



Phubbing among Lebanese young adults: Scale validation and association with mental health (depression, anxiety, and stress)

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Abstract

Mobile phones use has not been without several social and psychological problems, specifically during the fast spread of the COVID-19 infection, which imposed strict restrictions and isolation. This research principal aims were to (1) confirm the validity of the Generic Scale of Phubbing in Arabic (GSP), and (2) evaluate the association between phubbing and mental health (depression, anxiety and stress). A first cross-sectional study enrolled 203 participants to confirm the factor structure of the phubbing scale among Lebanese young adults. A confirmatory factor analysis (CFA) was carried out on the whole sample using SPSS AMOS v.24 to confirm the four-factor structure of the GSP. The root mean square error of approximation (RMSEA) statistic, the comparative fit index (CFI) and the Tucker Lewis Index (TLI) were used to evaluate the goodness-of-fit of the model. RMSEA values ≤ 0.08 and ≤ 0.10 indicate a good and acceptable fit respectively. CFI and TLI values ≥ 0.90 indicate good model fit. A second cross-sectional study enrolled 461 respondents (18-29 years old) to conduct the multivariable analysis. The fit indices values were as follows: $\chi^2/df = 181.74/84 = 2.16$, TLI = .92, CFI = .94 and RMSEA = .076 [95% CI .061-.091] respectively, indicating an excellent fit of the model. The results of the multiple linear regression using the ENTER model, when taking the phubbing score as the dependent variable, showed that female gender ($\beta = 0.11$; $t(454) = 2.50$; $p = .013$), more stress ($\beta = 0.27$; $t(454) = 3.94$; $p < .001$), more anxiety ($\beta = 0.30$; $t(454) = 4.24$; $p < .001$), and older age ($\beta = 0.28$; $t(454) = 6.12$; $p < .001$) were positively correlated with higher phubbing, or higher household crowding index ($\beta = -0.15$; $t(454) = -3.62$; $p < .001$) was significantly correlated with less phubbing. The results of this study were able to confirm the validity of the Arabic version of the GSP scale. This will allow Lebanese clinicians to use this validated tool to screen for the presence of the phubbing phenomenon within this age group. We propose finding possible correlation between phubbing and others factors (such as obsession and loneliness) and validating this scale in other Arabic-speaking countries.

Keywords Phubbing · Mental health · Depression · Anxiety · Stress · Validation · Arabic version · Lebanon

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Abbreviations

BDS	Beirut Distress Scale
COVID-19	Coronavirus disease
GSP	Generic Scale of Phubbing
HCI	Household Crowding Index
LAS	Lebanese Anxiety Scale
MADRS	Montgomery Asberg Depression Rating Scale
SAS-SV	Smartphone Addiction Scale – Short Version

Background

A significant increase in people's desire for using mobile devices resulted from the rapid mobile technologies development (Revilla et al., 2016). The number of mobile phone users worldwide increased from 6.95 billion users in 2020 to 7.1 billion in 2021 (O'Dea, 2021). Estimations showed that this number may reach 7.49 billion users in 2025 (O'Dea, 2021). These statistics coincide with the fast spread of the COVID-19 infection imposing strict restrictions and isolation worldwide (T. Abel & McQueen, 2020) such as prolonged lockdowns, online teaching/work, and meetings leading to more internet and phone use (King et al., 2020; Mestre-Bach et al., 2020; Wiederhold, 2020). Mobile phones can obviously bring individuals together despite the physical distance and can help them in entertaining and interacting with many others, but excessive phone use has not been without several psychological problems and dysfunctional behaviors such as “phubbing” (Fernández et al., 2020; Ho et al., 2014).

“Phubbing”, a merger of the two terms “phone” and “snubbing” (Ivanova et al., 2020), is defined as the phenomenon of using the smartphone to snub other people instead of paying attention to them during face to face interaction (Chotpitayasunondh & Douglas, 2016; Karadağ et al., 2015; Sun & Samp, 2021). It is noticeable that phubbing is widespread and socially accepted; it can be commonly found in our daily routines such as when having a meal with a friend, during work breaks and familial events (Chotpitayasunondh & Douglas, 2016; Procentese et al., 2019).

Phubbing behavior and internet addiction were found strongly associated (Karadağ et al., 2015). Despite this strong connection, phubbing is characterized by various predictors that cannot be limited to internet addiction only (Rahman et al., 2021) such as low self-control and the fear of missing out (Chotpitayasunondh & Douglas, 2016; Davey et al., 2018; Parker et al., 2008), social media addictions (Davey et al., 2018; Karadağ et al., 2015), depressive temperament (Bitar et al., 2021), neuroticism, social anxiety (Guazzini et al., 2019), and age (Rahman et al., 2021); the latter can be explained by the greater susceptibility of younger people to accept new technological devices than

older people (Augner & Hacker, 2012; Kwon et al., 2013). Also, previous findings explained that individuals addicted to social media and smartphones use their phones as a tool that helps them in situations of loneliness, anxiety and stress; which may predict phubbing (Karadağ et al., 2015). Actually, phubbing aggravates phubbers' and phubbees problems (Karadağ et al., 2016) (i.e. the absence of communication might have a negative impact on relationships and mental health (Roberts & David, 2016)).

