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ORIGINAL ARTICLE

Smartphone Addiction and Its Relationship with Cyberbullying Among University Students

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Abstract

The present study explored smartphone addiction (SA) and cyberbullying among a group of university students. Participants were 449 male and female university students whose ages ranged from 17 to 24 years. A scale probing SA and cyberbullying was used to collect data. The frequency of SA among participants was 33.2. In terms of the daily usage of smartphones, 67.3 participants were found to use smartphones for more than 4 h per day. The frequency of cyberbullying reported by participants was 20.7. Furthermore, significant differences between males and females in SA and cyberbullying were found favoring males. Finally, data revealed that cyberbullying can be predicted by university students' SA.

Keywords Smartphone addiction · Cyberbullying · University students · Gender differences · Technology addiction

Smartphones are the most remarkable and fastest diffusing technology today. They are one of the three survival tools that people carry wherever they go besides money and keys (Emanuel et al. 2015). If not strange, then the today students and smartphones are inseparable. In this respect, Walsh et al. (2008) reported that the age of 77% of smartphone users ranges between 18 and 24 years and that they carry their smartphones everywhere and check that they have their phones every 5 min on average. Olufadi (2015) asserts smartphone dependency arises because smartphones provide instant access to the Internet through which the user can access information, news, programs, and preferred social media networks.

Smartphone and Internet overuse can cause significant problems for users' personal and social lives. Individuals who overuse smartphones exhibit addiction-like symptoms. Similar to an addict, a smartphone user may exhibit depression, trance, withdrawal, inability to control a craving, and anxiety (Chiu et al. 2013). Torrecillas (2007) asserts that smartphone addiction (SA) is a form of behavioral addiction exactly like addiction to electronic games and the

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Internet. SA does not have direct physical effects. However, it has negative psychological effects on students' academic performance and social and familial interactions.

SA has been found to correlate with many variables. Emanuel et al. (2015) have reported that one out of every five students is completely dependent on their smartphones. Half of the participants in their study overused smartphones to escape their problems and to improve their mood. Lee (2015) found that the desire to spend leisure affected self-control adversely, whereas the desire to establish social relations and spend leisure affected smartphone dependency positively. Madewy (2013) argues that university students' usage of smartphones is mostly of a negative nature; they use smartphones for lying, providing incorrect information about their places, and for cyberbullying.

Cyberbullying Definition and Measurement

Researchers have been concerned with cyberbullying, and some see it as a form of traditional bullying in a new context (Stewart et al. 2014). Heiman et al. (2015) defined cyberbullying as an intentional online act via electronic media, to harm, embarrass and/or humiliate another person. Likwise, Olenik-Shemesh et al. (2012) defined cyberbullying as deliberate, aggressive activity carried out through digital means. Similarly, Hinduja and Patchin (2008) defined cyberbullying as "willful and repeated harm inflicted through the medium of electronic text." However, traditional bullying must be repeated; however, for cyberbullying, it is not clear what constitutes has to be repeated. Cyberbullying refers to behaviors such as sending or posting harmful and aggressive texts or pictures via the Internet and social networking sites; it is repeated, and intentional harm is caused to individuals or groups. The bullying person or the troll can be anonymous or known to the victim (Tokunaga 2010). Cyberbullying is characterized by the trolls' ability to conceal their identities; they can use fake names to protect themselves, which makes cyberbullying more attractive and prevalent. Another characteristic is the ease with which content can be sent, Trolls lack sympathy in that they do not discern the effects of their harassing actions on their victims (Hinduja and Patchin 2008). Cyberbullying becomes more impactful because of the troll's ability to trace the victim outside their school or university and reach the victim via the smartphone, e-mail, or messaging programs anytime. Cyberbullying therefore can interfere with the victim's whole life (Akbulut and Eristi 2011; Juvonen and Gross 2008; Willard 2007).

