).[46]

The DASS-21 consists of 21 items in three subscales that are valid and reliable measures of Depression (items 3, 5, 10, 13, 16, 17, 21), Anxiety (items 2, 4, 7, 9, 15, 19, 20), and Stress (items 1, 6, 8, 11, 12, 14, 18) separately;[47] however the scale also taps into a more general dimension of psychological distress and that it can be used as a measure of distress in adolescents.[48,49] In this study, the Cronbach's Alpha score for SAS-SV was 0.94 (> 0.8), demonstrating excellent reliability level. Further, an adequate KMO (Kaiser-Meyer-Olkin) value and significant Bartlett's test of sphericity for DASS-21 were found in this study (0.97, $\chi 2$ = 24538.54, p < 0.001). Thus, the scale showed psychometric adequacy and sufficient levels of reliability and validity.[42]

In this study, the scale is adopted as a general dimension, considering evident cut-off scores for each gender.[48] Previous studies indicated that the Arabic version of DASS-21 had acceptable reliability [47,48] and that the Urdu version has shown good internal consistency (Cronbach's alpha 0.86).[50]

The data analysis was performed using the Python libraries Sklearn and Scipy, and Statistical Software Package for Social Sciences (SPSS) version 29.0.1.0. Numeric SAS-SV, TAS-20 & DASS-21 scores were treated, almost exclusively, as target variables. In Python, the label represents the variable name. Labeling variables with descriptive names helps clarify their meanings. Labeling values of numerical categorical variables ensures better readability of results. The categorical binary data label variables' predictive influence was measured with a two-sided t-test. When the label variables had more than two categories, one-way ANOVA was used. Ordinary least squares regression was used for estimating coefficients of linear regression equations and describing the relationship between the three main measures of this study.

The authors of the TAS-20 scale endorsed using the scores as a continuous measure of alexithymia severity. Nonetheless, cut-off scores for 'alexithymic' and 'non-alexithymic' have been established.[51] Accordingly, this study refers to these cut-off scores which were classified as follows: ≤ 51 indicates non-alexithymia, ≥61 indicates alexithymia, while scores between 52 and 60 may indicate alexithymia.

Pertinent evidence indicates that significant differences exist in the SAS-SV scores for gender (p<.001) and that based on Receiver Operating Characteristics ROC curve analysis and subsequent computed specificity and sensitivity values, the smartphone addictive group can be identified by the following cut-off scoring: ≥31 for males and ≥33 for females.[52] Also, research statistically analyzing the ROC Curve to identify psychologically distressed groups using the DASS-21 total score indicated that a cutoff score of ≥14 was deemed to be best suited for female adolescents, while a cutoff score of ≥ 17 was deemed best for male adolescents.[48]

The aim of employing the cut-off scoring is to enhance the interpretability and minimize subjective judgment.[53] Hence, based on relevant evidence, the TAS-20, DASS-21, and SAS-SV scores were transformed into binary categorical target variables using the above-mentioned evident cut-off scoring criteria. In these cases, Chi-Squared tests of independence and crosstabulations were used.

Results

The majority of participants were from Oman (n = 1619, 62%), while the other participants were from Egypt (n = 489, 19%) and Pakistan (n = 508, 19%). Females formed the highest proportion of the total sample (n = 1911, 73%). Participants' average age was 22.59 ± 3.54. The comparisons of mean values based on the characteristics of the participants are presented in Table 1, and this has been demonstrated in relation to the three applied scales: TAS-20, SAS-SV, and DASS-21. Mean scores on the TAS-20, SAS-SV, and DASS-21 total scale were M = 59.18 (SD 11.59), M = 35.45 (SD 9.90), and M = 21.89 (SD 12.99) respectively. At this time point, the mean TAS-20 score was slightly below the cutoff value (≥61); however, the mean SAS-SV score was above the cutoff value (≥31 for males and ≥33 for females), indicating the high risk of smartphone addiction. Further. the mean DASS-21 score was above the cutoff value (≥17 for males and ≥14 for females) indicating the trend towards the prevalence of psychological distress.

