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- Sleep is essential for healthy adolescent development (Gruber et al,. 2014)
- Adolescents recommended 8-10 hours sleep/night (Hirshkowitz et al., 2015, Paruthi et al, 2016)
- 7 hours or less is deemed as insufficient level of sleep for adolescents (Hirshkowitz et al., 2015, Paruthi et al, 2016)
- No exact screen time guidelines currently exist (RCPCH, 2019, AAP 2016)
- Higher screen time has been related to poorer self-reported sleep outcomes (Carter et al, 2016, Hysing et al. 2015, Gamble et al., 2014, Mak et al, 2014, Mazzer et al, 2018)



Aim & Objective

Aim

• To examine the association between screen time and sleep outcomes in adolescents living in Ireland

Objectives

- To describe self-reported sleep outcomes
- To describe self-reported screen time usage
- To examine the association between self-reported screen time and self-reported sleep outcomes adjusting for the potential confounders



Literature Review

International sleep durations:

Average hours sleep per night:

- Australia 8.06 hours/night (Chaput and Janssen, 2016)
- Sweden 7. 5 hours/night (Mazzer et al, 2018)
- Hong Kong 7.28 hours/night (Cheung et al, 2016)
- Japan 6.3 hours/night (Ohida et al, 2004)
- Korea 5.4 hours/night (Yang et al, 2005)



Literature Review

Sleep measurement:

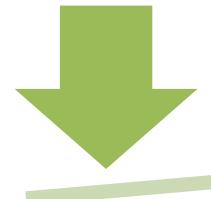
- Overnight polysomnography (PSG) (Bartel et al, 2019)
- Validated measures Pittsburgh Sleep Quality Index (Buysse et al., 1989)
- Self-reported questionnaires (Lang et al, 2015, Combs et al, 2017)

Screen time measurement:

- No validated subjective measures
- Self-reported questionnaires



Literature Review: Factors Affecting Sleep Outcomes



Improved Sleep Outcomes:

Physical activity (Bartel et al., 2014, Foti

et al., 2011, ACSM 2018)

Poorer Sleep Outcomes:

Biological changes (Crowley., 2018,

Carskadon 1993)

Mental health (Zhang et al., 2016, Lovato et al., 2014)

Screen time (Cain & Gradisar., 2010, Bartel et

al., 2014, Hale & Guan, 2014, Carter et al., 2016)





- A secondary analysis of 'Growing Up in Ireland: Wave 3' (n=6,216)
- Screen time, sleep and general health variables
- Analysis were conducted using SPSS software
- Descriptive, comparative and inferential statistics



Example of Sleep and Screen time variables

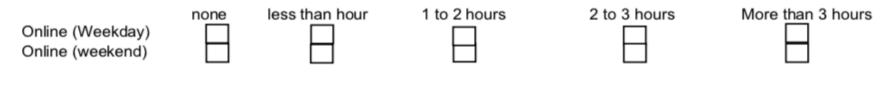
To measure sleep, participants were asked:

- 12. On a normal week-night, how long do you usually sleep? Do not include time you spend awake in bed. Hours Minutes
- 13. Do you have any difficulty with sleep?

Yes, a lot of difficulty		Yes, some difficulty		No		
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To measure screen time, participants were asked:

15. How much time do you spend on each of the following activities on a typical day (where it is your main activity at the time)? For each, please answer separately for weekdays and weekend days.





Results

Table 1: Descriptive data on participants (N=6,216)						
	n	%				
Gender						
Male	3,024	48.6				
Female	3,192	51.4				
Family SES						
High	3, 148	50.6				
Low	2,325	37.4				
BMI						
Healthy	4,553	73.3				
Overweight/obese	1,490	24.4				
No. days of 20mins hard exercise in past 14 days						
<5 day/14 days	3,724	59.9				
> 5 day/14 days	2,486	40.1				
Poor General Health	265	4.3				
Chronic physical/ mental health condition	830	13.4				



Results

Sleep variables

- Average sleep duration was 7.8 hours per night (SD ± 1.14)
- 9% reported sleeping ≤ 7 hours per night
- 30% reported sleep difficulties

