Elsevier Editorial System(tm) for Journal of Adolescence

Manuscript Draft

Manuscript Number: JOA18-377R5

Title: Adolescent perceptions of sleep and influences on sleep behaviour: a qualitative study

Article Type: Article

Keywords: Sleep; Adolescence; Social media; Sleep hygiene; Schools; Qualitative research

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Abstract: Introduction

Adolescent sleep deprivation is a growing public health problem. This qualitative study explores adolescents' perceptions of sleep and sleep behaviour, enhancing the current limited body of qualitative research in this area.

Methods

Thirty three 13 - 14 year olds (17 boys and 16 girls) from two schools in England participated in focus group discussions. Qualitative thematic analysis was used to identify and examine patterns emerging from the data.

Results

Participants understood recommended sleep requirements for their age group and 'sleep hygiene' strategies, yet most reported getting insufficient sleep. Both boys and girls acknowledged the influence of peers on sleep behaviour. A common obstacle to sleep was distractions from electronic devices. Gender was identified as influencing behaviour, with boys more likely to report watching videos and gaming and girls reporting being distracted by communicating on their mobile phones. Anxious dependency on phones at night was reported by some girl participants. Parents were considered key 'sleep messengers' and rule-setters. A variability in parental involvement in sleep behaviour was identified and can be understood as at least partially related to new challenges posed by adolescent use of electronic devices.

Conclusions

Findings highlight the importance of parental and peer involvement in supporting adolescents to secure healthy sleep. Endeavours to bring

about sustained changes in adolescent sleep practices should be predicated on the role of parents/carers as sleep enforcers and the impact of peers, as well as responding to the gendered aspects of compromised sleep behaviour.

22 March 2019

Many thanks for the comments to our submission of 15 March 2019.

Please find below a description of the changes made to the manuscript based on the feedback. We hope that this provides adequate detail as to how we have addressed your various concerns.

Revised manuscript page number	**Changes related to stated concerns and requests**
Manuscript	Spaces between sections have been removed.
Manuscript	Numbers from headings have been removed.
Discussion	The headings 'Conclusions' and 'Limitations' have been removed, as requested.
16-17	The text under the old 'Conclusions' and 'Limitations' sections has been revised and is now part of the 'Discussion' section.
16-17	We were concerned about repetition given we had removed the Conclusions heading. Therefore the combined limitations and conclusions paragraphs have been revised, concluding the general discussion section with a stronger paragraph, as suggested.
References	The reference Saunders et al., 2018 has been removed.

*Title Page (including author details)

Adolescent perceptions of sleep and influences on sleep behaviour: a qualitative study

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Adolescent perceptions of sleep and influences on sleep behaviour: a qualitative study

Restorative sleep is essential for the body and mind to function effectively (Colten & Altevogt, 2006), and nightly sleep duration requirements have been established for different age groups, with a recommendation of 8-10 hours for adolescents (Hirshkowitz et al., 2015). Adolescents are understood to have distinctive 'sleep architecture' due to changes in melatonin levels during puberty and an associated shift in circadian rhythms, later onset of tiredness and a need for greater sleep time (Crowley, Acebo, & Carskadon, 2007; Lockley & Foster, 2012). It has been posited that pubertal circadian rhythms, coupled with socially-induced sleep-delaying behaviour, may generate a self-perpetuating cycle of short sleep duration and low sleep quality amongst adolescents (Kira, Maddison, Hull, Blunden, & Olds, 2014). Indeed, insufficient sleep is emerging as an important health risk (Roberts, Roberts, & Xing, 2011; Royal Society for Public Health, 2016), with associations established between reduced adolescent sleep and atopic conditions (asthma, for example) and headaches (Smaldone, Honig, & Byrne, 2007), depression (Short, Gradisar, Lack, & Wright, 2013; Glozier et al. 2014), behavioural and emotional problems (Sarchiapone et al., 2014), lowered impulse control (Dahl & Lewin 2002), concentration (Wolfson & Carskadon 1998, 2003), and a compromised immune system (Carskadon, 2011; Orzech, Acebo, Seifer, Barker, & Carskadon, 2014). Conversely, increased sleep has been associated with reduced depressive symptoms, fatigue and health service attendance (Owens, Belon, & Moss, 2010).

Sleep deprivation is understood as a potentially remediable risk (Roberts et al., 2011; RSPH, 2016), with particular practices purported to promote good sleep, offering potential mediating factors between adolescents' biological sleep needs and their sociocultural context (Noland, Price, Dake, & Telljohann, 2009; Malone, 2011). These practices, referred to as 'sleep

hygiene', include establishing regular sleep/wake times, avoiding bedtime technology use, establishing a favourable sleeping environment, and minimising late afternoon / evening physical, cognitive, and social stimulation (Noland et al., 2009; Malone, 2011). Yet it has been argued that poor knowledge of how adolescents implement sleep hygiene, as well as limited understanding of the social context and cultural values influencing their sleep behaviour, compromise interventions to promote healthy sleep habits amongst this group (Malone, 2011).