Similar to traditional bullying, cyberbullying can be direct or indirect. Direct cyberbullying refers to incidents in which the victim is involved directly. This type includes privacy violation, which, in turn, includes sending files with viruses intentionally; verbal bullying where smartphone applications are used to threaten and offend people; and non-verbal bullying where obscene pictures are sent as a threat. Indirect cyberbullying refers to a type of bullying where the victim is unaware of the bullying incident, e.g., reading someone's e-mail, deceiving someone by pretending to be another person, and disseminating shaming material via mobile phones, e-mail and chat programs (Vandebosch and Van Cleemput 2009). Cyberbullying can start in elementary school and persist till the university stage. However, it is more frequent in the critical stages of adolescence and adulthood (Tokunaga 2010).

It is very important to initiate a research on cyberbullying with a definition of cyberbullying that operationally clarifies the concept and the way to measure it (Tokunaga 2010). The current research therefore adopted the definition provided by El-Shenawy (2014) who defined cyberbullying as the ability of an individual or group of individuals to use recent information

and communication technology with its various applications to intentionally and repeatedly ham an individual or group of individuals. This definition is in line with some researchers' conceptualizations of cyberbullying (Akbulut and Eristi 2011; Heiman et al. 2015; Hinduja and Patchin 2008; Juvonen and Gross 2008; Tokunaga 2010; Willard 2007).

Measuring a wide range of forms of cyberbullying can lead to a better understanding of patterns and frequency of cyberbullying and the way it is perpetrated (Doane et al. 2013). It is worth mentioning here that the majority of studies on cyberbullying did not investigate the psychometric efficiency of its measures. Many researchers took it for granted that the questionnaires they used measured a number of factors based on the theoretical basis of the concept without exploring this empirically through factor analysis (Berne et al. 2013). Most researchers used measures of cyberbullying developed specifically for the source studies from which they adapted their measures. In such measures, perpetrators and victims of cyberbullying respond to items on a scale consisting of never, rarely, sometimes, and often. In some other studies, participants were asked whether they got involved in cyberbullying behaviors via the Internet or the smartphone (Vandebosch and Van Cleemput 2009). For instance, Hinduja and Patchin (2010) asked their participants whether they did such cyberbullying behaviors as disseminating personal pictures on the Internet without permission, ridiculing others by posting material defaming them on the Internet and disseminating rumors. Ybarra et al. (2007) asked participants if they experienced incidents of cyberbullying throughout the past 6 months as victims (e.g., ridiculing others and disseminating rumors) and perpetrators (e.g., making obscene remarks, disseminating rumors about others, posting aggressive remarks, and forcing someone to talk about sex).

The current researchers used the Cyberbullying Questionnaire developed by El-Shenawy (2014) because it fitted their purpose. Furthermore, it enjoys good validity and reliability as supported by its piloting on a sample of university male and female students in the Arabic environment. The questionnaire is inclusive of cyberbullying behaviors since its items cover SMs and e-mails, instant messaging, chatrooms, and social media. It also includes direct (verbal, non-verbal, social, and privacy) and indirect cyberbullying (impersonation and sending harmful software). Finally, the questionnaire was developed based on relevant previous literature that detailed categories of cyberbullying and developed instruments to measure it (Doane et al. 2013; Stewart et al. 2014). Added to this, researchers of the present study re-established the reliability of the questionnaire and it proved to have good reliability indices. Hence, it could be used to meet the purposes of the current study.

Prevalence of SA and Cyberbullying

Several studies have reported the prevalence of SA in different cultures. The frequency of SA was reported to be 48% (Aljomaa et al. 2016) and 38.4% (Khalil et al. 2016) in Saudi Arabia and 13% (Desouky and Ibrahem 2015) in Egypt. Lopez-Fernandez's (2017) study found a frequency of 12.5% and 21.5% for probable SA among Spaniards and Belgians respectively. Two Indian studies reported the frequency of SA to be 33.3 (Soni et al. 2017) and to fall between 39 and 44% (Davey and Davey 2014). Long et al. (2016) reported that 21.3% of Chinese university students were smartphone addicts. Abo-Jedi (2008) found a SA frequency of 26% among Jordanian students.

