Internet-based assessment of what's keeping adults awake? Pre-bedtime behaviors pattern and smartphone addiction.

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Abstract

Introduction and objectives: The study aimed to evaluate the patterns and the association of technology-related behaviors (*e.g. smartphone use*) prior bedtime in a random sample. Few studies characterized behaviors related to sleep; this study (1) evaluate behaviors regarding one hour before sleep and test their association with sleep quantity parameters, (2) determine the degree to which each behavior is related to smartphone addiction use, and (3) assess smartphone addiction effect on sleep parameters.

Materials and Methods: Study population included (N=126) participants with a mean age of 28.9 ± SD 8.8. Participants completed self-report measures on *prebedtime behavior* and smartphone addiction assessed respectively by *the prebedtime behavior questionnaire (PBBQ)* and *the Smartphone addiction scale (SAS)*.

Results and conclusions: Adults engaged in various behaviors prior bed. In particular, *online chat / discussions, spending time with friends* were associated with single marital status; whereas, *having drinks that contain alcohol* and *pray or meditate* were more prevalent among married participants. Online chat and social networking behaviors revealed significant association with smartphone use prior sleep time ($r=.32**$, $p=.001$; $r=.43**$, $p=.000$; respectively), while *sport and exercise* showed significant negative association and could be a probable protective factor from smartphone addiction.

Technology and media use relevant to prebedtime behaviors were more prevalent among single participants and were significantly linked to smartphone use prior bedtime.

Keywords: Prebedtime behavior, Social media, Smartphone addiction, Internet-based assessment.

Introduction

The lack of sleep either in quality and quantity among adults has been previously reported in the literature (Medic, Wille, & Hemels, 2017), and was previously linked to various consequences on cognitive performance (Alhola & Polo-Kantola, 2007), low academic achievement (Mirghani, Mohammed, Almurtadha, & Ahmed, 2015), and poverty (Patel, Grandner, Xie, Branas, & Gooneratne, 2010). The causes of either delayed sleep or sleepiness are manifold; technology plays now a day an important role in such problem and being linked to internet use, smartphone use, gaming, watching television etc…(Van Den Bulck, 2004).

With this background the present study aims to evaluate the patterns and the association of technology-related behaviors (*e.g. smartphone use*) prior bedtime in a Moroccan sample. Few studies characterized behaviors related to sleep; this study (1) evaluates behaviors regarding one hour before sleep and test their association with sleep quantity parameters, (2) determine the degree to which each behavior is related to smartphone addiction use, and (3) assess smartphone addiction effect on sleep parameters.

Materials and Methods

e-screening assessment
Data collection was made possible through Google sheet free service which represents an anonymous channel of collecting data.

Participants answer to multi survey including various aspects in addition to basic personal information like gender, age, marital status and education level. Participants were fully knowledge about aims and objective of the study and consented regarding their participation.

The prebedtime behaviour questionnaire (PBBQ)
PBBQ or the prebedtime questionnaire represents a self assessment tool that assess 25 frequent behaviors prior sleeping time it include behaviors such as snacking, reading book, or listening to music. No scale was available to measure PBBs till it was established by a focused discussion among seven researchers where rating was based on four point Likert scale: *never (0), once or twice a week (1), three to four times a week (2), and most nights (3).*

The Smartphone addiction scale (SAS)
The Smartphone addiction scale (SAS) represents a self diagnosis scale distinguishing smartphone addicts. The SAS was modified from the K-scale that assess juveniles Internet addiction, its development was subject to a validation study (Kwon et al., 2013) where 33 items were adopted in the final version of the scale. In addition, 6 subscales were included: Daily life disturbance, Positive anticipation, Withdrawal, Cyberspace- oriented relationship, Overuse, and Tolerance. Items are scored on 6 points-Likert scale: *Strongly disagree (1), Disagree (2), Weakly disagree (3), Weakly agree (4), Agree (5), Strongly agree (6).* The sum of the six subscales refers to SAS score with a range of 33 to 198; higher the score reflect higher addiction to smartphone use. The Arabic version used in the present study has previously showed high reliability (Sfendla et al., 2018).

