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ORIGINAL ARTICLE

WHAT PREDICTS LATE-NIGHT WHATSAPPING HABITS - USAGE CHARACTERISTICS OR PSYCHO-BEHAVIORAL ATTRIBUTES? A HEALTH WORKERS SURVEY

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Abstract

Objectives: **With the explosion in the use of WhatsApp Messenger globally, the prevalence of late-night WhatsApping is poised to show a commensurate increase. This has sparked debates on a possible new wave of technological addiction that could cause serious psycho-behavioral repercussions. Acknowledging the ubiquity of WhatsApp, healthcare professionals have adopted it as a preferred communication tool in clinical practice. This preliminary cross-sectional study aimed to explore the prevalence of and psycho-behavioral factors associated with late-night WhatsApping.** ***Methods:*** **It was conducted on a universal sample of 307 healthcare professionals across medical and casualty departments in a Malaysian public hospital. The self-administered questionnaire consisted of items on socio-demographics, WhatsApp usage characteristics, and psycho-behavioral attributes.** ***Results:*** **Majority of respondents (72.9%) reported late-night WhatsApping habits. In multivariate analyses, late-night WhatsApping was significantly higher among those who used WhatsApp for more than 12 months (Adjusted odds ratio, AOR = 4.4, 95% Confidence interval, CI 2.2–8.8, p < 0.001), those who frequently kept mobile data on to avoid missing WhatsApp messages (AOR = 3.2, 95% CI 1.3–5.8, p = 0.006), those with frequent social connections (AOR = 3.0, 95% CI 1.4–6.4, p = 0.003), and those living alone (AOR = 2.3, 95% CI 1.1–5.2, p = 0.038).** ***Conclusion:*** **Late-night WhatsApping was significantly associated with usage characteristics and psycho-behavioral attributes.** ***ASEAN Journal of Psychiatry, Vol. 18 (2): July – December 2017: XX XX.***

Keywords: Mobile Technology, Habits, Psychology, Behavior, Addiction, Healthcare

Introduction

The exponential rise of smart phone utilization has sparked debates on behavior-oriented technological addiction, which is projected to reach epidemic proportions across different strata of populations [1]. Mounting evidence suggests that the predilection for smart phones is caused by the excessive usage of WhatsApp [2]. This novel technological addiction habit is poised to cause unprecedented psycho-behavioral repercussions such as low self-esteem, difficult social relationships, loneliness, and insomnia [2,3]. The relatively limited literature on this topic has motivated researchers to explore the WhatsApp addiction phenomenon, a novel subset of technology-driven addiction, to gain a deeper understanding of its associated factors and how to control it.

Malaysian WhatsApp users constituted about 2.3% of over 900 million monthly active WhatsApp users worldwide as of October 2015 [4]. This corresponds to a WhatsApp penetration rate of over 75% among mobile Internet users in Malaysia—the second highest penetration rate after South Africa [4]. Although data on the prevalence rate of late-night WhatsApping remains scarce in Malaysia, available evidence from digital monitoring by a consulting company showed that as of September 2014, about 35% of Malaysian Internet users use their mobile phones in bed before they sleep, while a similar proportion reached for their mobile phones before they get out of bed [5].

Modern medical practice demands the extensive mobility of healthcare providers for effective diagnostics and communication during patient management. The ubiquity of WhatsApp is perceived to be valuable in clinical settings [6]. Healthcare professionals could interact fast and efficiently for effective patient management during clinical practice [6]. However, despite the perceived benefits of WhatsApp, it can also have adverse effects. Limited evidence has shown that WhatsApp overuse during nighttime has a greater negative impact than overuse during the daytime [7-9]. Inadequate sleep due to late-night WhatsApping may lead to poor concentration, stress, and low productivity. These undesired effects are a major concern among healthcare staff, as the sensitive nature of their jobs requires maximum concentration and alertness to make the best clinical judgments in daily practice.

The preference and use of WhatsApp for instant messaging and social connection purposes among Malaysians has been on the rise [5]. With increased WhatsApp penetration and use among Malaysians, one could hypothesize that the prevalence of late-night WhatsApping will show a commensurate increase, although variability by socio-demographic and other psycho-social attributes can be expected. The domestication theory, which introduced the notion that "we adopt and adapt technologies, and we shape and are shaped by them," determines the complexity of how technological innovations fit into the structures and routines of individuals' daily lives; it also explores their associations within the social environment [10]. The 24/7 nature of healthcare jobs disrupts work-life balance, but equilibrium could be achieved with WhatsApp's real-time text-messaging functionality. Healthcare workers can communicate through WhatsApp for work purposes and at the same time be connected with their friends and family. However, owing to the wide reach and continuous use of WhatsApp, untoward psycho-behavioral effects such as distraction, lack of focus, cravings, nomophobia, i.e. fear of being without mobile phone communications, and a high prevalence of phantom vibration syndrome, particularly among medical staff [11], are strong indicators of its negative impact [12]. Thus, this study aims to determine the prevalence of and factors associated with late-night WhatsApping among healthcare staff in Malaysia.