Tables 1 and 2 comprise comparisons between the three countries based on selected variables. For example, the statistical comparison between the three countries for the mean scores of each applied scale revealed that there were significant differences with regard to TAS-20 (F [2, 2613] = 4.57, $p < 0.05$), SAS-SV (F [2, 2613] = 120.76, $p < 0.01$) and DASS-21 (F [2, 2613] = 57.39, $p < 0.01$). Students from Egypt had the highest TAS-20 mean score M = 60.52 (SD 11.21), followed by students from Oman M = 59.02 (SD 11.29), while the least mean score was associated with the students from Pakistan M = 58.41 (SD 12.73). Students from Oman had the highest SAS-SV mean score M = 36.89 (SD 9.24), followed by students from Egypt M = 36.78 (SD 9.45), while the least mean score was associated with the students from Pakistan M = 29.59 (SD 10.20). Students from Egypt had the highest DASS-21 mean score M = 26.06 (SD 12.75), followed by students from Pakistan M = 24.42 (SD 13.87), while the least mean score was associated with the students from Oman M = 19.86 (SD 12.24). In regards to the gender comparison, in each of the three sampled countries, there was no statistically significant difference between males and females in terms of SAS-SV ($p > 0.05$). However, females had higher mean scores of TAS-20 than males in each country ($p < 0.01$). In Oman and Pakistan, there was no statistically significant difference between males and females in terms of DASS-21 ($p > 0.05$), However, in Egypt, females had higher mean scores of DASS-21 than males ($p < 0.01$).

Table 1: Characteristics of the participants, comparisons of mean values for TAS-20, SAS-SV and DASS-21 in different groups.

Variable	N (%)	SAS-SV score Mean	SD	p	TAS-20 total score Mean	SD	p	DASS-21 total score Mean	SD	p
Country				<0.0001**			.0104*			<0.0001**
Oman	1619	36.89	9.24		59.02	11.29		19.855	12.235	
Egypt	489	36.78	9.45		60.52	11.21		26.055	12.75	
Pakistan	508	29.59	10.20		58.41	12.73		24.415	13.87	
Faculty				0.64			0.91			0.02*
Theoretical	1221	35.35	10.01		59.21	11.56		22.525	13.165	
Practical	1395	35.53	9.79		59.16	11.60		21.35	12.71	
Marital status				0.0012 **			<.0001**			<0.0001**
Single	2125	35.19	9.98		59.65	11.76		22.455	12.99	
Married	477	36.75	9.35		57.31	10.36		19.21	12.355	
Paying for social media attractions				0.72			0.204			<0.0001**
Yes	348	35.62	9.95		60.03	13.69		25.25	13.265	
No	2268	35.42	9.89		59.05	11.22		21.385	12.81	
Academic Year				<0.0001**			<0.0001**			<0.0001**
1st Year	140	36.32	10.18		63.34	12.90		24.86	13.14	
2nd Year	318	36.44	9.70		61.07	12.80		22.745	12.985	
3rd Year	355	34.26	10.20		59.06	12.32		23.145	12.575	
4th year	569	33.95	10.25		59.52	10.47		21.625	13.23	
5th year	373	36.63	9.45		58.70	11.15		20.73	13.005	
6th year	345	35.92	9.77		58.61	11.32		18.76	12.285	
7th year	516	35.90	9.48		57.32	11.13		24.86	13.14	
Place of Residence				0.39			0.24			0.14
Family	1812	35.40	9.98		58.91	11.66		22.055	12.93	
Friend	104	36.84	9.41		60.07	9.85		23.78	13.155	
Alone	46	34.02	10.46		58.28	10.19		23.065	14.65	
Hostel	654	35.45	9.69		59.87	11.71		21.08	12.76	
Income Level				0.016*			0.13			0.0004**
low-income	401	34.65	10.00		60.27	14.09		23.99	13.24	
middle income	2038	35.73	9.87		58.99	11.01		21.38	12.785	
high income	177	33.97	9.77		58.99	11.66		23.095	13.465	