Similarly, cyberbullying is becoming prevalent worldwide. A study (Ybarra and Mitchell 2004) conducted on American young people aged between 10 and 17 years found that one of every five Internet users becomes involved in bullying behavior, as reported by 20% of participants. Another American study (Ybarra et al. 2007) found that 43% of participating students were victims of cyberbullying and that 21% of them had been involved in harassing behavior via the Internet. In a study conducted by Hinduja and Patchin (2008), 32% of male participants and 36% of females reported being victims of cyberbullying. Eighteen percent of males and 16% of females admitted harassing others via the Internet. Students (17.5%) participating in a study conducted by Arslan et al. (2012) reported harassing their school mates via the Internet or smartphones using SMSs, messages via chat programs, and e-mail. Data from a study conducted by Floros et al. (2013) revealed that 28% of the participants were victims of cyberbullying and 15% practiced it. Zhou et al. (2013) found that 34.8% of participating Chinese students became involved in cyberbullying behaviors, and 56.9% were victims. The prevalence of cyberbullying among university students ranged between 11 and 28.7% (Hinduja and Patchin 2010). Twenty-two percent of Turkish students admitted practicing cyberbullying at least once (Dilmac 2009). In a another study by Crosslin and Crosslin (2014), 16% of the participants admitted practicing cyberbullying during their university education. Similarly, 19% of university students participating in the study conducted by Zalaquett and Chatters (2014) reported being victims of cyberbullying.

An increase has been noted in the frequency of cyberbullying among adolescents in the Arab world, but no accurate statistics are available excepting a few studies that explored the prevalence of bullying in general. In Saudi Arabia, for example, the frequency of cyberbullying was found to be 29.6% (Al-Harbi 2013) and 31.5% (Al-Qahtani 2008). A study by Fleming and Jacobsen (2009) revealed a prevalence of 39%, 33.6%, 32%, and 21% in Oman, Lebanon, Morocco, and United Arab Emirates respectively. Prevalence in Jordan was reported to be 47% (Al-Bitar et al. 2013). Finally, in a recent study conducted in Lebanon, the frequency of cyberbullying was 53.4% (Khamis 2015).

Differences in SA and Cyberbullying by Gender

Recent studies have documented inconsistency in results concerning gender differences in SA. Some studies conducted by Al-Barashdi et al. (2015) and Usman et al. (2014) did not report differences in SA between males and females. Other studies, however, found differences favoring males. For example, Aljomaa et al. (2016) found that more males are smartphone addicts than females. Bisen and Deshpande (2016) explored SA among students in engineering colleges in India. The overall trend showed that male students are more prone to smartphone addiction than females. Similarly, Bolle (2014) found that SA is more prevalent among Dutch male students than among females. Two other studies conducted in the Korean context (Kwon and Paek 2016) and Italian contexts reported the same results (De Pasquale et al. 2015). In contrast, studies in other Korean universities (Park and Lee 2014a, b) documented higher frequency of SA among females than among males. This same finding was documented in two studies conducted in Taiwan (Chiu et al. 2013) and Germany (Randler et al. 2016).

With regard to gender differences in cyberbullying, research findings are quite consistent concerning the exposure of both genders to cyberbullying. Similarly, research consistently reported significant differences in engaging in cyberbullying favoring males (Akbulut and Eristi 2011; Arslan et al. 2012; Dilmac 2009; EL-Shenawy 2014; Floros et al. 2013; Khamis 2015;Wong et al. 2014; Zhou et al. 2013). Very few studies did not find significant differences

between males and females in committing cyberbullying or being victims of it (Hinduja and Patchin 2010).

With regard to negative effects of SA and cyberbullying on mental health, there appears to be consensus in literature concerning the psychological, cognitive, emotional, and social effects; SA proved to have adverse psychological effects on university students. Strong correlations were found between SA and many of adolescents' abnormal behaviors and psychological disorders (Kim et al. 2017). It adversely affects direct social communication, academic performance, emotional intelligence, and self-regulation. It also causes social exhaustion (Bolle 2014). Anxiety (Hong et al. 2012) and psychological stress (Beranuy et al. 2009) were revealed to correlate positively with smartphone and Internet addiction.