However, phubbing can cause an impact on mental health. As mentioned in the literature, when someone is phubbed by his partner, or classmates, during work or parties, he will instantly present negative feelings and be upset (Ergün et al., 2020). These emotions will negatively affect mental health.

The association between phubbing and depression is “bi-directional” (McDaniel & Coyne, 2016). Depression is associated with various phubbing predictors such as Facebook addiction (Błachnio et al., 2015) and mobile dependence (Augner & Hacker, 2012; Demirci et al., 2015). Internet and social media addiction has similar symptoms of physical/psychological dependence (i.e. mood swings, being tolerant, craving, conflict and relapse) (Donovan, 2004; Tran et al., 2017). Individuals with internet addiction turn to excessive and repetitive internet and phone use (Bell, 2009), in order to treat underlying psychological disorders and reduce the severity of withdrawal symptoms (e.g. depression) (Hamissi et al., 2013). In the other hand, individuals found that smartphones cannot help them fix their problems but make it more severe, and increases their unworthiness and depressive feelings (McDaniel & Coyne, 2016). Phubbing also, presents indirect effect on depressive symptoms by decreasing life satisfaction (Roberts & David, 2016). Moreover, phubbing may increase the sense of social exclusion expressed by the ignorance of the person speaking by using a mobile phone (Karadağ et al., 2016), which in turn increases depressive symptoms (Li et al., 2021). Biologically speaking, the electromagnetic waves from smartphones lead to slow production of melatonin and therefore, the continuous checking and excessive phone use can lead to sleep disturbances associated with increased severity of depressive symptoms (Wood et al., 2006; Zarghami et al., 2015).

Moreover, anxiety is significantly associated with phubbing (Guazzini et al., 2019). Research showed that phubbing is positively linked to greater social withdraw (Beranuy et al., 2009; Thomée et al., 2011), a reduction in communication quality perception (Chotpitayasunondh & Douglas, 2018), and a low level of interpersonal trust (Roberts & David, 2016) all leading to anxiety. These associations can arise from people's desire of belongingness to social groups existing today in real life and on social media platforms (Abel et al., 2016). This desire increases anxiety when people realize that they are missing out rewarding events

people are having (Franchina et al., 2018) and by improving inter-personal insecurity among people anxiously attached and seeking self-validation from others (Roberts & David, 2016). Add to this, researchers explained that individuals with higher levels of anxiety do more phubbing in order to decrease anxious symptoms and discomfort by social interactions through their mobile phones (Davey et al., 2018; Guazzini et al., 2019). But ironically, the more individuals check their phones to get rid of anxiety, the more they find out that they are socially excluded and missing many events; therefore, the person will end up having more anxiety (Abel et al., 2016; Franchina et al., 2018).

Based on recent studies, mobile phone use has been also found associated with higher stress (Thomé et al., 2011). Despite that communicating on social media platforms and behind phone's screen make users feels more comfortable (Berry et al., 2017b); Mobile phone users perceives their accessibility as a stressor, since phone usage demands availability, regardless of time and space (Thomé et al., 2011). Moreover, a recent study found that phubbing has been found positively correlated with negative affect and negatively with positive affect (Guazzini et al., 2021). Negative affect is linked to increased stress levels (Dua, 1993), which justify thBerry et al., 2017a excessive phone use by stressed individuals to deal with their negative feelings (). Another study suggested that the nature of activity done using the mobile phone can induce stress such as playing games, receiving negative text messages or watching stressing videos or news (Hunter et al., 2018). Interestingly, a recent study demonstrated that observers of phubbing are affected too by this behavior, they presents less positive affect, increased negative affect and higher stress (Nuñez et al., 2020).

Recent studies showed that psychological wellbeing of general Lebanese community may be adversely affected due to many factors; Lebanese adults are in mental distress (Obeid et al., 2019, 2020). First, the economic crisis and poverty seen in the country may both trigger psychological distress and affect mental health (Cooper, 2011). Secondly, the COVID-19 pandemic imposed numerous restrictions such as social distancing, limiting face-to-face social interaction, avoiding crowded places, working from home, and transition to online learning (Haleem et al., 2020). These restrictions present the perfect way to limit the COVID-19 infection; nevertheless, it may have negative consequences on mental health. This come in parallel with the increased number of Lebanese smartphone users in 2021 reaching 4.57 million users (*Digital in Lebanon*, 2021), which may results a problematic smartphone use (Sohn et al., 2019). The brain's reward system can be hacked to engage the individual in same activities that he was doing during the lockdown period even if restrictions

are withdrawn (Ratan et al., 2021), which may enhance phubbing behavior (Bitar et al., 2021).