	N	Mean	SD	p	Mean	SD	p	Mean	SD	p
Monthly Smartphone Bill				**<0.0001****			**0.02***			0.09
Very low	593	33.05	10.54		60.23	12.27		22.71	13.905	
Low	737	34.82	9.27		58.45	11.24		21.195	13.04	
Middle	1082	36.73	9.48		58.93	11.00		21.715	12.125	
High	204	37.93	10.66		60.15	13.43		23.065	13.67	
Freq. of Changing Smartphone/year				**0.019***			**.003****			0.27
0-1	2188	36.90	10.01		59.22	11.51		21.85	13.05	
1-2	219	35.88	8.56		59.29	10.87		23.115	12.26	
2-3	115	37.38	10.57		61.32	13.54		22.01	13.095	
4+	94	36.90	8.87		55.39	11.56		20.055	11.43	
Academic Performance				**<0.0001****			0.31			**<.0001****
Pass	182	32.96	11.63		59.86	13.48		25.975	14.865	
Good	831	35.89	9.95		59.68	10.95		23.435	12.95	
Very Good	1207	36.01	9.28		58.88	11.13		20.705	12.18	
Excellent	396	33.95	10.43		58.74	13.16		20.44	13.48	
Environment				**0.048***			0.22			0.16
Urban	1600	35.07	10.32		59.45	11.67		21.685	13.155	
Rural	859	36.01	9.25		58.62	11.59		22.51	12.665	
Mountain	157	36.23	8.71		59.54	10.49		20.725	12.025	
Freq. of Social Media Usage				**<0.0001****			**<0.0001****			0.053
Never	94	28.10	10.51		62.70	14.37		23.945	13.885	
Rarely	251	29.07	9.43		57.0	12.30		22.665	12.915	
Occasionally	618	32.85	9.00		57.82	10.47		20.835	12.12	
Frequently	1653	37.81	9.37		59.82	11.59		22.06	13.155	

Bolded values with * and ** indicate statistical significance p < 0.05 and p < 0.01, respectively.

SAS-SV, Smartphone Addiction Scale–Short Version; TAS-20, Toronto Alexithymia Scale; DASS-21, Depression, Anxiety and Stress Scale

Table 2: Comparisons of mean values for TAS-20, SAS-SV and DASS-21 based on gender and country.

			Mean	SD	t	p-value	95% CI
SAS	All countries	Male (N = 705)	33.53	10.67	-5.75	**<0.0001****	[-3.52, -1.73]
		Female (N = 1911)	36.16	9.50			
	Oman	Male (N = 373)	36.32	9.55	-1.31	0.19	[-1.83, 0.37]
		Female (N = 1246)	37.05	9.14			
	Egypt	Male (N = 67)	35.31	10.00	-1.31	0.19	[-4.3, 0.89]
		Female (N = 421)	37.02	9.36			
	Pakistan	Male (N =264)	29.13	10.93	-1.06	0.29	[-2.72, 0.82]
		Female (N = 244)	30.08	9.34			
TAS	All countries	Male	56.75	12.76	-6.13	**<0.0001****	[-4.39, -2.26]
		Female	60.08	10.98			
	Oman	Male	56.75	12.76	-4.06	**<0.0001****	[-4.38, -1.52]
		Female	59.70	10.71			
	Egypt	Male	56.30	14.12	-2.74	**0.008****	[-8.52, -1.35]
		Female	61.24	10.51			
	Pakistan	Male	56.92	12.46	-2.75	**0.006****	[-5.3, -0.88]
		Female	60.02	12.85			
DASS	All countries	Male	21.665	13.365	-0.54	0.59	[-1.46, 0.825]
		Female	21.985	12.775			
	Oman	Male	19.32	12.035	-0.97	0.30	[-2.095, 0.71]
		Female	20.015	12.295			
	Egypt	Male	21.94	13.42	-2.73	**0.008****	[-8.25, -1.29]
		Female	26.71	12.53			
	Pakistan	Male	24.91	14.46	0.84	0.40	[-1.38, 3.445]
		Female	23.875	13.21			

Bolded values with ** indicate statistical significance p < 0.01
SAS-SV, Smartphone Addiction Scale–Short Version; TAS-20, Toronto Alexithymia Scale; DASS-21, Depression, Anxiety and Stress Scale

Comparatively (including the entire sample covering the three countries), females had higher mean scores of SAS-SV and TAS-20 than males (p<0.001), however, there was no significant difference between the two groups with regards to the DASS-21 mean scores (p = 0.59) – refer to Table 2. 1695 (65%) of the participants pertained to the "SA group"; within this percentage, males represented 26% whereas females represented 74%. However, there was not enough evidence to suggest an association between gender and smartphone addiction ($\chi^2(1) = 2.33$, p = 0.31). 1135 (43.4%) of the participants pertained to the "TAS positive group", males represented 23% whereas females represented 77%. Further, there was a statistically significant association between gender factor and alexithymia ($\chi^2(1) = 19.77$, p < 0.01), explicitly indicating that females are more vulnerable to being alexithymia positive.

