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Association of Excessive Use of Electronic Devices with Musculoskeletal Symptoms, Vision, Psychosocial Health, and Activities of Children and Adolescents in Hong Kong

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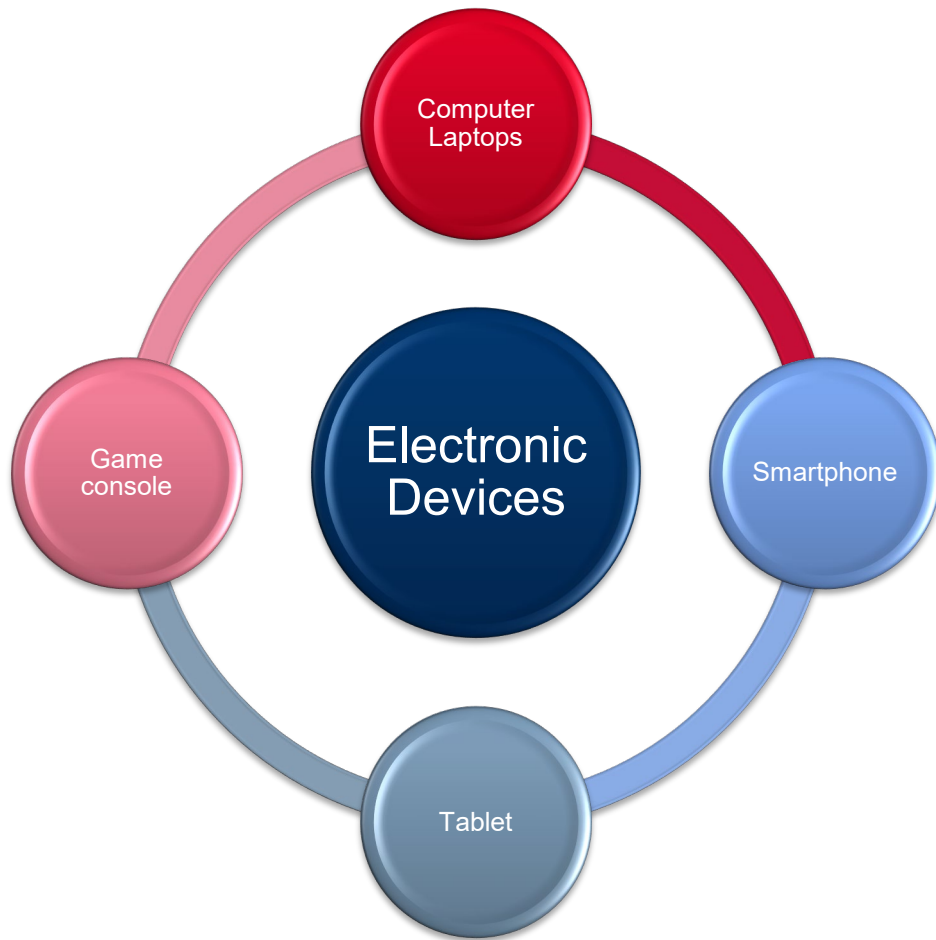