While there is a dearth of scholarship research regarding adolescent behaviour related to sleep hygiene, various factors impacting on sleep behaviour have received substantial attention from researchers. Sleep disruption caused by academic demands has been examined, for example (Teixeira, Fischer, Nagai, & Turte, 2004). The negative impact of adolescent use of social networking sites (SNS) is receiving increasing attention (Vernon, Barber, & Modecki, 2015; Garmy & Ward, 2018) as are the general effects of mobile phone use (Vernon, Barber, & Modecki, 2018). Sedentary 'screen time' - the use of television or electronic devices - immediately prior to bedtime has been correlated with later sleep onset (Foley et al., 2013). Reduced sleep duration due to night-time electronic device use has, in turn, been associated with depressive symptoms (Lemola, Perkinson-Gloor, Brand, Dewald-Kaufmann, & Grob, 2015) and daytime tiredness (Sisson, Broyles, Newton, Baker, & Chernausek, 2011; Pieters et al., 2014; Grover et al., 2016; Power, Taylor, & Horton, 2017).

The mechanisms whereby different electronic devices disrupt sleep are complicated and not yet fully understood (Cain & Gradisar, 2010; Power et al., 2017). However, meanings related to nascent adolescent autonomy which both adolescents and their parents invest in mobile phone ownership (Blair & Fletcher, 2011) may have implications for night-time phone use. Adolescents' emotional connection to social media (Thomée, Dellve, Härenstam, & Hagberg,

2010), including the ‘fear of missing out’ if not socially connected (Emmerson & Clark, 2015) is another relevant but under-studied area (Woods & Scott, 2016). Data suggesting that female adolescents are significantly more likely to take their mobile phone to bed (Power et al., 2017), as well as an observed tendency for this group to report higher night time mobile phone messaging (Grover et al., 2016), suggest that more gender-disaggregated study of sleep behaviour and outcomes amongst adolescents may provide essential insights. Indeed, given the scarcity of studies examining gender differences in sleep behaviour, further research in this area has been recommended (Woods & Scott, 2016).

Much of the afore-mentioned scholarship pertaining to adolescent sleep is founded on quantitative investigation. Qualitative research on adolescent sleep is scant, yet, as highlighted by Orzech (2013), has the potential to address gaps in our understanding of adolescent perceptions of the role of parents as ‘sleep messengers’; influencing children’s sleep habits as they transition through adolescence. Further qualitative study on adolescent sleep behaviour, including sleep hygiene practices, may better inform appropriate interventions for promoting healthy sleeping habits and supporting adolescents to make necessary changes (Noland et al., 2009; Malone, 2011). The current qualitative study aimed to investigate adolescents’ beliefs, attitudes and behaviour related to sleep, explore facilitators and barriers to sleep, including ‘sleep messengers’, and the role of sleep hygiene practices. A wider objective of this research was to inform the planning of new public health responses to counteract the known poor quantity and quality of sleep amongst adolescents in England (RSPH, 2016).

Methods

Procedures

Given the study aim of understanding personal views and practices from an 'insider' perspective, a qualitative approach was followed (Flick, 2007; O'Leary, 2014). The focus group discussion method was selected as a way to systematically interrogate human behaviour and also elicit the reasons behind specific actions (Pollock, 1955; Kitzinger, 1994; Strauss & Corbin, 1998). A series of open-ended questions enabled probing into the processes occurring in relation to sleep (Tiggemann, Gardiner, & Slater, 2000), as well as providing a platform for contrasting voices (Barbour, 2007), which suited our aim of examining both commonalities and differences in perspectives amongst adolescents of the same age. Given current poor understanding of gender differences related to adolescent sleep behaviour, separate male and female focus groups were considered appropriate to enable data comparison. Participants were 33 Year 9 students aged 13 – 14 years old; 17 boys and 16 girls.[1] This age group was selected because it was anticipated that the majority of Year 9 students were likely to have already experienced the shifting pattern of sleep associated with changes in melatonin levels, and the later onset of tiredness (Crowley et al., 2007; Lockley & Foster, 2012). Two suburban secondary schools in South Gloucestershire, England, were selected to take part in the study, both of which had participated in the South Gloucestershire Online Pupil Survey[2]. One school was selected which reported a higher than local authority[3] average bed/sleep time and another with a lower than local authority average bed/sleep time for the age group targeted, to minimise selective bias. Access to both schools was obtained through the member of staff who had previously led the survey and who acted as a gatekeeper (Barbour, 2007). Ethical approval for the study was granted by the

1 In the education system in England, Year 9 is the third year of secondary (high) school.

2 The aim of the online pupil survey is to ask children and adolescents in the region about their behaviour and views in relation to a range of health-related issues in order to provide essential information for individual schools, the local authority and other stakeholders. The first survey was carried out in 2015 and has been repeated every two years. All schools in the local authority are invited to take part on a voluntary basis.

Health and Applied Science Faculty Research Ethics Committee of the University of the West of England.