Methods

Study setting and population

Between September 2015 and February 2016, we conducted a cross-sectional study among 307 healthcare staff members across medical and casualty departments at Tengku Ampuan Rahimah Hospital in Klang, the second busiest public health facility in Malaysia [13].

As this study was novel (hypotheses generating), we adopted a universal sampling technique and recruited all medical (internal and emergency medicine physicians, medical officers, and medical residents) and allied healthcare (nurses and medical assistants) staff for our study sample. We invited respondents to participate in a closed-ended survey during the hospital's Departmental Continuing Medical Education sessions. The respondents' anonymity and confidentiality were ensured. Written consent was obtained from those who agreed to participate in the study.

Ethics statement

This study complied with the guidelines established in the Declaration of Helsinki. The research protocol was approved by the Medical Research Ethics Committee of the Ministry of Health Malaysia (government approval number: NMRR-15-893-26047).

Study instrument

We employed universal sampling technique to recruit all medical (internal and emergency medicine physicians, medical officers, and medical residents) and allied healthcare (nurses and medical assistants) professionals within medical and casualty departments of the hospital between September 2015 and February 2016. Self-administered questionnaire that contained items on socio-demographics (five items), WhatsApp usage characteristics (two items), and psycho-behavioral attributes (four items) was used. Socio-demographics included gender, age, marital status, living circumstances, and profession. Two items assessed WhatsApp usage characteristics: (1) the duration of WhatsApp use and (2) a 4-point Likert-scale item that measured the frequency of WhatsApp use for social connections, ranging from 1 (rarely) to 4 (often). During the analysis, we dichotomized the Likert-scale item into two categories, "frequently" and "less frequently," to facilitate the interpretation.

The domestication theory, which incorporates the social relationships surrounding the complexity of information technology usage into the structure and routine of individual daily lives [10], provided the framework for this study to determine associations between novel psycho-behavioral attributes and late-night WhatsApping habits. Two validated items assessed psychological attributes. First, perceived nomophobia, which is the perception of fear of being unable to communicate through mobile phone was assessed in terms of severity using a 4-point Likert-scale, ranging from 1 (mild) to 4 (very severe) [14,15]. This item was dichotomized into two categories, "less severe" and "severe," to facilitate interpretation. Another psychological attribute measured was phantom vibration syndrome, which is an intermittent perception that the mobile phone is vibrating even though it is not [11]. This item was assessed on a 4-point Likert scale ranging from 1 (rarely) to 4 (often). In the analysis, these items were dichotomized into two categories, "frequently" and "less frequently," to facilitate interpretation.

Items that assessed behavioral factors were adapted and modified from previous measures [16]; the questions included (1) "How frequently do you crave to WhatsApp someone?" and (2) "How frequently do you keep mobile data on to avoid missing any WhatsApp messages?" These items were rated on a 4-point Likert scale ranging from 1 (rarely) to 4 (often). In the analysis, the items were dichotomized into two categories, "frequently" and "less frequently," to facilitate interpretation. Owing to the around-the-clock work of healthcare staff, the primary outcome measure "late-night WhatsApping" was adapted and modified based on the concept of "late-night text messaging," which includes midnight and after-midnight text activities (collectively termed "chronic nighttime exposure") [3,17]. Late-night WhatsAppping was assessed using the question "Do you WhatsApp even after midnight?" with the response items "Yes" or "No."

Statistical analyses

Analysis was performed using SPSS version 18.0 (SPSS Inc., Chicago IL, USA). A normality check showed that all quantitative data were normally distributed. Descriptive statistics were calculated for all independent variables. Chi-square tests were used to

determine the associations between late-night WhatsApping and the categorical variables in this study. Multiple logistic regression analysis using the backward Wald technique was performed to eliminate confounders and to determine the most significant factors associated with the primary outcome measure. All significant variables in the univariate analysis were included in the multivariate analysis. Multicollinearity between independent variables was checked for standard errors not exceeding five [18]. The accepted level of significance in this study was set below 5% ($p < 0.05$).