Cyberbullying also has dangerous effects on both trolls and victims. It threatens psychological well-being and academic performance. It has adverse effects on students' self-esteem and leads to anxiety, depression, and psychological alienation. Trolls and victims of cyberbullying become involved in problem behavior (Chad and Brendesha 2015; Fredstrom et al. 2011; Ybarra and Mitchell 2004) and have suicidal ideas (Hinduja and Patchin 2010).

The researchers did not find a study that connected smartphone addiction and cyberbullying. Conversely, there are studies connecting Internet addiction and cyberbullying. Results from these studies revealed a statistically significant positive relationship between Internet overuse and cyberbullying (Athanasiades et al. 2015; Chang et al. 2015; Kırcaburun and Bastug 2016; Nartgün and Cicioğlu 2015).

Overuse of mobile phones is expected to result in adolescents becoming either trolls or victims. There is a need therefore to explore the prevalence of SA and cyberbullying among male and female university students and to detect the relationship between SA and cyberbullying, factors affecting them, ways to eliminate them, and adverse effects. These issues, to the best of the authors' knowledge, have not received significant academic attention. This concurs with Chen and Yan (2016) conclusion after surveying 132 studies conducted between 1999 and 2014 that SA needs to be further researched. They also cited inconsistent findings of research on SA as motivating further research attempts to obtain a fuller understanding of this important issue.

Research Questions

1. How frequent is SA among participants?
2. How frequent is cyberbullying among participants?
3. Are there statistically significant gender differences in SA and cyberbullying?
4. Can cyberbullying be predicted by SA?

Method

Participants

Study participants were 449 smartphone users (males = 227 and females = 222), Saudi university students selected from various educational stages and colleges. Their ages ranged between 17 and 28 years ($M = 20.93$, SD = 2.96). The majority of participants were from the Saudi Arabia Students (85.3%), followed by those from other Arabian countries (7.2%), other Asian countries (Pakistan, India, Bangladesh, Nepal, China, Philippine, Tajikistan, Afghanistan,

Indonesia) (4.1%), other African countries (Senegal, Mali, Eretria, Cote d'Ivoire, Togo, South Africa, Nigeria, Ghana, Benin, Chad) (2.3%), and other countries (Turkey, Australia, Sweden, Spain, Serbia, Estonia, Albania, and the USA) (1.1%).

The researchers used convenience sampling by administering the instruments to students from groups they taught and also by getting colleagues to administer them to students they taught.

Table 1 below presents the descriptive data of participants according to study variables.

Instruments

Smartphone Addiction Scale

The Smartphone Addiction Scale developed by Aljomaa et al. (2016) was used in the present study. It consists of 80 items distributed under five dimensions: overuse of smartphones (11 items), the technological dimensions (13 items), the psychological-social dimension (25 items), preoccupation with smartphones (17 items), and the health dimension (14 items). The internal consistency of the scale was established in the original study by computing correlation coefficients between scale items and the dimensions they belong to. These ranged from 0.88 to 0.96. Furthermore, correlation coefficients between scale items and the whole scale were also computed. These coefficients ranged from 0.32 to 0.91. Correlation coefficients among scale dimensions ranged from 0.54 to 0.91. All items were statistically significant. Scale reliability was established by the test-retest method. The scale was administered to a pilot sample ($N = 60$) twice with an interval of 2 weeks. Pearson correlation coefficients for scale dimensions ranged from 0.89 to 0.92, and correlation coefficient for the whole scale was 0.95. The internal consistency of the scale was also established using Cronbach's alpha. These statistics yielded correlation coefficients ranging from 0.84 to 0.94 for scale dimensions and 0.97 for the whole scale. In the present study, scale reliability was established using Cronbach's alpha. This yielded reliability coefficients of 0.833, 0.954, 0.953, and 0.970 for the Jordanian, Sudanese, Yemeni, and Saudi samples respectively. The overall reliability coefficient was 0.961.