A pre-study meeting was held in each school, at which a detailed plan of the research, including recruitment, consent, data collection, confidentiality and safeguarding, was provided. Two Year 9 tutor groups were then randomly selected in each school. Parents or carers of students in the two tutor groups were e-mailed an opt-out consent letter together with a participant information leaflet. These documents were also distributed to all students in the selected tutor groups. Students who wanted to take part in the study and whose parents/carers had consented to their participation provided their name to the gatekeeper who collated a list of possible participants. Recruitment was on a 'first come first served' basis until the sample was at least 7 participants per group.

Two focus group discussions were conducted in each school; each group included participants from the same establishment. The discussions were organised into single gender groups to enable comparison between girls and boys, with each group comprised of a manageable number of between seven and nine participants per group (Barbour, 2007, 2014; Flick, 2007; Silverman, 2011). A total of 33 students participated: 16 girls and 17 boys.

Data collection and analysis

The four focus group discussions were convened during the school day in May 2016 and lasted for approximately 45 minutes. Participants provided verbal consent at the outset of the activity. The lead author facilitated the discussions, which were digitally recorded. Each discussion started with a 'draw and write' ice breaker activity whereby participants were invited to present their ideas about sleep on a large sheet of paper. The aim of this activity was to

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3 In England, local authorities are responsible for public services and facilities in a particular geographical area.

introduce the study topic and set participants at ease (Kitzinger, 1994; O'Leary, 2014). Information generated from this activity was not used as study data. Following this exercise participants were asked a range of questions concerning their views on sufficient sleep, their current sleep behaviours, their opinions on facilitators of and barriers to sleep, the impact of inadequate sleep, and the role which 'sleep messengers' played in shaping their sleep hygiene. The discussions ended once all questions were addressed and participants had nothing further to say.

The lead author transcribed all recordings and led the analysis. Thematic analysis was employed to identify and unpick patterns in the data related to the study focus (Creswell, 2014; Silverman, 2011) and was conducted by hand coding, given the manageable amount of data. A number of themes were identified early in the fieldwork process (O'Leary, 2014). Familiarisation with the data during transcribing made it possible to confirm recurring themes, which formed initial codes as part of an inductive, open coding process (Braun & Clark, 2006). The codes were refined and a coding framework was generated through re-reading of the transcripts; this framework was verified by a senior researcher who supervised the study (second author), and then applied to the whole body of data. A process of constant comparison (Flick, 2007) was employed to gauge similarities and differences in findings amongst each discussion group and between male and female groups.

Results

Four main themes and associated sub-themes emerged from the data: perceptions of sleep requirements; inhibitors to sleep; effects of insufficient sleep on daytime experience; and sleep promoters.

Perceptions of sleep requirements

Overall participants considered their age group as requiring between eight and 10 hours of sleep each night. However, there was also general consensus that 'sleep need' was subjective; certain people coped better with less sleep. At the same time there was an overall sense, vocalised by both girls and boys, that they were "all tired" and that none of them slept the required amount for their age group. Many used the weekend to catch up on sleep; some described this as having a positive effect. For others, however, this was not considered a beneficial strategy: "At weekends I wake up at 10 but I still feel rubbish" (FGD4/f8)[4]. There was some recognition amongst participants that they no longer felt tired at bedtime in the same way they did when they were at primary school, which posed challenges to going to sleep early. Many participants also described how they understood that they needed to sleep well for optimum performance and the way to do this was to learn strategies for getting to sleep even when one was not tired. The role of peer expectations in terms of sleep behaviour was introduced by participants early in discussions as a key influencing element:

> "Yeah, I think at primary I went to sleep more easily than I do now" (FGD3/m6), "Yeah I agree. You weren't expected to go to bed later, if you know what I mean, you just went to bed at 7" (FGD3/m3), "There's peer pressure, like if you went to bed at half seven now you'd probably get teased for it" (FGD3/m1), "Yes that is true. Social expectations isn't it. Social expectations" (FGD3/m3).

Other participants associated sleep need with their activities, such as exercise, during any given day. Although, conversely, it was acknowledged that late-night exercise might lead to over-

4 Cited data are referenced by focus group discussion / male or female and assigned participant number (1 – 10), e.g. FGD3/m5.

stimulation, with one participant describing being tired yet "awake in my mind" due to evening dance class. Participants readily shared their perceptions of sleep requirements, but there was less understanding of the longer-term impact of sleep deprivation on health and educational outcomes. Indeed, many discussants acknowledged how understanding about sleep was less widespread than for other aspects of health: "Well….it's not like you get information [about sleep], like when there's such and such a disease, like on the news, but you don't get information or a booklet about sleep!" (FGD3/m5).

Inhibitors to sleep

Bedroom environment

Participants in all groups referred to bedroom temperature and the weather affecting their ability to get to sleep; being too hot created a stuffy room and prevented sleep, but opening a window to cool down let in noise that also kept them awake (all participants lived in urban or semi-urban areas). Physical conditions such as waking up to go to the toilet, suffering from hay fever or nosebleeds and "having your period" were provided as examples of sleep being broken for reasons beyond one's control. Sharing a bedroom with a sibling was also described as a barrier to sleep onset. Similarly, light was reported as a common inhibitor of sleep, such as landing lights left on for younger siblings and technology-related lights such as standby beams from laptops or televisions. Bedroom ambience was also described as an influencing condition within participants' control; one female discussant, for example, recounted how she felt calmer and slept better after she had tidied her room.