Lebanese population are candidate for phubbing tendencies' assessment, specifically during the emergence of the COVID-19 pandemic, the severe economic crisis associated with high unemployment rate and the rising internet use during the last few years as explained above in the literature (Bitar et al., 2021). To our knowledge, there are no studies reporting the validation of phubbing scales in Arabic-speaking countries; we chose to validate the Arabic version of the Generic Scale of Phubbing (GSP) developed by Chotpitayasunondh et Douglas (Chotpitayasunondh & Douglas, 2018) instead of Pubbing Scale (PS) developed by Karadağ et al. (Karadağ et al., 2015) for the following reasons: PS has limited generalizability; it has been constructed on native Turkish students, with no consideration of language or cross-culture adaptability (Chotpitayasunondh & Douglas, 2018; Karadağ et al., 2015). The GSP presents a multidimensional and generalizable scale (Chotpitayasunondh & Douglas, 2018) and was found to be reliable and valid (Chotpitayasunondh & Douglas, 2018).

Digitalization and mobile phones usage continues to grow and to cover the majority of people's daily activities, therefore phubbing presents an important topic to study in order to develop preventative and effective interventions as soon as possible. To our knowledge, the correlations between mental health and phubbing have not been previously studied in Lebanon or in any Arabic-speaking country, the principal aims of this research were to (1) confirm the validity of the Generic Scale of Phubbing in Arabic, and (2) evaluate the association between phubbing and mental health (depression, anxiety and stress).

Methods

Study 1

Participants

A first sample composed of 203 participants, was recruited in a first cross-sectional study to confirm the factor structure of the phubbing scale among Lebanese young adults (18-29 years). This age group was chosen since they are more prone to use their phones (Silver et al., 2019). The snowball technique was used; it consists of responding to the questions online and sharing the link of the survey to other eligible participants from all districts/governorates of Lebanon. Included were persons having mobile phone. This study excluded people who refused to participate.

Minimal Sample Size Calculation

A minimal sample of 150 participants was deemed necessary to validate the Generic Scale of Phubbing, based on 10 participants per 1 scale item (Mundfrom et al., 2005).

Questionnaire

The language of the survey that was created on Google forms was in Arabic. Section one consisted of socio-demographic questions. The household crowding index (HCI) was determined by the division of the number of individuals in the house by the total of house rooms (except bathrooms and kitchen); increased HCI is associated with less socioeconomic status (Melki, 2004). Section two of the survey contained the **Generic Scale of Phubbing (GSP)**, assessing phubbing behavior, and consisting of 15 items such as “I feel anxious if my phone is not nearby; I use my phone even though I know it irritates others; and I get rid of stress by ignoring others and paying attention to my phone instead” (Chotpitayasunondh & Douglas, 2018). Responses are graded from 1 = never to 7 = always. Higher scores indicate more phubbing (current Cronbach’s $\alpha = 0.934$).

Statistical Analysis

To confirm the four-factor structure of the GPS (Chotpitayasunondh & Douglas, 2018), a confirmatory factor analysis (CFA) was accomplished on the total sample based on the polychoric correlation matrix using Weighted Least Squares with Means and Variance Adjusted estimation (WLSMV) method in Mplus v 7.2 (Muthén & Muthén, 2012). The Relative Chi-square (χ^2/df) (cut-off values: <2-5), root mean square error of approximation (RMSEA) statistic, comparative fit index (CFI) and Tucker Lewis Index (TLI) present the common indices so they were used to assess the goodness-of-fit of the model. Values of RMSEA ≤ 0.08 demonstrate a good-fitting model, whereas values ≤ 0.10 are indicative of an acceptable fit (Kenny et al., 2015). CFI and TLI values greater than 0.90 indicate good model fit (Byrne, 2013). To assess validity concerns, the composite reliability, average variance extracted and discriminant validity were computed.