Although R-squared values were low for the OLS Regressions that were run between SAS, TAS, and DASS, there were definite underlying positive relationships, p< 0.01 (refer to Table 3). Further, the Chi-square statistic indicated that there were statistically significant associations between SAS-SV, TAS-20, and DASS-21, p< 0.01 (refer to Table 4).

Table 3: OLS Regressions between SAS-SV, TAS-20 and DASS-21

	coefficient	Std error	t	P>|t|	95% CI
const	49.88	.821	60.75	<.0001**	[48.27, 51.49]
SAS_total	.2625	.022	11.768	<.0001**	[.219, 306]
TAS ~ SAS R²: 0.050					
const	8.534	.901	9.473	<.0001**	[6.768, 10.615]
SAS_total	.377	.024	15.395	<.0001**	[.329, .425]
DASS ~ SAS R²: 0.083					
const	-3.988	1.212	-3.299	.001**	[-6.375, 1.622]
TAS_total	0.437	0.020	21.768	<.0001**	[.398, .477]
DASS ~ TAS R²: 0.153					

SAS-SV, Smartphone Addiction Scale–Short Version; TAS-20, Toronto Alexithymia Scale; DASS-21, Depression, Anxiety and Stress Scale.
∗∗ *The regression statistic is significant at p< 0.01 level.*

Table 4: Associations between different categorized groups based on thresholds of TAS-20, SAS-SV and DASS-21.

			SAS-SV		χ^2	P value
			Addicted	**Not Addicted**	**45.419**	**<0.001****
TAS	Alexithymia	N	817	318		
		% of TAS	72.0%	28.0%		
		% of SAS	48.2%	34.5%		
	No Alexithymia	N	878	603		
		% of TAS	59.3%	40.7%		
		% of SAS	51.8%	65.5%		
DASS	DASS Psychologically Distressed	N	1270	559	57.461	<0.001**
		% of DASS	69.40%	30.60%		
		% of SAS	74.90%	60.70%		
	DASS not psychologically distressed	N	425	362		
		% of DASS	54.00%	46.00%		
		% of SAS	25.10%	39.30%		
			TAS			
			Alexithymia	No Alexithymia		
DASS	DASS Psychologically Distressed	N	976	853	246.311	<0.001**
		% of DASS	53.40%	46.60%		
		% of TAS	86.00%	57.60%		
		N	159	628		

DASS not psychologically distressed	% of DASS	20.20%	79.80%
	% of TAS	14.00%	42.40%

SAS-SV, Smartphone Addiction Scale–Short Version; TAS, Toronto Alexithymia Scale; DASS, Depression, Anxiety and Stress Scale (DASS-21)
** *The Chi-square statistic is significant at p< 0.01 level.*

Despite low association values, hours of mobile usage significantly predicted SAS ($R^2 = 0.1$, $p < 0.01$) and TAS ($R^2 = 0.01$, $p < 0.01$). The results of the t-test showed that university students frequently using social media platforms (WhatsApp, Instagram, Facebook, Twitter, and Snapchat) had greater smartphone addiction scores than those who didn't use them frequently ($p < 0.01$). Further, the Chi-Square test indicates that there was a statistically significant association between the frequent usage of these platforms and smartphone addiction ($p < 0.05$), explicitly indicating that frequent social media users are more vulnerable to smartphone problematic usage. Interestingly, while the frequent usage of WhatsApp, Facebook, Twitter, or Snapchat was not significantly associated with alexithymia ($p > 0.05$), the frequent Instagram usage was in a statistically significant association with the TAS ($\chi^2(1) = 8.99$, $p < 0.01$), explicitly indicating the vulnerability of Instagram users to be affected with alexithymia.

Discussion

In this cross-sectional study, the rates of alexithymia and its association with smartphone addiction and psychological distress were investigated among a sample of university students in Egypt, Oman, and Pakistan. According to our best knowledge, this research is the first of its kind to study and address this subject through a comparative analysis among these three countries of different ethnicities. Further, this study adopted different methodical and analytical approaches for understanding how significant the relationships between the three investigated constructs were; hence regression analysis was run, and second, chi-square distribution was applied considering the measures' cutoff scores evidently specified to each measure.