Distractions

"Distractions" was a term used by both female and male participants in all four groups to describe the various activities and behaviours that delayed sleep onset and generally prevented

them from sleeping: “Well, you are meant to get like 10, at least 10 hours... but some people are distracted and stuff and stay up longer” (FGD1/m9); “I’m just constantly distracted” (FGD1/m7); “Oh on average I think… that people our age should get on average nine hours sleep? But I think most people get probably less than that because of things like devices and apps and other distractions” (FGD2/f7).

Electronic devices

While all participants reported distractions related to electronic devices, the nature and role of these devices in sleep prevention differed for boys and girls. Girls described being distracted by their mobile phones, particularly due to messaging on social media sites, whilst boys described a tendency to watch ‘Netflix’ on computers and participate in online gaming activities: “We’re just [on our phones] chatting to friends. I just enjoy that in the evening” (FGD4/f2); “Well, phones, you go on to YouTube and just look at videos. You get bored but then you just carry on watching them” (FGD1/m9), “I think game consoles distract you because... they get addictive … to get to the next level” (FGD1/m1). Indeed, perceived gender differences amongst participants informed their own particular perspectives: girls understood that boys were likely to have more sleep because they did not spend as long talking on their phone or worrying late at night, while boys considered girls to sleep longer because they were less distracted by gaming. Girls also expressed a dependence on their phones in order to be able to sleep; the fear of not having their phones leading to sleeplessness and worry:

> “My mum sometimes takes my phone out of my room, but I can’t sleep if it’s out of my room” (FGD4/f8), “Yeah, same. I have to have my phone with me, it’s my alarm or else I’ll panic” (FGD4/f7), “And yeah, my mum’s like ‘you should go to the doctors’…I really hate having it [my phone] out of my room, in case I wake up in the night all

panicky and I need to go on my phone or something. It really calms me, but I hate it when my phone is out of my room" (FGD4/f8).

Social pressures

Girls' reported mobile phone use at night also involved an element of social expectation and pressure, particularly in relation to communicating with boys as illustrated in the following conversation:

"And if I talk to a boy before bed….." (FGD4/f8), "Yeah, it's usually boys that keep me awake" (FGD4/f7), "I'm like no, I really like him and I can't end the call…" (FGD4/f2), "Yeah (general sounds of agreement)….I can't finish it [the conversation]" (FGD4/f2), Pause, "What would they think if you stopped it?" (Researcher), "That I'm really boring going to bed" (FGD4/f8), "And they'd say things like we're not interested….." (FGD4/f2), "If you really want to speak to them, you do stay up. And then they're like, `I'm going to sleep', but you are now wide awake" (FGD4/f8).

The role of social pressure in inhibiting sleep also emerged in girls' descriptions of their concerns about looking attractive, including what to wear and what make-up to put on; some described how this kept them awake, or prompted them to get up extra early to get ready. One participant suggested losing sleep was preferable to going to school without make up on. This particular discussion concluded with a frank reflection about combined pressures impacting upon sleep: "I think it's sad that we think we have to get up early to put make up on, and we're staying up late on social media when we should be doing other things" (FGD4/f1).

Effects of insufficient sleep on daytime experience

Both male and female participants recognised that stress about school and homework led to sleeplessness, which in turn created greater tiredness and worry: "You might, in the night,

worry about your GCSEs [exams], so that will affect your sleep which means you will be tired for your exam, which will affect your result" (Group3/m1); "I think stress stops you from sleeping and then…not sleeping makes you more stressed" (Group2/f7); "A big circle of stress" (Group2/f6). The emotional effects of regular, insufficient sleep were clearly articulated, and included feeling moody, grumpy, upset, irritable and self-conscious, all of which had a negative impact on day-to-day functioning: "I'm just a mix of emotions" (Group4/f2); "I think if I don't get enough sleep I look awful. It really does affect my eyes….I feel like I have to put makeup on" (Group4/f7); "[I feel] like a blob, just moving around" (Group4/f8). Certain discussants further described the cognitive and sensory effects of tiredness, such as being distracted, making poor decisions, feeling drained and clumsy.

Sleep promoters

There was consensus amongst all four groups that bedtime routines, where these existed, were largely instigated by parents. In the words of one participant: "it depends on your parents, like how strict they are" (FGD3/m1). Many described having a set bedtime of 9pm, yet reported that in reality they often did not get to sleep until as much as three to four hours later. Some recounted how internet access was turned off at a specific time at home to discourage them from staying awake; certain parents also enforced limits on electronic device use. While many discussants considered parental rules excessive, some acknowledged the importance of boundary-setting, despite the irritation it caused:

> "Of course everyone is going to think it's annoying because you want to do what you want to do, but at the same time it's for the better, so it's kind of fair" (FGD3/m1), "Yeah, I agree with that. It's kind of for the better. At the end of the day you're going to get your sleep. If there wasn't those rules I'd be watching [TV] most of the night" (FGD3/m8).