Results
Sample characteristics
A total sample size of 126 participants was included in the present study. With a mean age of 28.9 (SD=8.8), 45.2% were men and 54.8% were women. In total, 64.8% of the sample (n=80) were classified as adults 26 – 64 years old, 32.3% of the sample (n=40) were classified as young adults 18-25 years old, .8% of the sample (n=1) were classified as older adults ≥ 65 years old and teenagers 14-17 years old. The specific age categories were used by the National Sleep foundation and were used to facilitate future comparisons. In term of education 96.8% had higher education, whereas 3.2% reported being high school students.

Prebedtime behaviors patterns by marital status
Significant differences were noted when comparing single participants to married one. Married participants scored significantly higher than single participants in *having drinks that contains alcohol* (*M*=.07, SD=.25; *t*= (120) = -1.25, *p*=.014), *part time job* (*M*=.66, SD=1.07; *t*= (119)= -2, *p*=.002), and *pray or mediate* (*M*=2.5, SD=.88; *t*= (119)= -1.88, *p*=.001) prebedtime behaviors. Whereas, single participants scored significantly higher in *spending time with friends* (*M*=1.51, SD=.99; *t*= (120) = 3.02, *p*=.004),* and *online chat and discussion (chatroom, instant messengers, including audio and video chats)* (*M*=2.24, SD=1.17; *t*= (119) = 1.84, *p*=.022).*
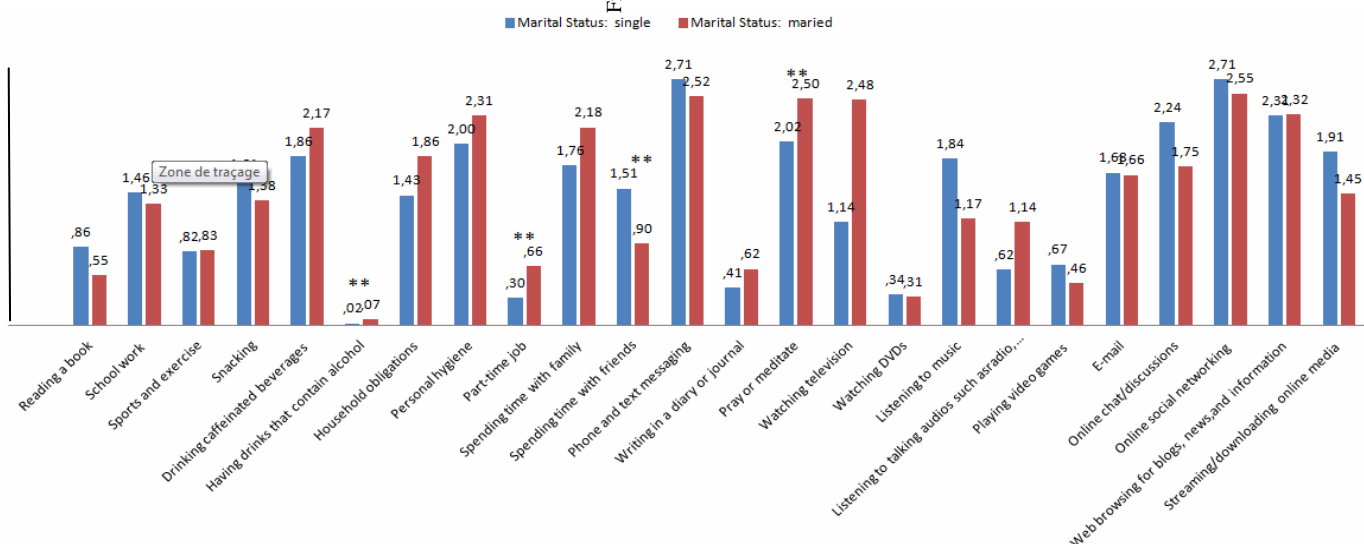
Mean average comparison of prebedtime behaviors based on the marital status reported, *p<.05, **p<.01 based on student t test