Items were scored on a 5-point Likert scale ranging from 5 "always true of me" to 1 "never true of me." Thus, the maximum score was 400 and the minimum 80. The respondents who scored 70% and above (280 out of 400) were considered a smartphone addict, and this cutoff point was determined after consulting some specialists in measurement and evaluation.

Cyberbullying Scale

The Cyberbullying Scale developed by El-Shenawy (2014) to probe cyberbullying among university students was used in the study. This scale was developed based on authoritative

Table 1 Basic information of participants according to study variables

Variable	Levels	Frequency	Percent
Gender	Males	227	50.6
	Females	222	49.4
Daily usage of smartphones	Less than 2 h	32	7.1
	2–4 h	115	25.6
	More than 4 h	302	67.3

scales in relevant literature (Doane et al. 2013; Stewart et al. 2014). Exploratory factor analysis revealed scale items loaded on four factors for the sample consisting of university students, namely defaming and sexual harassment (12 items), exclusion (3 items), ridicule and threatening (7 items), and privacy violation (4 items). The scale has a total of 26 items scored on a 5-point Likert scale ranging from 5 "Always" to 1 "Never." Respondents are required to select the alternatives that include their behaviors in the past 6 months. The scale has good internal consistency. Alpha coefficients for scale dimensions ranged from 0.74 to 0.93.

In the present study, the reliability of the scale was established by computing its internal consistency. Alpha coefficients for scale dimensions ranged from 0.75 to 0.94. The whole scale yielded an alpha coefficient of 0.97. All these values indicate good validity and reliability indices, hence proving its usability in the present study. Consulting specialists in measurement and evaluation and in accordance with El-Shenawy (2014), the researchers set 70% (91 (out of 130)) and above as the cutoff point at which the respondent is considered a perpetrator.

Procedures

The research team administered the scales to participants from some Saudi universities during the second semester of the academic year 2016–2017. The researchers explained the study aim to participants and the method to complete the scales. Scale completion took approximately 30 min. After collecting completed scales, the researchers scored them and codified scores for statistical treatment.

Data Analysis

Data were codified and treated statistically using the IBM SPSS 24 program. To answer the research questions, frequency, percentage, *t* test for independent samples, and multiple step-wise regression were used.

Results

Prevalence of SA and Cyberbullying

Table 2 reveals that 33.2% participants were classified as smartphone addicts. Data also reveal that the highest percentage of participants (302 out of 449, i.e., 67%) use their mobile phones for more than 4 h per day (Fig. 1). The frequency of cyberbullying among participants was computed based on the average 3.5 (out of 5) with a percentage of 70% and above. Students who reached this percentage or above were classified as perpetrators. Ninety-three participants scored an average of 3.5on the cyberbullying scale (out of 449; i.e., 20.7 %) (Fig. 2).

Gender Differences in SA and Cyberbullying

Table 3 reveals statistically significant differences on the total score of SA ($p = .05, .01$) between males ($m = 264.56$) and females ($m = 254.11$) favoring males. Similarly, there were

Table 2 Frequency of SA and daily usage of smartphones among participants

Levels	Total number	Classification based on frequency	Percent
Lower than average (3.5) with a percentage less than 70%	300	Non-addicts	66.8
Higher than average (3.5) with a percentage more than 70%	149	Addicts	33.2
Daily usage of smartphones	Less than 2 h	32	7.1
	2–4 h	115	25.6
	More than 4 h	302	67.3

statistically significant gender differences on the total cyberbullying scale and all its dimensions favoring males.

Predicting Cyberbullying Be by SA

Table 4 clarifies that cyberbullying among university students can be predicted by four dimensions of SA: the psychological-social dimension, time and overuse, the technological dimension, and preoccupation with smartphones. The health dimension did not contribute significantly in predicting cyberbullying. The prediction equation can be stated as follows:

Cyberbullying = 10.694 + 0.41 (the psychological–social dimension) + 0.442 (time and overuse) + 0.891 (the technological dimension) + 0.448 (preoccupation with smartphones).