Table 1 Sociodemographic characteristics of the study samples

	Sample 1 (N = 203)	Sample 2 (N = 461)
Gender		
Male	54 (26.6%)	134 (29.1%)
Female	149 (73.4%)	327 (70.9%)
Marital status		
Single/widowed/divorced	187 (92.1%)	421 (91.3%)
Married	16 (7.9%)	40 (8.7%)
Education level		
School education	11 (5.4%)	26 (5.6%)
University education	192 (94.6%)	435 (94.4%)
	Mean \pm SD	Mean \pm SD
Age (in years)	21.63 \pm 3.19	22.25 \pm 2.87
Household crowding index	–	1.08 \pm 0.61

Study 2

Participants

A second sample, composed of 461 young adults aged between 18 to 29 years and independent from the first one, was recruited to evaluate correlates of phubbing. The same sampling technique, inclusion and exclusion criteria followed in study 1, were applied. We used the same methodology used in our previous studies about phubbing/smartphone addiction (Bitar et al., 2021; Sfeir et al., 2021). Table 1 summarizes the sociodemographic characteristics of both samples. In sample 1, the mean age of the responders was 22.25 ± 2.87 years (minimum = 18; maximum = 29; median = 22), with 70.9% females. In sample 2, the mean age of participants was 21.63 ± 3.19 , with 149 (73.4%) females, 187 (92.1%) single and 192 (94.6%) having a university level of education.

General Study Design This study is a cross sectional one, conducted throughout summer vacation (August and September 2020) of the majority of Lebanese, which comes in parallel with the strict restrictions of social gatherings during the COVID-19 pandemic. An anonymous self-administered Google Forms link was shared on WhatsApp to avoid risky face-to-face interviews and to respect the strict restrictions imposed by the Lebanese government.

Minimal Sample Size Calculation The minimal sample size calculated by the G-power software was 395 participants, according to an effect size $f^2 = 2\%$, an alpha error

of 5%, a power of 80%, and considering ten factors to be added in the multivariable analysis (multiple regression).

Translation Method All previously noted scales underwent forward and backward translation. Scales were first translated from English to Arabic by one psychologist, then back to English from Arabic by another psychologist. The principal investigator compared both English versions to discern any discrepancies; all procedures were done according to the international recommendations of forward-back translation (Beaton et al., 2002; Beaton et al., 2000). A pilot study was conducted on 20 persons before the start of the data collection to make sure that all questions were clear and well understood. The answers of those 20 persons were not included in the final database.

Questionnaire and Variables The language of the survey was in Arabic as well, requiring 25–30 min to complete. Section one was the same as in study 1. Section two of the survey contained the **Generic Scale of Phubbing (GSP)** (current Cronbach's $\alpha = 0.929$) as well as other scales as follows: **Smartphone Addiction Scale – Short Version (SAS-SV)**.

Validated in Lebanon (Zeidan et al., 2021), assessing smartphone addiction among adolescents (Kwon et al., 2013) and adults (Luk et al., 2018) and consisting of 10 items such as “Missing planned work due to smartphone use” and “having a hard time concentrating in class, while doing assignments, or while working due to smartphone use” (Luk et al., 2018). The total score was calculated by adding the responses of these 10 items; higher scores indicates more smartphone addiction (current Cronbach's $\alpha = 0.886$). This scale was used to assess the convergent validity of the GSP scale since the Phubbing Model suggested by Chotpitayasunondh and Douglas (2016) demonstrated that the measure of phubbing should be in close relationship with other concepts linked to it such as Internet addiction, smartphone addiction, and fear of missing out (Chotpitayasunondh & Douglas, 2016).

Montgomery Asberg Depression Rating Scale (MADRS)

It's a 10-item semi-structured valid scale among Lebanese population (Hallit et al., 2019). This scale is used to assess the severity of the depressive condition through the following items: apparent sadness; reported sadness; inner tension; reduced sleep; reduced appetite; concentration difficulties; lassitude; inability to feel; pessimistic thoughts; and suicidal thoughts (Montgomery & Åsberg, 1979). Answers are graded from zero to six, with a maximum total score of 60 points. Higher scores means more

severe depressive symptoms (Montgomery & Åsberg, 1979) (current Cronbach's $\alpha = 0.822$).

Lebanese Anxiety Scale (LAS)