A number of adolescents who participated in the study had their own strategies for reducing technological disruptions during the night: "On Apple products there's a feature…. 'do not disturb'….so you set what time it comes on and what time it stops and between those hours or minutes there's no noise…..no vibrations" (FGD1/m2). However, overall, while participants recognised 'sleep hygiene' strategies, few expressed confidence in instigating these: "It's important [sleep] but we don't understand how to get it always" (FGD1/m7). In just one of the four focus groups several participants described different sleep hygiene methods they had been taught to facilitate a good night's sleep and explained how sporting activities and competitions outside of school had been key drivers in their positive practices. The role of friends in influencing sleep behaviour was also acknowledged: "I guess people started going to bed later and just told their mates, who thought 'because my best mate is doing it maybe I should start doing it'" (FGD1/m2).

> "I think most of us don't get sleep that we want. All of my friends don't really. But then if people tell me, 'Yeah, I go to bed at 9 every night' then I'm like oh I really need to do that and it really puts pressure on me to go to sleep" (FGD4/*f8).*

As well as identifying parents as key 'messengers' for promoting healthy sleep behaviour, some participants proposed other sources of information and strategies that might help them to learn about sleep such as leaflets, apps, the use of a 'Fitbit'[5] to monitor sleep, and also being signposted to relevant internet resources. Insofar as school-based interventions were concerned, it was recognised that schools could play a signposting role to accessible information about sleep

5 The Fitbit is a watch with technology that measures and tracks all-day activity including sleep. It tracks the sleep cycle, monitoring the length of each stage of sleep (REM/NREM).

that could be discussed at home. A key priority was for parents to be more knowledgeable about sleep in order to enforce domestic rules regarding sleep hygiene.

Discussion

While study participants demonstrated awareness of the 8-10 hours of sleep recommended for their age group (Hirshkowitz et al., 2015), the links between insufficient sleep and overall health were poorly understood. Yet there was a recognition amongst the adolescent discussants that insufficient sleep had noticeable impacts on their daily life in terms of mood, decision-making and concentration, confirming existing research in this area (Pieters et al., 2014; Grover et al., 2016). Descriptions of cumulative pressures, whereby worrying affected sleep and then this inadequate sleep provoked more anxiety (termed by one participant as a "circle of stress"), underscore the particular mental strains experienced by some adolescents, highlighting the need for support with healthy sleeping behaviour. Findings confirmed the role of socially-induced sleep-delaying behaviour (Kira et al., 2014) which was attributed to various causes. Peer pressure to stay up late was highlighted; conversely it was flagged how peer group role modelling might also facilitate healthier sleeping practices. "Distractions" were a predominant theme, particularly the distraction posed by electronic devices. A novel finding was the apparent gender differences in terms of electronic device use, with boys more focused on Netflix and gaming and girls spending more time communicating with friends (boys and girls) on their mobile phones. This indicates a potential gendered element to compromised sleep. Emerging theory regarding gender differences and sleep duration has suggested that adolescent girls may be more distracted than boys by mobile phones during the night (Grover et al., 2016; Power et al., 2017). Findings in the current study concerning the expectation of being available to 'chat' and message on social media late into the night, which appeared to affect girls more than boys,

coupled with an intense phone dependency expressed by some female participants ("I have to have my phone with me…or else I'll panic"; "I really hate having it [my phone] out of my room, in case I wake up in the night all panicky") reveal new insight into female phone use and its effects on sleep. Researchers have already established links between emotional investment in social media, and adolescent sleep and well-being (Woods & Scott, 2016), but the current study reveals the potential value of exploring sleep behaviour through a gender lens. The reported combination of night-time social media use and devotion of time to self-grooming in preparation for school, which also exacerbates sleep deprivation, is another example of a gender distinction which merits further exploration, as is boys' involvement in night-time gaming and video watching.

It has been argued that sleep can be a low priority amongst adolescents (Wing et al., 2015) for whom other activities take precedence, including spending time on electronic devices (Woods & Scott, 2016). Yet the current study discloses certain complex psychological aspects of electronic device use. Findings concerning intense female phone dependency at night, as well as one male participant's reference to his gaming as "addictive" suggest that adolescents may not be consciously de-prioritising sleep but finding themselves dependent on certain devices as well as behaviours. Given that many of these behaviours (phone messaging and gaming) involve communication with friends and acquaintances, and participants' own acknowledgement that their sleep behaviour can be influenced by that of their peers, there appears to be some important potential for peer-based sleep education.

Many discussants expressed awareness of sleep hygiene practices, in particular the importance of a conducive sleeping environment and minimising over-stimulation prior to bedtime, which were in keeping with recommendations in this area (Malone, 2011; Noland et al.,