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Background of Study



Electronic Devices

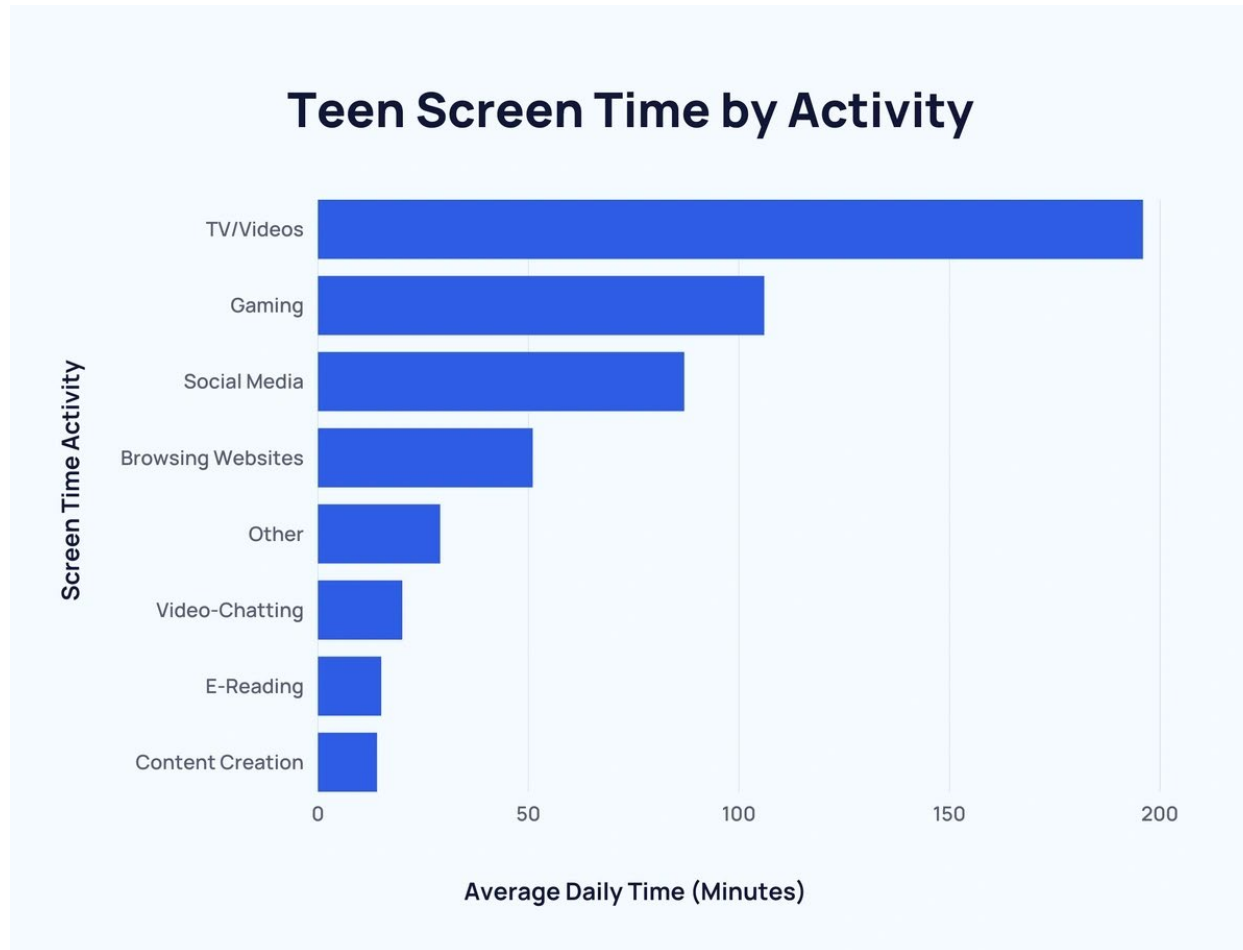


Other devices:

- TV
- Smartwatches & fitness trackers
- Audio devices and portable media players
- e-readers
- Digital cameras

Screen time and activity

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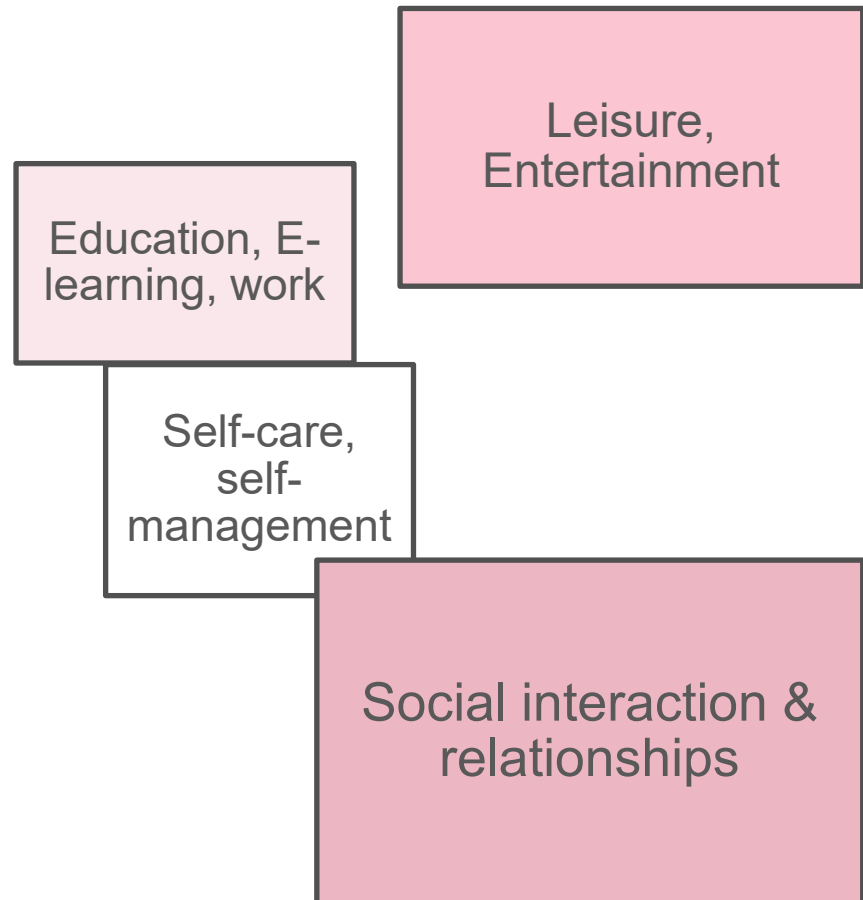