In considering the present findings, it is important to highlight the high prevalence rates of alexithymia amongst the participants of this study (43.4%) and that the students of Egypt had the highest TAS mean score M = 60.52 (SD 11.21). Our finding is around twice the rate reported by Elkholy et al. (2020)[28] who found that 22% of their 200 sampled students had alexithymia in Egypt. Further, this study's alexithymia prevalence is about four times higher than the rate of the general population which is approximately 10%.[54-56] Similarly, the prevalence rates of psychological distress and smartphone addiction were high 70% and 65%, respectively. These high rates may pertain to the devastating influence of the COVID-19 pandemic, as data from this study was collected in the last quarter of 2021. Amidst this pandemic, several reports have shown that psychological distress, intrusive thoughts, and negative emotions had been exacerbated among university students across many countries worldwide.[57,58] Despite limited studies conducted on the subject of alexithymia over the pandemic, in Italy, it was found that 27.3% of young adult university students had alexithymia and that 22.9% showed excessive internet use.[59] In parallel, few studies investigated smartphone addiction amid COVID-19, a study conducted among Saudi University Students found that 37.4% of the sample were addicted to smartphone use.[60] However, some studies pointed out that COVID-19 did not lead to significant changes in the prevalence of smartphone addiction.[61,62] Despite that, our study showed a high incidence of smartphone addiction doubled to what was reported by a study that took place before the COVID-19 pandemic in Egypt with a prevalence of 32.5%[28].

In consistency with previous research findings, this study confirms the significant association between alexithymia and smartphone addiction and that alexithymia is found a significant predictor of smartphone addiction, such studies were conducted in countries like Egypt,[28] Istanbul,[21] Islamabad.[63] This association necessitates the attention of education providers due to evidence that alexithymia can positively predict learning burnout through the mediating influence of smartphone addiction.[27] Further, our study findings confirm what other recent studies have shown with regard to the significant correlation between psychological distress and problematic smartphone use, particularly among young adults and college students.[64-66] However, overcoming such psychological difficulties, as suggested by these studies, entails taking into account the role of buffering factors like personality traits and the capacity to be alone; hence these are important aspects when designing educational and coping strategies.

Despite that evidence suggest that men tend to score higher in alexithymia than women on average,[67,68] in this study females exhibited higher levels of alexithymia in each of the three countries ($p < 0.01$). Hence, the high vulnerability of the female gender to alexithymia in our sampled countries, particularly amid the COVID-19 crisis,

represents an alarming area that needs to be rationally analyzed, and to identify its predictors. In general, relevant reports indicated that the COVID-19 pandemic had negatively and disproportionately impacted women's psychological well-being more significantly than the men group.[69-70]

In this study, it was found that the greater usage of social media including WhatsApp, Instagram, Twitter, Facebook, and Snapchat, the higher incidence of smartphone addiction. Such findings are in line with the emerging recent research which showed that high engagement with social network sites is linked with high levels of smartphone usage, and subsequent disruption to one's subjective well-being.[71-73] Factors aggravating smartphone addiction relate to low self-esteem, fear of missing out, and low self-efficacy (Ibid). Interestingly, Among the different social media applications above-mentioned, only Instagram social network was found in significant positive association with alexithymia. Such a result confirms the conclusions revealed in previous research emphasizing on relationship between alexithymia and Instagram addiction.[74-76] Also, a study found that psychological distress due to COVID-19 significantly mediated the effect of alexithymia on Instagram addiction.[74] Hence, strategies to induce wise and balanced usage of social media networks deem of high importance to maintain healthy connectedness and relationships while controlling the risk of vulnerability towards addictive behaviors associated with problematic internet usage, and subsequent damage to psychological health.

In summary, the interrelations found in this study between the three investigated factors of alexithymia, smartphone addiction, and psychological distress, alongside the role of sociocultural differences and gender variation on mental health, imply the importance of holistic psychology and inclusiveness to support the well-being and life quality of students. Pertinent evidence indicates that socioeconomic and demographic characteristics can influence university students' health-related quality of life to a great extent.[77] Further, the vulnerability of college students group to mental health issues like depression,[78] represents a major aggravator to negative behaviors and maladaptation. Simultaneously, this vulnerability could be further affected by changes in the style of learning, transition to adulthood, levels of academic stress, and large-scale crises.[79,80,81] Further, the rapid revolution in communication and the associated tendency of university students to smartphone addiction or experience fear of missing out are factors of potentially negative influence on general health and academic performance.[82,83] Based on these complexities, we emphasize holistic and integrative psychology when combating prevalent psychiatric conditions amongst university students and aiming at creating a state of flourishing. This can be led with a special focus on self-efficacy-promoting strategies and positive coping strategies education that must be prioritized in the academic administration work.[71]

The study found a high prevalence of alexithymia among university students, with a significant correlation between alexithymia and smartphone addiction. Furthermore, smartphone addiction was significantly correlated with psychological distress. The results suggest that individuals with alexithymia may use smartphones as a coping mechanism for their emotional difficulties. However, this coping strategy may lead to problematic smartphone use, exacerbating their mental health problems.