Screen time variables

- 32% reported online screen time usage of >3 hours on weekdays and 38% on weekends
- 82% report regularly messaging friends on media devices before bed
- 83% report regularly surfing the internet before bed



- Being female, having 'poor' general health, having a chronic physical/mental health condition, less than 7 hours sleep and >3 hours/day online screen time were sig associated with having sleep difficulties (p < 0.001)
- Being female, having a lower family SES, having a chronic physical/mental health condition, being overweight/obese, and > 3 hours/day online screen time were sig associated with sleeping less than 7 hours per night (p < 0.001)



Logistic Regression Results

Table 2: Logistic regression final model for the effect of weekday online screen time on sleep difficulties

	Adjusted OR ⁺	95% CI	P Value ⁺
Weekday online screen time ^a	1.30	(1.12-1.50)	< 0.001
General health ^c	2.59	(1.92- 3.49)	< 0.001
Chronic physical/mental health condition ^e	2.18	(1.82-2.60)	< 0.001
Hard exercise ^d	.78	(0.68- 0.89)	< 0.001

^a Weekday time online; online screen time of greater than 3 hours per day

 $^{\rm c}\,$ GenHealth; 'poor health' categories created by combining 'fair and poor'

^d Hard Exercise participate in 20 minutes of hard exercise in 5 of the past 14 days

^e Chronic physical/mental condition;: self-reported chronic physical or mental health disease or condition

⁺ P Values and Adjusted Odds Ratios are calculated from multivariate logistic regression

* Bonferroni Correction p value = .05/7= .00714



Logistic Regression Results

Table 3: Logistic Regression final model for the effect of weekday online screen time on sleep duration (≤ 7 hours)

	Adjusted OR ⁺	95% CI	P Value ⁺
Weekday online screen time ^a	1.80	(1.47-2.22)	< 0.001
General health ^s	3.12	(2.21-4.42)	< 0.001
Chronic physical/mental health condition ^e	1.63	(1.26-2.11)	< 0.001
Hard exercise ^d	.65	((0.52-0.81)	< 0.001

^a Weekday time online; online screen time of greater than 3 hours per day

^b BMI Category: BMI of greater than 25kg/m^{2 P}

• ^c GenHealth; 'poor health' categories created by combining 'fair and poor'

• ^d Hard Exercise participate in 20 minutes of hard exercise in 5 of the past 14 days

• • • Chronic physical/mental condition; self-reported chronic physical or mental health disease or condition

* P Values and Adjusted Odds Ratios are calculated from multivariate logistic regression

• * Bonferroni Correction p value = .05/7= .00714



- Large % spend > 3 hours weekday/weekend on online screen devices
- *Online screen time was associated with sleep difficulties and insufficient sleep durations
- 3 potential mechanisms for poorer sleep outcomes (Cain and Gradisar, 2010)
 1) Blue Light
 - 2) Cognitive arousal
 - 3) Sleep displacement
- Physical activity was identified as a protective factor for sleep duration and sleep difficulties



Discussion

Strengths

- Large, nationally representative sample size
- Two stage randomisation
- High quality data collection

Limitations

- Cross sectional design
- Specific to online screen time
- Self-reported measurement of sleep/screen time
- Struggle of research to keep up to date with technological advances



Implications

- Identified patterns in Irish adolescent
 - 1) Sleep behaviours
 - 2) Online screen time usage
- These findings have implications for researchers, public health practitioners and parents
- This may help guide and support educational campaigns in relation to healthy screen time usage and improving sleep behaviours in adolescents.



- Almost 1 in 10 Irish adolescents are not getting sufficient levels of sleep each night
- One third of Irish adolescent report sleep difficulties
- Large % of Irish adolescents spend > 3 hours online screen time on weekdays and weekends
- There is an association with higher online screen time (>3 hours/day) and poorer sleep quality and sleep duration in Irish adolescents
- Further longitudinal and experimental research with objective measurements is needed in this area



Thank you

Questions?



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