2009). The finding that parents were the group most relied upon as ‘sleep messengers’ to instill good sleep practice was consistent with findings from existing research (Orzech, 2013; Pieters et al., 2014), and confirms the significance of parenting to adolescent sleep behaviour (Brand et al., 2009). Important differences were identified in the forms of parental sleep regulation. While many of the adolescents reported fixed bedtimes set by their parents, if this did not include a corresponding enforcement of rules concerning electronic device use and/or internet access, some were literally “left to their own devices”, and likely to be awake for many more hours. This finding adds new complexity to previous knowledge concerning the role of relaxed parental bedtime monitoring to delayed sleep onset (Carskadon, 1990). An important distinction can be made between ‘bedtime’ and ‘sleeptime’ amongst those who have access to electronic devices in their bedrooms, which might not necessarily be obvious to parents. Participants’ descriptions of the role of parents in sleep regulation suggested some of the tensions which may emerge in the establishment of night-time boundary-setting at home. Researchers have determined how mobile phone ownership is imbued with meanings by both adolescents themselves and their parents, related to the development of nascent adolescent autonomy (Blair & Fletcher, 2015). These meanings may also influence how night-time phone use is managed and negotiated within families. Yet a simultaneous desire was expressed amongst participants to have their parents enforce limitations (“If there wasn’t those rules I’d be watching [TV] most of the night”). The psychological dependency on electronic devices apparent amongst some adolescents may also be posing new challenges to parents as sleep ‘enforcers’, a role in which they may require particular guidance. This is captured in one girl’s description of a parent’s concerned response to her anxious need to retain her phone in her bedroom: “My Mum says I should go to the doctor”. These various findings flag the fundamental role of parents (and other carers), and peers in

promoting healthy sleep behaviour in the home and the importance of them being properly equipped for and supported in fulfilling this role.

Despite the small sample size, the focus group methodology employed allowed for saturation, and study findings provide a meaningful contribution to the small body of existing qualitative research on adolescent perceptions of sleep. Our study confirms that while aware of sleep requirements for their age group, adolescents face difficulties in achieving the recommended amount of sleep, which affects their day-to-day functioning. Findings underline the considerable impact which the 'distraction' of electronic device use has upon adolescent sleep, and suggests the mechanisms whereby such devices inhibit sleep differ between boys and girls. The apparent intensity of both girls' overall phone dependency and boys' gaming dependency and its impacts on sleep merit further investigation. Moreover, reported expectations to be available to communicate on SNS late into the night, as well as the pressures of morning self-grooming indicate that girls face a particular combination of social pressures which compromise their sleep. Our study also highlights the importance of sleep 'influencers'. The identification of parents as key sleep messengers and the problems participants described in accomplishing good sleep hygiene autonomously underscore the importance of including parents in any initiative to promote healthy sleep amongst adolescents. New research with parents/carers to explore current knowledge and practices in relation to promoting healthy sleep amongst children in their care could play an important role in informing future responses, for example, and public health practitioners might consider raising awareness amongst parents of the importance of sleep and sleep hygiene through methods such as Making Every Contact Count (Public Health England, 2016). As highlighted elsewhere, training on sleep for professionals working with young people is also recommended (Malone, 2011; Orzech, 2013). Health

professionals and pastoral staff in schools could usefully include questions on sleep when screening and monitoring behaviour, anxiety and attendance issues, and collaborate with pupils to provide age appropriate and meaningful information on sleep and sleep hygiene, to be disseminated both amongst adolescents and their parents. The reported role of peers in influencing sleep behaviour suggests that peer-based interventions may also have an important role to play; positive examples of sleep hygiene practice could be promoted through peer education in school settings. To conclude, any endeavours to bring about sustained changes in adolescent sleep practices should be predicated both on the role of parents/carers as sleep 'enforcers' (and the potential challenges parents may face in this role), and the known influences of peers, while also responding to the gendered aspects of compromised sleep behaviour.

Conflict of interest

The authors wish to declare no conflicts of interest. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

Barbour, R.S. (2007) *Doing Focus Groups.* London: Sage.

Barbour, R.S. (2014) *Introducing Qualitative Research: A Student's Guide. (*2nd ed.). London: Sage.

Blair, B. l., & Fletcher, A.C. (2011). "The Only 13-Year-Old on Planet Earth Without a Cell Phone": Meanings of Cell Phones in Early Adolescents' Everyday Lives. *Journal of Adolescence*, *26*(2), 155-177. doi: 10.1177/0743558410371127

Brand, S., Hatzinger, M., Beck, J., & Holsboer-Trachsler, E. (2009). Perceived parenting styles, personality traits and sleep patterns in adolescents. *Journal of Adolescence*, *32*(5), 1189-1207. doi: 10.1016/j.adolescence.2009.01.010

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. doi: 10.1191/1478088706qp063oa

Cain, N., & Gradisar, M. (2010). Electronic media use and sleep in school-aged children and adolescents: a review. *Sleep Medicine, 11*(8), 735-742. doi: 10.1016/j.sleep.2010.02.006

Carskadon, M.A. (1990). Patterns of sleep and sleepiness in adolescents. *Pediatrician, 17,* 5-12. https://www.ncbi.nlm.nih.gov/pubmed/2315238

Carskadon, M.A. (2011). Sleep in Adolescents: The Perfect Storm. *Pediatric Clinics of North America, 58*(3), 637-647. doi: 10.1016/j.pcl.2011.03.003

Colten, H.R., & Altevogt, B.N. (editors). (2006). *Sleep Disorders and sleep deprivation: an unmet public health problem.* Washington: National Academies Press.

Creswell, J.W. (2014) *Research Design: Qualitative, Quantitative and Mixed Methods Approaches.* (4th ed.). Los Angeles: Sage.