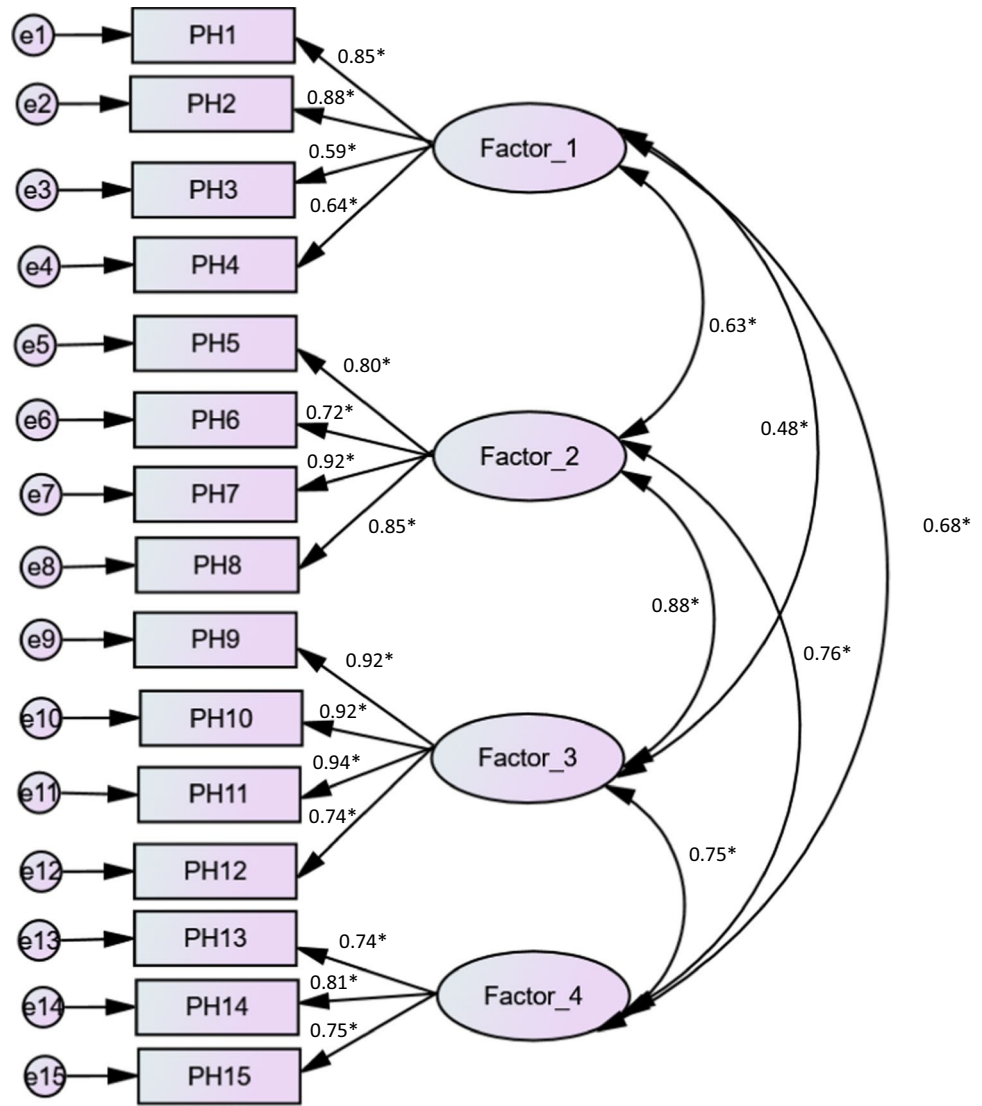
It's a 10-item instrument, with seven questions rated from one to four such as “I have insomnia (Difficulty in falling asleep, broken sleep, unsatisfying sleep and fatigue on waking, dreams, nightmares, night terrors)” and “I have an anxious mood (Worries, anticipation of the worst, fearful anticipation, irritability)” and three questions graded from 0 to 3, such as “I feel inadequate; I feel that difficulties are piling up so that I cannot overcome them and I feel indecisive”. Higher scores indicate more anxiety (Hallit et al., 2020; Merhy et al., 2021) (current Cronbach's $\alpha = 0.886$).

Beirut Distress Scale (BDS)

It's a ten-item validated scale, assessing stress “My mood changes rapidly for tiny matters; I get angry for ridiculous reasons; My ideas are puzzled; etc.” (Malaeb et al., 2021). The responses are rated from 0 = never to 3 = very much. Higher scores reflect higher stress (current Cronbach's $\alpha = 0.877$).

Statistical Analysis Data analysis was done using the 23rd SPSS software version. Weighting to the general population was done according to gender and education level. To carry out reliability analysis, Cronbach's α values of all previously noted scales were calculated. The confirmation of the normality of distribution of the phubbing score was handled via a calculation of the skewness and kurtosis ranging from -2 to $+2$ (accepted range proving normal univariate distribution) (George & Mallery, 2010). These conditions support the assumptions of normality in samples higher than 300 (Mishra et al., 2019). The comparison of 2 and 3 or more means was done using the Student t and ANOVA tests respectively; the correlation of 2 continuous was done using the Pearson correlation test. An effect size of 0.2, 0.5 and 0.8 indicated small, moderate, and large effects, respectively (Cohen, 1988). In terms of correlation, coefficient values of $|0.1-0.23|$, $|0.24-0.36|$, and $> |0.37|$ indicated small, moderate, and large correlations, respectively (Vandekerckhove et al., 2015). A multiple linear regression, was carried out to determine variables correlated with phubbing, using the ENTER method and adjusting for potential confounders. In the linear regression model, included covariates were those that showed with $r > |0.24|$ in the bivariate analysis to achieve more parsimonious models (Vandekerckhove et al., 2015). Adjusted R^2 values were determined for all models to check how much independent variables would

Fig. 1 Standardized factor loadings of four-factor model of the Arabic version of the General Phubbing Scale. Factor 1 = Nomophobia; Factor 2 = Interpersonal conflict; Factor 3 = Self-isolation; Factor 4 = Problem acknowledgment



explain the dependent one. $P < 0.05$ indicates significant results.