Discussion

Prevalence of SA

The study results revealed that 33.2% of Saudi university students are smartphone addicts. In general, this percentage is similar to the percentages in some regional and international studies.

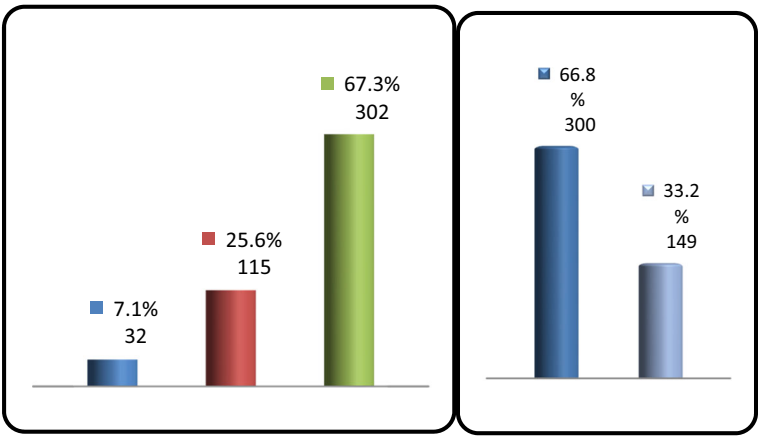

Fig. 1 Frequencies of SA and daily usage of smartphones among participants

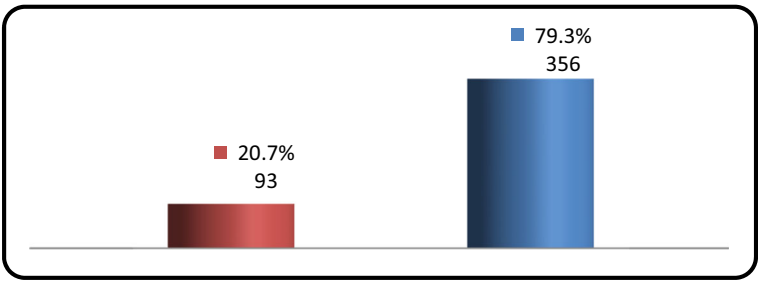

Fig. 2 Frequency of cyberbullying among participants

The highest percentage of participants (67.3%) reported using smartphones for more than 4 h per day. This percentage of SA is slightly lower than the percentage reported in other studies (e.g., Abo-Jedi 2008; Aljomaa et al. 2016; Khalil et al. 2016; Soni et al. 2017). However, it is slightly higher than other studies reported by (Alosaimi et al. 2016; Long et al. 2016; Lopez-Fernandez 2017; Torrecillas 2007).

Prevalence of Cyberbullying

The frequency of cyberbullying among Saudi university students reported in the present study was 20.7%. This is close to international percentages. This percentage of SA is slightly lower than the percentage reported by (Crosslin and Crosslin 2014; Walker et al. 2011; Zalaquett and Chatters 2014); however, *t* is slightly higher than other studies reported by (Al-Bitar et al. 2013; Al-Qahtani 2008; Al-Harbi 2013; Dilmac 2009; Hinduja and Patchin 2010; Khamis 2015). It is worth noting that the differences in cyberbullying in some Arab countries can arise from cultural differences, the ability to use information technology and communication media, different measurement tools, number of participants, focus on preuniversity students (even though cyberbullying is also prevalent among university students), and examination of traditional bullying rather than cyberbullying in some studies.