Crowley, S.J., Acebo, C., & Carskadon, M.A. (2007). Sleep, circadian rhythms and delayed phase in adolescence. *Sleep Med, 8*(6), 602-612. doi: 10.1016/j.sleep.2006.12.002

Dahl, R., & Lewin, D. (2002) Pathways to adolescent health sleep regulation and behavior**.** *Journal of Adolescent Health, 31* (6 Suppl.), 175-184. https://www.ncbi.nlm.nih.gov/pubmed/12470913

Emmerson, L., & Clarke, K. (2015, June). Impact of Social Media on Young People: Report from a Think Tank. Brighton and Hove City Council. https://www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/social%20media%20final%20report%20(PDF%20376KB).pdf

Flick, U. (2007). *Designing Qualitative Research.* (2nd ed.). London: Sage.

Foley, L.S., Maddison, R., Jiang, Y., Marsh, S., Olds, T., & Ridley, K. (2013). Pre-sleep activities and time of sleep onset in children. *Pediatrics, 131,* 276-82. doi: 10.1542/peds.2012-1651

Garmy, P., & Ward, T.M. (2018). Sleep Habits and Nighttime Texting Among Adolescents *Journal of School Nursing, 34*(2), 121-127. doi: 10.1177/1059840517704964

Glozier, N., O'Dea, B., McGorry, P.D., Pantelis, C., Amminger, G.P., Hermens, D.F., & ... Hickie, I.B. (2014). Delayed sleep onset in depressed young people. *BMC Psychiatry, 14*, 33. doi: 10.1186/1471-244X-14-3

Grover, K., Pecor, K., Malkowski, M., Kang, L., Machado, S., Lulla, R., … Ming, X. (2016). Effects of Instant Messaging on School Performance in Adolescence. *Journal of Child Neurology*, 1-8. doi: 10.1177/0883073815624758

Hirshkowitz, M., Whiton, K., Albert, S.M., Alessi, C., Bruni, O., DonCarlos, L., … Adams Hillard, P.J. (2015). National Sleep Foundation's sleep time duration recommendations: methodology and results summary. *Sleep Health 1,* 40-43. doi: 10.1016/j.sleh.2014.12.010

Kira, G., Maddison, R., Hull, M., Blunden, S., & Olds, T. (2014). Sleep Education improves the sleep duration of adolescents: a randomized controlled pilot. *Journal of Clinical Sleep Medicine, 10*(7), 787-92. doi: 10.5664/jcsm.3874

Kitzinger, J. (1994). The Methodology of Focus Groups; the importance of interaction between research participants. *Sociology of Health and Illness, 16*(1), 103-121. doi: 10.1111/1467-9566.ep11347023

Lemola, S., Perkinson-Gloor. N., Brand, S., Dewald-Kaufmann, J.F., & Grob, A. (2015). Adolescents' Electronic Media Use at Night, Sleep Disturbance and Depressive

Symptoms in the Smartphone Age. *Journal of Youth and Adolescence, 44*, 405-418. doi: 10.1007/s10964-014-0176-x

Lockley, S.W., & Foster, R.G. (2012). *Sleep: A Very Short Introduction.* Oxford: Oxford University Press.

Malone, S.K. (2011). Early to Bed, Early to Rise: An exploration of Adolescent Sleep Hygiene Practices. *Journal of School Nursing, 000(00),* 1-7. doi: 10.1177/1059840511410434

Noland, H., Price, J.H., Dake, J., & Telljohann, S.K. (2009). Adolescents' Sleep Behaviors and Perceptions of Sleep. *The Journal of School Health, 79*(5), 224. doi: 10.1111/j.1746-1561.2009.00402.x

O'Leary, Z. (2014). *The Essential Guide to Doing Your Research Project.* (2nd ed.). London: Sage.

Orzech, K.M. (2013). A qualitative exploration of adolescent perceptions of healthy sleep in Tucson, Arizona, USA. *Social Science and Medicine, 79,* 109-116. doi: 10.1016/j.socscimed.2012.05.001

Orzech, K.M., Acebo, C., Seifer, R., Barker, D., & Carskadon, M.A. (2014). Sleep Patterns Are Associated with Common Illness in Adolescence. *Journal of Sleep Research, 23*(2), 133-42. doi: 10.1111/jsr.12096

Owens, J.A., Belon, K., & Moss, P. (2010). Impact of Delaying School Start Time on Adolescent Sleep, Mood, and Behavior. *Archives of Pediatrics and Adolescents Medicines Journal, 164*(7), 608-614. doi:10.1001/archpediatrics.2010.96

Pieters, D., De Valck, E., Vandekerckhove, M., Pirrera, S., Wuyts, J., Exadaktylos, V., … Cluydts, R. (2014). Effects of Pre-Sleep Media Use on Sleep/Wake Patterns and Daytime

Functioning Among Adolescents: The Moderating Role of Parental Control. *Behavioral Sleep Medicine, 12*(6), 427-443. doi: 10.1080/15402002.2012.694381

Pollock, F. (1955) *Gruppenexperiment: Ein Studienbericht*. Frankfurt: Europäische Verlagsanstalt. In Flick, U. (2002). *An Introduction to Qualitative Research.* 2nd ed. London: Sage.