The high prevalence of alexithymia among university students in this study is consistent with previous research indicating that university students are at higher risk of experiencing mental health problems than the general population.[84] The unique stressors that university students face, including academic demands, financial pressures, and social isolation, may contribute to the development of alexithymia. This highlights the need for universities to prioritize interventions to reduce stress and improve mental health among their students.

The relationship between alexithymia and smartphone addiction found in this study is also in line with previous research.[85] The relationship suggests that individuals with alexithymia may use smartphones as a coping mechanism for their emotional difficulties. However, this coping strategy may lead to the development of problematic smartphone use, which can exacerbate their mental health problems. Therefore, interventions to reduce smartphone addiction among individuals with alexithymia should focus on addressing the underlying emotional difficulties that contribute to their smartphone use.

In addition, the current study is in line with prior research conducted by Gündoğmuş et al. (2021) that examined the association between smartphone addiction (SA), social media use, and alexithymia levels among university students in Istanbul.[21] Moreover, the relationship between smartphone addiction and psychological distress is an important finding of this study. It suggests that smartphone addiction may be a risk factor for the development of psychological distress among university students. The excessive use of smartphones may lead to social isolation, sleep disturbances, and decreased academic performance, which may contribute to psychological distress. Therefore, interventions to reduce smartphone addiction should be a priority for universities to improve the mental health of their students.

Although this study provides valuable insights into the prevalence of alexithymia and its relationship with smartphone addiction and psychological distress among university students from Egypt, Oman, and Pakistan, there are some limitations that must be acknowledged.

Firstly, the study's sample was limited to university students, which may limit the generalizability of the findings to other age groups or populations with different characteristics, such as different socioeconomic backgrounds or educational levels. Besides that, in this study, convenience sampling was adopted and hence findings may be interpreted with caution due to the inherent selection bias.

Additionally, the cross-sectional design of the study means that causality cannot be inferred from the observed associations between alexithymia, smartphone addiction, and psychological distress. Further research using longitudinal or experimental designs would be necessary to establish causality and to determine the temporal relationship between these constructs.

Despite these limitations, this study's findings have important implications for mental health intervention and prevention efforts, especially in university settings. It highlights the need for universities to prioritize the mental health of their students by implementing evidence-based interventions to reduce stress, enhance emotional regulation skills, and promote healthy smartphone use habits. Future research could explore the effectiveness of such interventions and their potential to improve the mental health outcomes of university students.

Conclusion

To conclude, the present study sheds light on the prevalence of alexithymia and its association with smartphone addiction and psychological distress in university students from Egypt, Oman, and Pakistan. The findings highlight the need for universities to prioritize mental health interventions that reduce stress and improve students' overall well-being. In addition, it is crucial for universities to develop and implement interventions that target smartphone addiction among their student populations. Along with this, the study emphasizes the importance of providing emotional regulation education and resources to students to enhance their emotional awareness and communication skills, ultimately reducing the risk of alexithymia and problematic smartphone use. Universities can also create a supportive environment that promotes social connections and meaningful activities to help students cope with stress effectively.

Future studies should explore cultural factors that may contribute to the development of alexithymia and smartphone addiction among university students from different regions. This will inform the development of culturally sensitive interventions that cater to the specific needs of students in various countries and regions.

Moreover, it is essential to recognize the significance of multidisciplinary approaches to address mental health issues among university students. Collaborations between mental health professionals, educators, and technology experts can lead to the development of effective interventions that promote mental health and well-being in this population. Therefore, future research should investigate the effectiveness of multidisciplinary interventions in reducing alexithymia, smartphone addiction, and psychological distress among university students.

In summary, the current study highlights the need for universities to prioritize mental health interventions, including emotional regulation education, and resources to reduce stress, smartphone addiction, and psychological distress in university students. Collaborations between professionals from different disciplines can provide a comprehensive and effective approach to addressing mental health issues in this population.

Disclosure

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