Table 3 *T* test values for gender difference in SA and cyberbullying

Dimension	Gender	Number	*M*	SD	*t* value	Sig.
Smartphone addiction	Males	227	264.595	51.64	2.201	.028*
	Females	222	254.113	49.19		
Defaming and sexual harassment	Males	227	41.54	20.04	2.971	.003**
	Females	222	35.94	19.876		
Exclusion	Males	227	10.865	4.39	2.579	.01**
	Females	222	9.81	4.30		
Ridicule and threatening	Males	227	13.88	8.28	2.482	.013*
	Females	222	12.09	6.98		
Privacy violation	Males	227	1.63	5.60	3.111	.002*
	Females	222	8.08	4.88		
Total cyberbullying	Males	227	79.98	27.03	2.749	.006**
	Females	222	73.42	23.38		

Table 4 Predicting cyberbullying by SA

Predictors	Constant	R	R^2	Change in R^2	Beta	B	F	Sig
Psychological–social dimension	10.69	.84	.70	.70	0.376	0.410	263.04	.001*
Time and overuse					.181	.442		.001*
The technological dimension					.84	.98		.001*
Preoccupation with smartphones					.43	.45		.001*

Gender Differences in SA and Cyberbullying

The present study found gender differences in SA favoring males. This finding concurs with several studies (e.g., Aljomaa et al. 2016; Bisen and Deshpande 2016; Bolle 2014; De Pasquale et al. 2015; Kwon and Paek 2016; Athanasiades et al. 2016). It nevertheless is in contrast with other studies that found differences in favor of females (e.g., Abo-Jedi 2008; Choi et al. 2015; Chiu et al. 2013; Park and Lee 2014a, 2014b; Randler et al. 2016; Beranuy et al. 2009; Perry 2015). While Scholtz et al. (2015) and Faucher et al. (2014) suggest that female populations can experience more of this bullying than opposite gender.

However, regarding gender differences in cyberbullying, the present study revealed that males indulge more in cyberbullying than females. Previous studies have arrived at the same finding (Arslan et al. 2012; Dilmac 2009; EL-Shenawy 2014; Floros et al. 2013; Khamis 2015; Wong et al. 2014; Zhou et al. 2013). However, it contradicts the results of other studies that found no gender differences in cyberbullying (Alasdair and Philips 2011; Hinduja and Patchin 2010; Campbell 2005; GSMA 2011).

Predicting Cyberbullying Be by SA

Our finding is consistent with the concept of SA that refers to prolonged usage of smartphones, preoccupation with smartphones, and inability to control their usage. Results are also consistent with the concept of cyberbullying that refers to behaviors such as sending or posting harmful and aggressive texts or pictures via the Internet and social networking sites. It is repeated, and intentional harm is caused to individuals or groups. The perpetrating person can be anonymous or known to the victim (Akbulut and Eristi 2011; Hinduja and Patchin 2008; Juvonen and Gross 2008; Tokunaga 2010; Willard 2007). In brief, our finding is in line with most studies that explored cyberbullying and its adverse psychological, educational, and social effects on trolls and smartphone and Internet addicts (Chad and Brendesha 2015; El-Shenawy 2014; Hinduja and Patchin 2010; Fredstrom et al. 2011; Madewy 2013; Ybarra and Mitchell 2004).

This finding supports the result reported by Nartgün and Cicioğlu (2015). This result indicates that controlling and preventing students' problematic use of the Internet may significantly reduce their cyberbullying behaviors and is supported by Arslan et al.'s (2012) conclusion that the individual who suffers from cyberbullying may involve in it as a perpetrator and as a protective mechanism in the future. An individual's previous experience as a victim of cyberbullying may inculcate aggression in him/her. Such individuals can get involved in various forms of cyberbullying via the smartphone, e.g., sending harmful software to others and stealing others' accounts (Walrave and Heirman 2011). This finding is also partially supported by the results of previous studies that reported a statistically significant positive relationship between Internet addiction and cyberbullying (Athanasiades et al. 2015; Chang et al. 2015; Kırcaburun and Bastug 2016; Nartgün and Cicioğlu 2015). This finding agreed with the result of Cicioğlu (2014),

Türkoğlu (2013), and Navarro et al. (2013) which indicate that as the time spent online increases, probability of demonstrating cyberbullying attitude increases as well. Also, this finding coincides with Bumpas (2015) which indicates that cyberbullying can also be seen as a new form of abuse and crime which happens due to access to Internet as an application of smartphone.