What is Excessive Use? Use on what? Healthy Screen time is 2 hours/day?

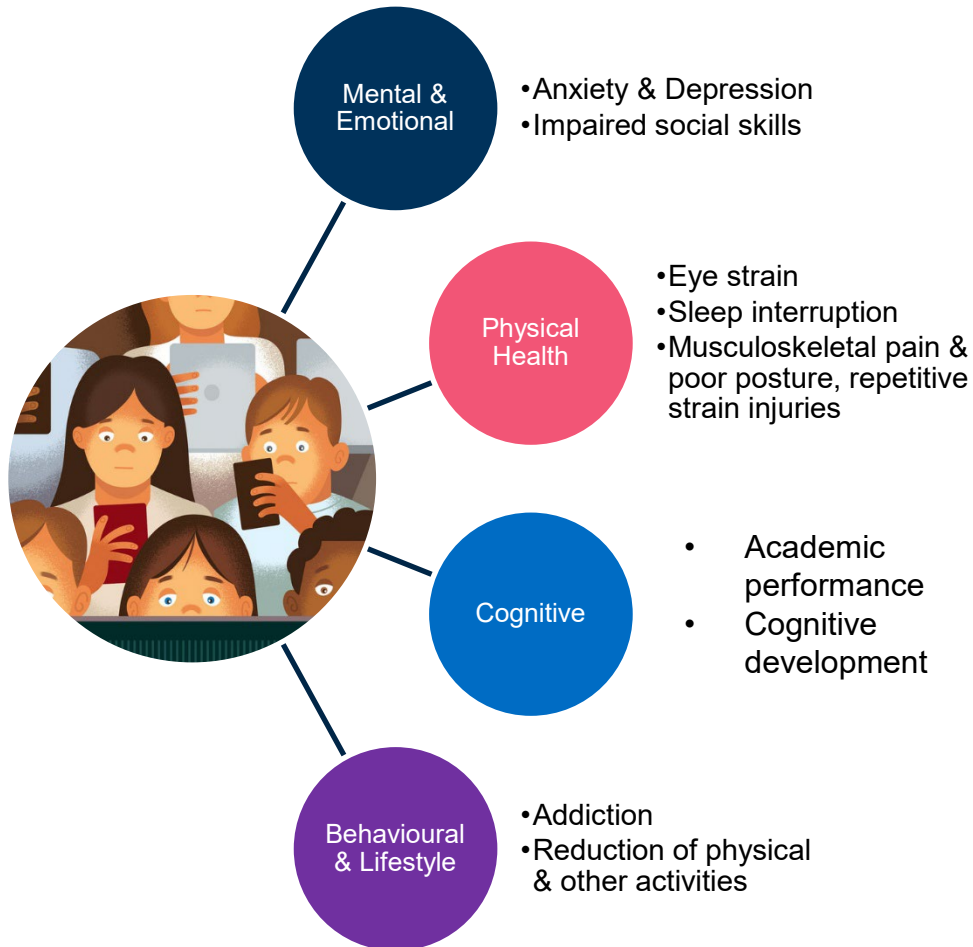
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Most Used Apps:

TikTok, IG, Snapchat,
Facebook, X, Whatsapp,
FB messenger, Discord,
Youtube, Netflix, Roblox,
Fortnite, Spotify, Apple
Music, Khan Academy,
Google Classroom.



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Current research

- In most developed countries, use of electronic devices & screen time far exceed recommended guidelines.
- Much time is spent on watching videos, online gaming, social media, chatting, browsing, not on education, learning, or self-management.
- Lots of studies on impact of screen time (and device use) on mental health, academic performance, addiction.
- Much less investigations on physical health like:
 - Eye strain or vision
 - Musculoskeletal issues: pain, posture, strain
 - Time use of activities



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Method



Objectives

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Identify amount of device use and symptom severity (musculoskeletal, vision-related, psychosocial health, time use).



Explore relationship (association/correlation) between device use and symptom severity.