Results

Study 1

Confirmatory Factor Analysis

The fit indices values were as follows: $\chi^2/df = 181.74/84 = 2.16$, $TLI = .92$, $CFI = .94$ and

Table 2 Validity of the Generic Scale of Phubbing (GSP)

	Composite reliability	Average variance extracted	Problem acknowledgment	Nomophobia	Interpersonal conflict	Self-isolation
Problem acknowledgment	0.811	0.589	0.767			
Nomophobia	0.835	0.565	0.676	0.752		
Interpersonal conflict	0.895	0.682	0.757	0.634	0.826	
Self-isolation	0.935	0.783	0.750	0.476	0.880	0.885

Table 3 Bivariate analysis of categorical variables associated with the phubbing score (Sample 2)

	Phubbing score Mean ± SD	<i>p</i>	Effect size
Gender		.003	.328
Male	38.21 ± 13.10		
Female	43.32 ± 17.69		
Marital status		.012	.383
Single	42.78 ± 15.79		
Married	35.78 ± 20.41		
Education level		.760	.035
Secondary or less	41.95 ± 16.55		
University	41.35 ± 17.06		

Numbers in bold indicate significant *p*-values

Table 4 Bivariate analysis of continuous variables associated with the phubbing score (Sample 2)

	Pearson correlation coefficient	<i>p</i>
Stress	.56	<.001
Anxiety	.51	<.001
Depression	-.01	.888
Age	.14	.004
Household crowding index	-.29	<.001

Numbers in bold indicate significant *p*-values

RMSEA = .076 [95% CI .061-.091] respectively, indicating an excellent fit of the model. The Cronbach’s α values for the phubbing scale and subscales are: Total scale = .934, Factor 1 = .831, Factor 2 = .896, Factor 3 = .928, Factor 4 = .814 (Factor 1 = Nomophobia; Factor 2 = Interpersonal conflict; Factor 3 = Self-isolation; Factor 4 = Problem acknowledgment).

Table 5 Multivariable analysis: Linear regression (using the ENTER model) taking the Generic Scale of Phubbing as the dependent variable (Sample 2)

Variable	Unstandardized Beta	Standardized Beta	<i>P</i>	95% Confidence Interval	
Gender (females vs males*)	3.91	0.11	0.013	0.83	6.99
Marital status (married vs single*)	-1.81	-0.04	0.413	-6.14	2.52
Stress	0.75	0.27	<0.001	0.38	1.12
Anxiety	0.60	0.30	<0.001	0.32	0.88
Household crowding index	-1.80	-0.15	<0.001	-2.77	-0.82
Age	1.25	0.28	<0.001	0.85	1.64

*Reference group

Adjusted $R^2 = 40\%$, *p* value < 0.001

Numbers in bold indicate significant *p*-values

The standardized factor loadings of the four-factor model of the Arabic version of the Generic Scale of Phubbing are presented in Fig. 1.

Validity Concerns

Composite Reliability Our model has achieved composite reliability since all composite reliability values were higher than 0.7 (Hair et al., 2014; Henseler et al., 2009) (Table 2).

Convergent Validity All AVE values were > 0.5 (Table 2) and all factor loadings were > 0.5 (Fig. 1) (Hair et al., 2014; Henseler et al., 2009), therefore our model achieved convergent validity. In addition, more phubbing was positively correlated with more smartphone addiction ($r = .604$; $p < 0.001$).

Discriminant Validity The square root of the AVE for the interpersonal conflict subscale was less than the absolute value of the correlations with the other factors, but was adequate for the three other subscales (Table 2).

Bivariate Analysis

Bivariate analysis results are summarized in Tables 3 and 4. An increased mean generic scale of phubbing score was noticed in females in comparison to males ($t(459) = -3.02$; $p = .003$) and in single participants as compared to married ones ($t(459) = 2.58$; $p = .012$). Moreover, higher anxiety ($r(459) = .51$; $p < .001$), stress ($r(459) = .56$; $p < .001$) and older age ($r(459) = .14$; $p = .004$) were positively correlated with increased phubbing, whereas increased household crowding index ($r(459) = -.29$; $p < .001$) was significantly correlated with decreased phubbing score.