Results

Sample characteristics and WhatsApp usage

The sample consisted mostly of females (80.5%). The average age was 28.0 (± 5.8) years, and the age ranged from 19 to 56 years. The bulk of the respondents were allied health staff members (70.0%) and living with their families (74.3%). Nearly half of the total respondents used WhatsApp for more than 12 months (48.9%); the majority of them used WhatsApp for social connections (83.4%). A total of 248 (72.9%) respondents reported late-night WhatsApping habits.

Association between socio-demographics and late-night WhatsApping

Table 1 exhibits the association between socio-demographics and late-night WhatsApping among healthcare staff. Late-night WhatsApping was significantly higher among singles compared with married respondents (OR = 2.2, 95% CI 1.2–3.9, p = 0.008). Respondents living alone had significantly been higher late-night WhatsApping habits than those living with their families (OR = 2.2, 95% CI 1.0–4.7, p = 0.041). Respondents using WhatsApp for more than 12 months had significantly been higher late-night WhatsApping habits than those who had been using it for 12 months or less (OR = 4.4, 95% CI 2.2–8.5, $p < 0.001$). Respondents engaged in frequent social connections had significantly been higher late-night WhatsApping habits than those with fewer frequent social connections (OR = 2.5, 95% CI 1.3–5.0, p = 0.005).

Table 1. Association between socio-demographics and late-night WhatsApping among healthcare staff (n = 307)

Characteristics	Late-Night WhatsApping		OR (95% CI)	p-value
	Yes, N (%)	No, N (%)		
Gender				
Male	50 (83.3)	10 (16.7)	1.2 (0.6-2.6)	0.576
Female	198 (80.2)	49 (19.8)		
Age (years)				
≤ 30	198 (81.1)	46 (18.9)	1.1 (0.6-2.2)	0.749
> 30	50 (79.4)	13 (20.6)		
Marital status				
Single	144 (86.2)	23 (13.8)	2.2 (1.2-3.9)	0.008
Married	104 (74.3)	36 (25.7)		
Living circumstances				
Alone	70 (88.6)	9 (11.4)	2.2 (1.1-4.7)	0.041
Family	178 (78.1)	50 (21.9)		
Profession				
Medical staff	78 (84.8)	14 (15.2)	1.5 (0.8-2.8)	0.245
Allied health staff	170 (79.1)	45 (20.9)		

WhatsApp use (months)				
> 12	137 (91.3)	13 (8.7)	4.4 (2.2-8.5)	< 0.001
≤ 12	111 (70.7)	46 (29.3)		
Social connection				
Frequently	214 (83.6)	42 (16.4)	2.5 (1.3-5.0)	0.005
Less frequently	34 (66.7)	17 (33.3)		

(OR = Odds ratio; 95% CI = Confidence Interval)

Association between psycho-behavioral factors and late-night WhatsApping

Table 2 shows the association between psycho-behavioral factors and late-night WhatsApping. Late-night WhatsApping was significantly higher among healthcare staff with severe perceived nomophobia (OR = 2.2, 95% CI 1.0–4.9, p = 0.046), those with frequent experiences of phantom vibrations (OR = 3.9, 95% CI 1.2–13.1, p = 0.018), those with frequent cravings to WhatsApp someone (OR = 7.7, 95% CI 1.0–57.5, p = 0.020), and those who frequently kept their mobile data on to avoid missing WhatsApp messages (OR = 2.8, 95% CI 1.3–5.8, p = 0.004).

Table 2. Association between psycho-behavioral factors and late-night WhatsApping among healthcare staff (n = 307)

Characteristics	Late-Night WhatsApping		OR (95% CI)	p-value
	Yes, N (%)	No, N (%)		
Perceived nomophobia				
Severe	64 (88.9)	8 (11.1)	2.2 (0.9-4.9)	0.046
Less severe	184 (78.3)	51 (21.7)		
Phantom vibration syndrome				
Frequently	43 (93.5)	3 (6.5)	3.9 (1.2-13.1)	0.018
Less frequently	205 (78.5)	56 (21.5)		
Crave to WhatsApp someone				
Frequently	29 (96.7)	1 (3.3)	7.7 (1.1-57.5)	0.020
Less frequently	219 (79.1)	58 (20.9)		
Keep mobile data on to avoid missing WhatsApp messages				
Frequently	90 (90.0)	10 (10.0)	2.8 (1.3-5.8)	0.004
Less frequently	158 (76.3)	49 (23.7)		

(OR = Odds ratio; 95% CI = Confidence Interval)