Hypotheses

More than 50% of participants spend more than 2 hours on electronic devices

Older adolescents use device more, and have more symptoms than younger

More device use is associated with higher prevalence and severity of musculoskeletal, vision-related symptoms.

Participants

- Convenient sample from three schools
- Participants are primary 5-6 or secondary 1-4 (Grades 5-10).
- Can complete English or Chinese questionnaire independently.
- Parent consent obtained.
- 1058 out of 1152 completed questionnaire.
- Health screening activities to engage more potential participants in schools.

Questionnaire

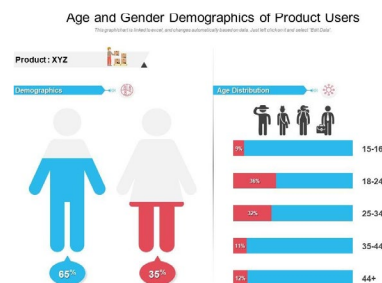
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Online and hard copy available.

Develop indexes by expert opinion, literature review, & user opinion:

- Musculoskeletal Discomfort Index (MDI)
- Eye Discomfort Index (EDI)
- Device-Related Psychosocial Health Index (DRPHI)

Measures



Demographics



Musculoskeletal



Vision



Psychosocial, Lifestyle



Results & Discussion

Demographics

12.83 years (SD, 1.76; range, 9 to 17).

50% male and 50% female

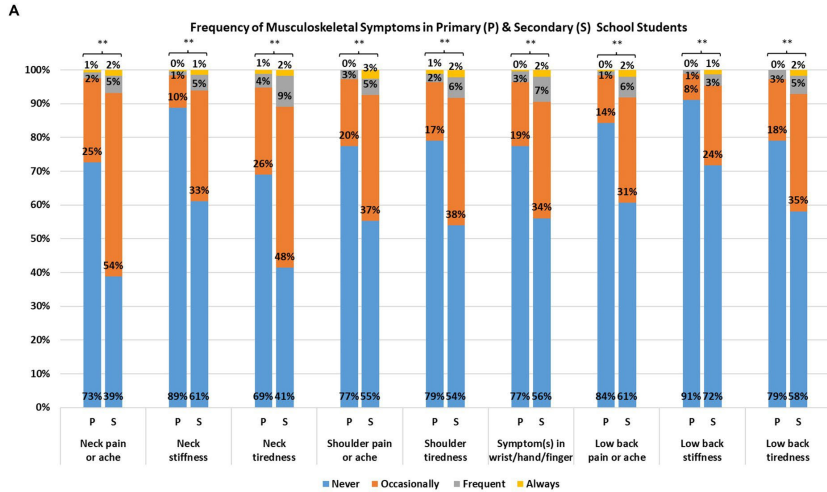
Class year	<i>n</i> (%)
Primary 5	129 (12.19%)
Primary 6	119 (11.25%)
Secondary 1	237 (22.40%)
Secondary 2	191 (18.05%)
Secondary 3	192 (18.15%)
Secondary 4	190 (17.96%)

Device Use

- 61% of primary and 78% of secondary school students spent more than 2 hours on device use (school and weekend/holidays)
- secondary school students reported a greater use of electronic devices than did the primary school students.

Musculoskeletal (MSK) Symptoms

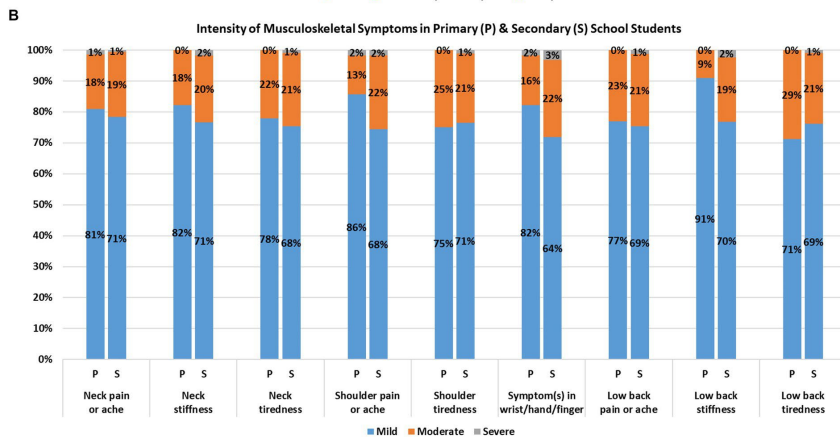
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Highest prevalence in the neck region:

- neck pain or aches (53%)
- neck tiredness (52%).