Multivariable Analysis

The results of the multiple linear regression using the ENTER model, when taking the phubbing score as the

dependent variable, showed that female gender ($\beta = 0.11$; $t(454) = 2.50$; $p = .013$), more stress ($\beta = 0.27$; $t(454) = 3.94$; $p < .001$), more anxiety ($\beta = 0.30$; $t(454) = 4.24$; $p < .001$), and older age ($\beta = 0.28$; $t(454) = 6.12$; $p < .001$) were positively correlated with high phubbing score, or higher household crowding index ($\beta = -0.15$; $t(454) = -3.62$; $p < .001$) was significantly correlated with decreased phubbing score (Table 5).

Discussion

Findings revealed that more anxiety, stress, being female and older age were positively correlated with higher phubbing, and higher household crowding index was associated with less phubbing.

Scale Validation

The Arabic version of the GSP showed the same factors as the original scale, which indicates a strong factorial validity (Chotpitayasunondh & Douglas, 2018). The indices obtained showed that this Arabic version has an adequate model fit according to the CFI and TLI values, but not RMSEA value. Moreover, the Cronbach's α of the GSP total scale was excellent ($=.934$), which indicates that the scale has a high internal consistency. Similar results were found in the original scale with Cronbach's α ranging between .86 and .96 (Chotpitayasunondh & Douglas, 2018). In accordance with the original scale, factor one "Nomophobia" presenting the fear of detachment of phone contained 4 items with a Cronbach's alpha of .831 ($\alpha_{\text{original scale}} = .84$) (Chotpitayasunondh & Douglas, 2018). Similarly, factor two "Interpersonal conflict" presenting perceived conflict between the individual and other people contained 4 items with a Cronbach's alpha of .896 ($\alpha_{\text{original scale}} = .87$) (Chotpitayasunondh & Douglas, 2018). Factor three "self-isolation" similarly to the original scale contained 4 items with Cronbach's alpha = .928 ($\alpha_{\text{original scale}} = .83$). As well as, for factor four "Problem acknowledgment" contained three items with Cronbach's alpha = .814 ($\alpha_{\text{original scale}} = .82$). Correlations between factors were positive and moderate to high in comparison with the original scale and a little better than the coefficients found in the Turkish validation of the GSP (Ergün et al., 2020). Furthermore, the factor loadings of each item on its corresponding factor were better than those of the Turkish version (Ergün et al., 2020). However, the fit indices were superior in the original and Turkish versions compared to the Arabic one. Finally, we have showed that the GSP scale is capable of screening for phubbing equally between males and females in regard to this four-factor structure. However, future studies should target the assessment of more psychometric properties of this scale.

Increased phubbing scores were positively correlated with more smartphone addiction ($r = 0.604$; $p < 0.001$), which reveals good convergent validity of the Arabic version of GSP. A significant association was found between phubbing and smartphone addiction in the original study related to the creation of the GSP scale (Chotpitayasunondh & Douglas, 2018); this correlation is due to many satisfying factors presents in social media such as phubber's rewarding (increased number of followers), encouraging (being accepted and encouraged), entertaining (online video games) (Yam et al., 2020). Accordingly, we can conclude that the Arabic version of the GSP is a valid instrument and a good reliable tool for phubbing screening in Lebanese young adults.

Phubbing and Mental Health

Results of our study demonstrated that more anxiety was correlated with higher phubbing, in alignment with recent researches (Ergün et al., 2020). Recent studies explained that individuals with higher levels of anxiety do more phubbing in order to decrease anxious symptoms and discomfort due to social interactions through their mobile phones (Davey et al., 2018; Guazzini et al., 2019). Caplan explained that people with high social anxiety fear negative evaluation and prefer online communication instead of face-to-face interaction because it enables them to control their appearance and behavior (Caplan, 2007); Therefore, internet addiction predicted smartphone addiction, which in turn predicted phubbing (Davey et al., 2018). Similarly, previous findings reported that social anxiety and stress are less when chatting online and increased in person-to-person conversations (Yen et al., 2012). Moreover, in 2019, Phing et al. explained this association by the psychological dependence toward internet devices, which is able to satisfy people's need of socialization and connection with the world (Phing et al., 2019). Additionally, the increased engagement of people on social media and internet (i.e. spending more time and owning multiple accounts) has been associated with internet addiction (Turel et al., 2018) and various psychiatric comorbidities weakly affecting one's well-being (Duradoni et al., 2020).

Furthermore, increased stress was associated with more phubbing in our study. Accordingly, the main factors of phubbing (communication disturbance and mobile phone obsession) were found significantly associated with negative affect (Guazzini et al., 2021). People became more prone to use their mobile phone in order to deal with these negative emotions and get rid of stress by communicating with others who may have same problems to get support and encouragement (Berry et al., 2017b). Add to this, online communication make users feels comfortable when expressing themselves and their feelings (Berry et al., 2017a).