Association between prebedtime behaviors and Smartphone use
Bivarate pearson correlation was used to assess the relationship between prebedtime behaviors and SAS score. SAS score had significant negative correlation with *sport and exercise,*

watching television prebedtime behaviors (*r*= -.23*, *p*=.016; *r*=-.21, *p*=.027, respectively). In the other hand significant positive correlation were noted for SAS score with *phone and texting* (*r*= .22*, *p*=.023), *online chat and discussion (chatroom, instant messengers, including audio and video chats)* (*r*=.32**, *p*=.001), and *online social networking (e.g. Facebook, twitter, My space)* (*r*=.43***, *p*=.000) prebedtime behaviors.
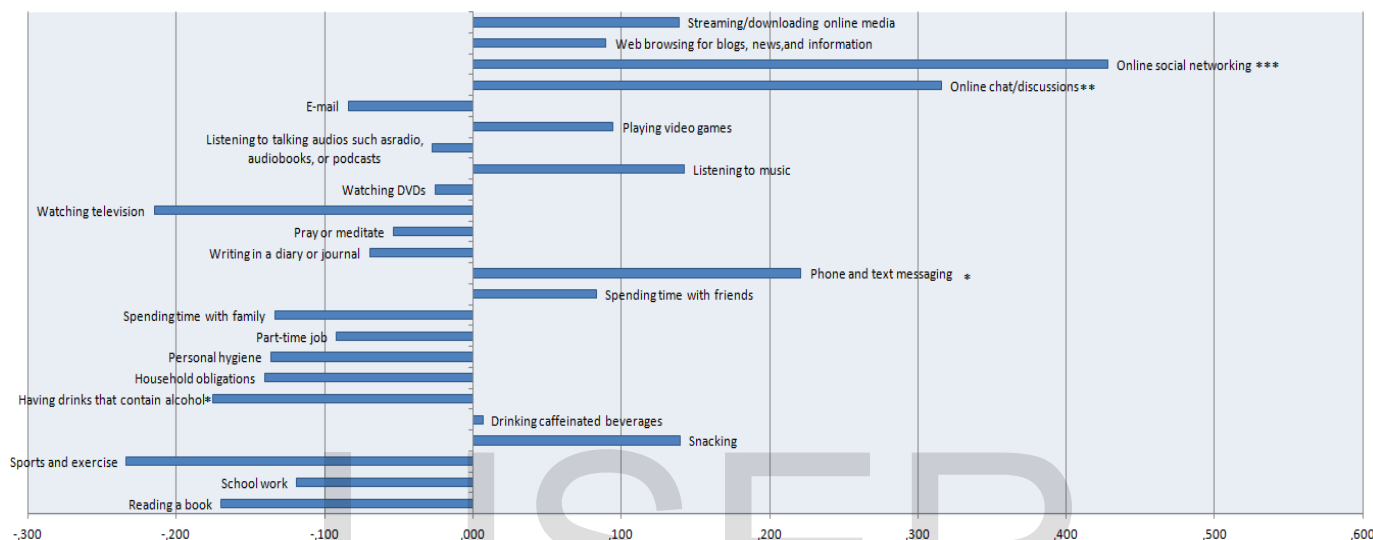
Bivariate correlation between Smartphone Addiction Scale and prebedtime behaviors in Moroccan adults, *p<.05, **p<.01, ***p<.000 based on pearson bivariate correlation

Discussion

Nowadays internet and electronic media use, especially among adults, became essential part of their daily life. Inadequate and excessive social media use was linked to variety of risk factors such as delayed bedtime, less amount of sleep, and several other health outcomes. Addiction once limited to drugs and substances is now introduced to mobile phone usage and internet; dependence symptoms were predicted among those who use Social Network Site SNS to establish and maintain new relationship, and those

addressing loneliness and stress. Consequently, sleep deprivation outcomes are well documented and shorter sleep hours are coupled with obesity, poor mental health, substance use /abuse, poor academic performance, self harm ideation, and cognitive failures. Few studies (Harbard, Allen, Trinder, & Bei, 2016) examined the association between prebedtime behaviors and electronic media use as that prebedtime behaviors are an important modifiable facets to understand in order to address sleep problems in adults.

Conclusion
The preliminary aims of this study were to assess the association between prebedtime behaviors and smartphone use, and to compare prebedtime behaviour among single and married participants.

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