Power, S., Taylor, C., & Horton, K. (2017). Sleepless in School? The Social dimensions of young people's bedtime rest and routines. *Journal of Youth Studies*. *20*(8), 945-958. doi: 10.1080/13676261.2016.1273522

Public Health England (2016). Making Every Contact Count (MECC): consensus statement. https://www.england.nhs.uk/publication/making-every-contact-count-mecc-consensus-statement/

Roberts, R., Roberts, C., & Xing, Y. (2011). Restricted sleep among adolescents: Prevalence, incidence, persistence, and associated factors. *Behavioral Sleep Medicine, 9,* 18-30. doi: 10.1080/15402002.2011.533991

Royal Society for Public Health. Waking up to the health benefits of sleep. University of Oxford (2016). https://www.rsph.org.uk/uploads/assets/uploaded/50220c8f-febb-416e-8f3f7a4d2f973897.pdf

Sarchiapone, M., Mandelli, L., Carli, V., Iosue, M., Wasserman, C., Hadlaczky, G., ... Wasserman, D. (2014). Hours of sleep in adolescents and its association with anxiety, emotional concerns, and suicidal ideation. *Sleep Medicine*, *15*, 248-254. doi: 10.1016/j.sleep.2013.11.780

Short, M.A., Gradisar, M., Lack, L.C., & Wright, H.R. (2013). The impact of sleep on adolescent depressed mood, alertness and academic performance. *Journal of Adolescence, 36*(6), 1025-1033. doi: 10.1016/j.adolescence.2013.08.007

Silverman, D. (2011). *Interpreting Qualitative Data. A Guide to the Principles of Qualitative Research*. (4th ed.). London: Sage.

Sisson, S.B., Broyles, S.T., Newton Jr, R.L., Baker, B.L., & Chernausek, S.D. (2011). TVs in the bedrooms of children: Does it impact health and behavior? *Preventive Medicine, 52,* 104-108. doi: 10.1016/j.ypmed.2010.11.019

Smaldone, A., Honig, J.C., & Byrne, M.W. (2007). Sleepless in America: Inadequate Sleep and Relationships to Health and Well-being of Our Nation's Children. *Pediatrics, 119*(1). 29-37. doi:10.1542/peds.2006-2089F

Strauss, A.L., & Corbin, J. (1998) *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, 2nd edition. London: Sage.

Teixeira, L.R., Fischer, F.M., Nagai, R., & Turte, S.L. (2004) Teen at work: the burden of a double shift on daily activities. *Chronobiol Int 21,* 845-58. doi: 10.1081/CBI-200036878

Thomée, S., Dellve, L., Härenstam, A., & Hagberg, M. (2010) Perceived connections between information and communication technology use and mental symptom among young adults – a qualitative study. *BMC Public Health, 10:66.* doi: 10.1186/1471-2458-10-66

Tiggemann, M., Gardiner, M., & Slater, A. (2000). "I would rather be size 10 than have straight A's": A focus group study of adolescent girls' wish to be thinner. *Journal of Adolescence, 23,* 645-659. doi: 10.1006/jado.2000.0350

Vernon, L., Barber, B.L., & Modecki, K.L. (2015). Adolescent Problematic Social Networking and School Experiences: The Mediating Effects of Sleep Disruptions and Sleep Quality.

Cyberpsychology, Behavior, and Social Networking. *18.* 386-392. doi: 10.1089/cyber.2015.0107

Vernon, L., Modecki, K., & Barber, B. (2018). Mobile Phones in the Bedroom: Trajectories of Sleep Habits and Subsequent Adolescent Psychosocial Development. *Child Development*, *89*(1), 66–77. doi: 10.1111/cdev.12836

Wing, Y.K., Chan, N.Y., Man Yu, M.W., Lam, S.P., Zhang, J., Li, S.X., … Li, A.M. (2015). A School-Based Sleep Education Program for Adolescents: A Cluster Randomized Trial. *Pediatrics*, *135*(3), 635-43. doi: 10.1542/peds.2014-2419

Wolfson, A.R., & Carskadon, M.A. (1998). Sleep Schedules and Daytime Functioning in Adolescents. *Child Development*, *69*(4), 875-887. https://www.ncbi.nlm.nih.gov/pubmed/9768476

Wolfson, A.R., & Carskadon, M.A. (2003). Understanding adolescents' sleep patterns and school performance; a critical appraisal. *Sleep Medicine Reviews*, *7*(6), 491-506. doi: I0.1053/smrv.2002.025

Woods, H., & Scott, H. (2016). #Sleepyteens: Social media use in adolescence is associated with poor sleep quality, anxiety, depression and low self-esteem. *Journal of Adolescence*, *51*, 41-49. doi: 10.1016/j.adolescence.2016.05.008

Acknowledgements

This work was conducted as part of an MSc in Public Health at the University of the West of England. Thanks are extended to school staff and the pupils who took part, to note takers and proof readers, and to colleagues in Public Health for their support.