Implications and Limitations

The current study aimed to explore the relationship between smartphone addiction and cyberbullying among university students in the Saudi environment. Though a relationship between the two variables was found, the study had a number of delimitations that should be considered when interpreting results. First, the study was conducted on a convenient sample of King Saud University undergraduate and graduate male and female students from various colleges in Riyadh—the capital city that is the largest and most populated. King Saud University is also the oldest university in the kingdom and the largest in terms of the number of students. Students from all over the kingdom are annually admitted to King Saud University being the most preferred among all Saudi universities. These facts make it possible to generalize results to other universities in the kingdom and Arabic environments taking into account similarity of culture, social aspects, and language. Furthermore, the use of a convenient sample to explore a relationship can be suitable in studies similar to the current one; this type of sampling was used for ease of recruiting participants and securing their consent to participate in the study. This type of sampling also makes it possible to collect data in a short time since participants are available to researchers within their work places. With this type of sampling, researchers need not to worry about the issue of representation. Convenience sampling is suitable to the application of questionnaires and useful for investigating the relationships among phenomena in given populations (Saunders et al. 2012; Given 2008).

Though this study was conducted on a limited sample, which limits the generalizability of results to populations and age groups in different cultural contexts, it can be an important initial attempt. It can stimulate further research attempts in other cultures and environments. In this respect, it is important to keep in mind that causes of cyberbullying in most cultures are similar. Everywhere in the world smartphones are available, and their problematic usage can lead students to get involved in the cyberbullying behavior (Hinduja and Patchin 2011). However, cautious generalization of this study' results is recommended. This also refers to the significance of replicating this study to other populations and cultures (Cole et al. 2006; Muñiz et al. 2013).

Second, the study was conducted on university students between 17 and 28 years of age. This limits the generalizability of results to other age groups, taking into account that studies conducted on cyberbullying among university students are few (Berne et al. 2013; Crosslin and Crosslin 2014; Doane et al. 2013). This results in inadequate information about cyberbullying in adults (Berne et al. 2013). Researchers are therefore required to conduct further studies in this area, so comparisons among studies conducted in various countries can be held.

Third, although the instruments used in the study had good validity and reliability indices, the use of self-report measures in assessing cyberbullying and smartphone addiction may have affected results. Such measures are known to be affected by social desirability that makes participants respond to items in a way that give a positive picture of themselves (Jiménez et al. 2009). In addition to that, this raises questions about the reliability and validity of the data collected. However, these issues affect all types of self-report research (Andrews et al. 2015). Moreover, absence of an agreed upon definition of cyberbullying impedes the construction of measures of concepts that have good psychometric efficiency (Tokunaga 2010). This results in

researchers' using different measures, which limits the generalizability of results (Berne et al. 2013). This study was also limited to perpetuating cyberbullying. That is, the other side of cyberbullying (i.e., victims) was not included. This needs to be addressed in further research.

Fourth, cyberbullying is a relatively new phenomenon and many students may not have a good grasp of the concept. They therefore may not understand questionnaire items well to respond to them accurately. This entails that university staff members introduce the concept of cyberbullying and its forms and ways of protection against it to students. We acknowledge some other limitations of the study, such as the difficulty of establishing causal relationships with the methodology employed, or the analysis of a sample limited to certain ages and geographical areas, which means that any generalization of the results of this study to different samples must be done with precaution in spite of the sample contain many nationalities and cultures. It is recommended that future research use varied quantitative and qualitative measures with larger samples and different age groups.

Fifth, another limitation to a thorough analysis of the results of this study that had to be overcome is that bullying is an extremely emotional and unstable issue for young people, whether they are currently going through the trauma of being bullied or are still trying to recover from bullying in their pasts.

Gender differences in SA need to be further researched, as research results concerning them are inconsistent. Another area for future research is the relationship between cyberbullying and variables such as moral and emotional intelligence, psychological alienation, anxiety, and depression.

Since this study revealed the predictability of cyberbullying by SA, therefore further research is needed to document the influential factors, negative effects, and counseling and preventive programs that can decrease cyberbullying.

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Compliance with Ethical Standards

Informed Consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for being included in the study.

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