Predictors of late-night WhatsApping among healthcare staff in multiple logistic regression analyses

Multiple logistic regression analyses yielded four factors significantly associated with late-night WhatsApping. WhatsApp usage for more than 12 months was the most significant factor associated with late-night WhatsApping (Adjusted Odds Ratio, AOR = 4.4, 95% CI 2.2–8.8, p < 0.001), followed by frequently keeping mobile data on to avoid missing WhatsApp messages (AOR = 3.2, 95% CI 1.3–5.8, p = 0.006), frequent social connections (AOR = 3.0, 95% CI 1.4–6.4, p = 0.003), and living alone (AOR = 2.3, 95% CI

1.1–5.2, p = 0.038). The total model was significant (p < 0.001) and accounted for 25% of the variance in late-night WhatsApping (Table 3).

Table 3. Multiple logistic regression (backward Wald) results for factors associated with late-night WhatsApping among healthcare staff (n = 307)

Predictors	B	SE	Wald	Exp (B)	95% CI	p-value
Living circumstances						
Alone	0.8	0.4	4.3	2.3	1.1–5.2	0.038
Family	Ref	Ref	Ref	Ref	Ref	Ref
Whatsapp usage (months)						
> 12	1.5	0.4	18.2	4.4	2.2–8.8	< 0.001
≤ 12	Ref	Ref	Ref	Ref	Ref	Ref
Social connection						
Frequently	1.1	0.4	8.6	3.0	1.4–6.4	0.003
Less frequently	Ref	Ref	Ref	Ref	Ref	Ref
Keep mobile data on to avoid missing WhatsApp messages						
Frequently	1.1	0.4	7.6	3.2	1.3–5.8	0.006
Less frequently	Ref	Ref	Ref	Ref	Ref	Ref

Variables entered: All significant variables in bivariate analyses. Exp (B) gives the adjusted odds ratio (AOR); SE = Standard error; OR = Odds ratio; 95% CI = 95% Confidence Interval)

Discussion

To the best of our knowledge, this is the first study to explore and report the prevalence of late-night WhatsApping among Malaysians. Beyond the use of WhatsApp for official communication among healthcare staff in Malaysia, this study observed the specific use of WhatsApp for social connections late at night, exploring the psycho-behavioral impact of long-term usage.

We found that a longer duration of WhatsApp usage was highly predictive of late-night WhatsApping; those who had used WhatsApp for over 12 months were 4 times more likely to engage in late-night WhatsApping than those who had used WhatsApp for 12 months or less. While this is not an unexpected finding, it is perhaps more important that this association is explained in light of psycho-adaptation, which underlies the obsessive-compulsive behavior of late-night WhatsApping due to long-term usage [10]. Over time, long-term WhatsApp users find coping mechanisms and a self-perceived balance in mitigating the effects of WhatsApp overuse, which consequently predisposes them to late-night WhatsApping at the expense of adequate sleep or rest. With prolonged usage comes the tendency to find a way to incorporate late-night WhatsApping into the routine of an individual's daily life. Unearthing the specific pathways in which these coping mechanisms or adaptive behaviors predispose an individual to late-night WhatsApping, although beyond the scope of our study, will be beneficial for targeted preventive and behavior modification purposes.

Our findings also showed a significant association between late-night WhatsApping and frequency of usage for social connection purposes. Respondents who frequently used WhatsApp for social connection were significantly more likely to engage in

late-night WhatsApping. Most mobile phone users demonstrate the often compulsive behavior of checking news updates and social media messages first thing in the morning and late at night [19]. This behavior is even more compelling among employed individuals whose job tasks, and schedule may restrict their access to WhatsApp during working hours. Thus, they feel the need to catch up with their social connections late into the night. While this explanation may be the most plausible for the observed relationship between late-night WhatsApp-ing and frequency of usage for social connections among health-care staff in this study, the fact that profession type (medical staff vs. allied health staff) did not show any independent association with late-night WhatsApping also underscores the general desire for social connection (in this case, through WhatsApp) across professions [20]. Even among medical students, a study conducted in India showed that over 94% possessed at least one smart phone, which they used mainly for social networking and predominantly at night [21]. A similar finding was also reported among health science students in Swaziland [22].