Sociodemographic Characteristics and Phubbing

The association between gender and phubbing has been found strong in some studies, whereas, in others gender did not affect phubbing scores (Guazzini et al., 2019). In our study, phubbing has been found stronger in females than in males; similar results were found in recent studies (Junco & Cole-Avent, 2008; Karadağ et al., 2015). This association has been explained by female's social media addiction due to their increased need to be accepted, liked and appreciated so they tend to use more their phones to share their daily life activities (Junco & Cole-Avent, 2008; Karadağ et al., 2015). Add to this, women can express their feelings more than men so they have been found using cell phone more than their counterparts (Leena et al., 2005; Sánchez-Martínez & Otero, 2009).

Age has been found as a moderator of phubbing behavior (Augner & Hacker, 2012; Kwon et al., 2013); in our study older age has been found associated with increased phubbing. Contradictory results have been found in a Turkish study where younger adults were found more addicted to smart phones (Augner & Hacker, 2012; Kwon et al., 2013) since their susceptibility to accept new technological devices and applications is higher than older people. This contradiction in our findings can be explained by the fact that older adults are more exposed to stressors such as social/economic problems, marital relationships, raising kids (Streiner et al., 2006) and most importantly the COVID-19 pandemic which affected Lebanese people mental health (El Othman et al., 2021); these factors make older adults more prone to use their smartphones to cope to the stressful events as explained above.

Our findings showed that increased Household Crowding Index (HCI) is associated with less phubbing. To our knowledge, no studies investigated directly the correlation between HCI and phubbing phenomena. Previous studies showed that bad economic level and low incomes has been correlated with increased crowding (Gray et al., 2001). Therefore, our findings can be explained by the recent results showing that low economic status is correlated with less mobile phone use, whereas, high economic level increased mobile phone dependence since it represents a part of rich peoples' lifestyle (Çağan et al., 2014). Furthermore, another study stated that loneliness may affect phubbing behavior (Youssef et al., 2020), so living in a crowded house with all family members may decrease loneliness and consequently decrease phubbing.

Clinical Implications

Correlations found in our study help researchers assess phubbing behavior using a validated/reliable Arabic version of the GSP, and recognize phubbing-related mental

health problems. This study should highlight the importance of raising awareness about excessive phone use in order to reduce it, organize it and to find other healthy way to cope with stressing situations. Add to this, our results can open the gate for further studies that should focus on interventions to improve the socio-economic situation affecting phubbing behavior. Plus, parents should pay attention to any comorbid symptom resulting of excessive phone use (i.e. anxiety, stress) to treat it early and prevent future complications.

Limitations and Strengths

Numerous limitations can be found in our research due to its cross-sectional design. There was no test-retest conducted to a bilingual group for the original and translated scale. The use of self-administered questionnaire to evaluate phubbing can present a possible information bias; some responses may be over- or underestimated by participants. When using the snowball technique, responders tend to share the link to those whom they know and presents same traits; so representativeness of our sample is not guaranteed, therefore, a selection bias can be present in our study. Discriminant validity was not fully shown in this study; further studies are needed to answer this goal. Despite these limitations, our study is the first done among Lebanese young population with a sample from all regions, and highlighted many important findings to evaluate the correlation between phubbing and mental health, using different validated scales (LAS-10, BDS and MADRS) in a sample of Lebanese young adults.

Conclusion

To sum up, the Arabic version of GSP is valid and can be easily used by healthcare professionals in their practical work. Phubbing appears to be positively associated with anxiety, stress, being female and older age. Further research is required worldwide to make sure if these findings apply in Lebanon only, or could be extended to other countries. We propose finding possible correlation between phubbing and others factors (such as obsession and loneliness) and validating this scale in other Arabic-speaking countries.

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Author Contributions ZB drafted the manuscript; SH and SO designed the study; SH carried out the analysis and interpreted the results; PS reviewed the paper; all authors read and approved the final manuscript; PS, SO and SH were the project supervisors.

Data Availability All data generated or analyzed during this study are not publicly available due to restrictions from the ethics committee.

The dataset supporting the conclusions is available upon request to the corresponding author (SH).

Declarations

Ethics Approval and Consent to Participate The Psychiatric Hospital of the Cross Ethics and Research Committee approved the study protocol (HPC-033-2020). The purpose and requirements of the study were explained to each participant prior to participation; submitting the form online was considered equivalent to obtaining a written informed consent from each participant.

Consent for Publication Not applicable.

Competing Interests The authors declare that they have no competing interests.

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