The compulsive behavior of frequently keeping mobile data on to avoid missing WhatsApp messages was also predictive of late-night WhatsApping among our study sample. We found that respondents who frequently felt the need to keep their mobile data on to avoid missing WhatsApp messages were thrice more likely to engage in late-night WhatsApping than those who did not feel this need. Although this may be related with the need to stay in touch with social connections, particularly among healthcare staff who is generally perceived to be busy with sensitive jobs during the daytime, the deeper underlying personality traits that may be responsible for this behavior are extroversion and social anxiety. Hence, there is a need to take a closer look at this finding. In addition, the interaction of these factors may be explosive because extroverts are thought to reach out more often to their social contacts and utilize WhatsApp for much longer periods than introverts [23]. For these reasons, they may feel a much more compulsive need than introverts to frequently keep their mobile data on to avoid missing WhatsApp messages. This becomes even more important considering the financial implications, however inconsequential, of keeping mobile data on, especially for low-income earners who regularly have to part with some funds to sustain their mobile data access.

Our study revealed that respondents' living circumstance was a significant predictor of late-night WhatsApping. Respondents who lived alone were twice more likely to indulge in late-night WhatsApping than those who lived with their families. This is not surprising because respondents who live with their families would necessarily commit more of their off-work time to their families by physically engaging in conversations, watching movies, and dining together, among others. In contrast, respondents who lived alone tended to spend more time communicating with their family members through regular WhatsApp chats, in addition to social connection with friends. This is supported by the study findings of Church and de Oliviera [24], who reported that WhatsApp was used more often with partners than with any other communities/groups. Their study also found a higher frequency of WhatsApp usage with family and friends than with work colleagues and clients. For employees working in distant locations away from their families, late-night WhatsApping appears to be their best daily opportunity to catch up with their spouses and immediate family members. Again, based on the results from our study, this is true for most people, irrespective of their job titles/professional categories and social status.

Our study failed to establish any associations between gender, age group, and late-night WhatsApping. Unlike Montag et al. [2], who found that being female and younger were predictive of longer daily WhatsApp usage, we observed no such associations among our study sample. Although a higher proportion of persons who indulged in late-night WhatsApping in our study were females less than 30 years old, the association fell short of statistical significance, apparently due to the imbalance in gender and age categories. In addition, the independent effect of the fairly balanced marital status of the respondents appeared to be nullified by their living

circumstances in predicting late-night WhatsApping.

This study has some important limitations. First, the results of the study are at best descriptive and should be interpreted with caution, as they may not be generalizable to the population of healthcare staff across Malaysia owing to the non-probability sampling technique employed to select study participants. Second, the specific socio-demographic determinants of WhatsApp overuse among this largely urban-based cohort may be different from those in much more remote locations across Malaysia, with perhaps fewer Internet connectivity and differing from social networking characteristics. The appropriateness of measuring the novel attribute, "perceived nomophobia" in terms of severity could be debated in this study. Such attribute was difficult to measure, but evidence suggests that perception of a condition can be measured in terms of 'perceived severity' or 'perceived susceptibility' both of which are linked [25]. Although, most times perception of severity of a condition often follows appropriate diagnosis of the condition, however, it may not be inappropriate in this situation since perceived nomophobia can be adequately and correctly appraised by the respondent [26]. As the present study only showed a statistical significance in the univariate analysis and eliminated in the multivariable model, it was not powered to definitely reject the null hypothesis to claim this factor as a predictor to technological addiction habit. Future research should use robust methodological techniques to determine the temporality between these factors. Finally, although WhatsApp is reported to be the most widely used instant messaging app in the country, it would have been interesting to explore whether late-night WhatsApping is associated with an increased concurrent use of other social media apps such as Facebook and Instagram or vice versa.

Conclusion

In summary, the prevalence of late-night WhatsApping among healthcare staff in our study location is relatively high. Given the untoward effects of late-night WhatsApping, including poor sleep, poor concentration, stress, and low productivity, and the projected increase in WhatsApp penetration among Malaysians, it is imperative to create targeted, context-specific behavioral control and preventive strategies to address this problem. Qualitative research to provide deeper explanations for the psycho-behavioral factors exposed in this study will be of immense value in creating targeted behavioral control and preventive strategies. Real-time psycho-behavioral attributes could be measured through WhatsApp meta-data in future robust studies through psycho-informatics, which is part of the "big data" revolution in healthcare.

Author Contributions

KG conceived and designed the study, analysed the data, wrote the paper, prepared the tables, and responsible for the final version. SARA-D analysed the data, wrote the paper, and revised the final draft critically for important intellectual content. SAA wrote the paper, revised the final draft critically for important intellectual content. SS and WHWY recruited participants, prepared the tables and reviewed drafts of the paper. PR conducted literature search, recruited participants and collected data. All authors have contributed to and approved the final version of the manuscript.

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