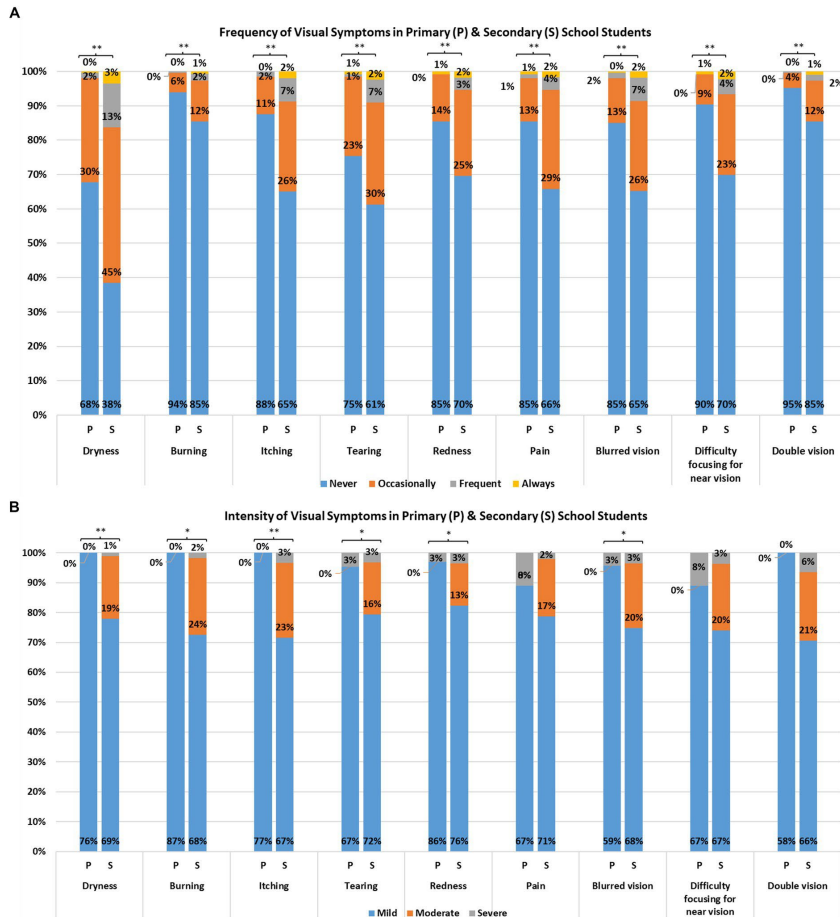
Intensity of pain/ache is moderate to high in around 20% of participants.



Due to sustained muscle contraction, poor posture, lack of breaks

Other symptoms are in shoulder, hand/wrist, low back.

Vision-related symptoms



Most common symptoms is eye dryness (55%). Other symptoms are tearing, itching, pain, blurred vision (25-30%). Intensity of symptoms are not strong.

May be due to lack of blinking, constant accommodation on a small screen, blue light.

Psychosocial Health

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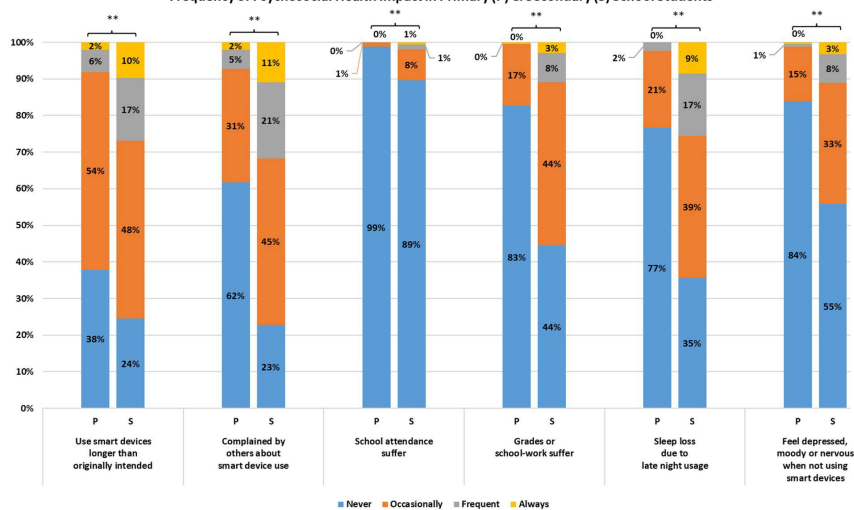
Key impact is

- Sleep deprivation
- More conflicts with parents/family

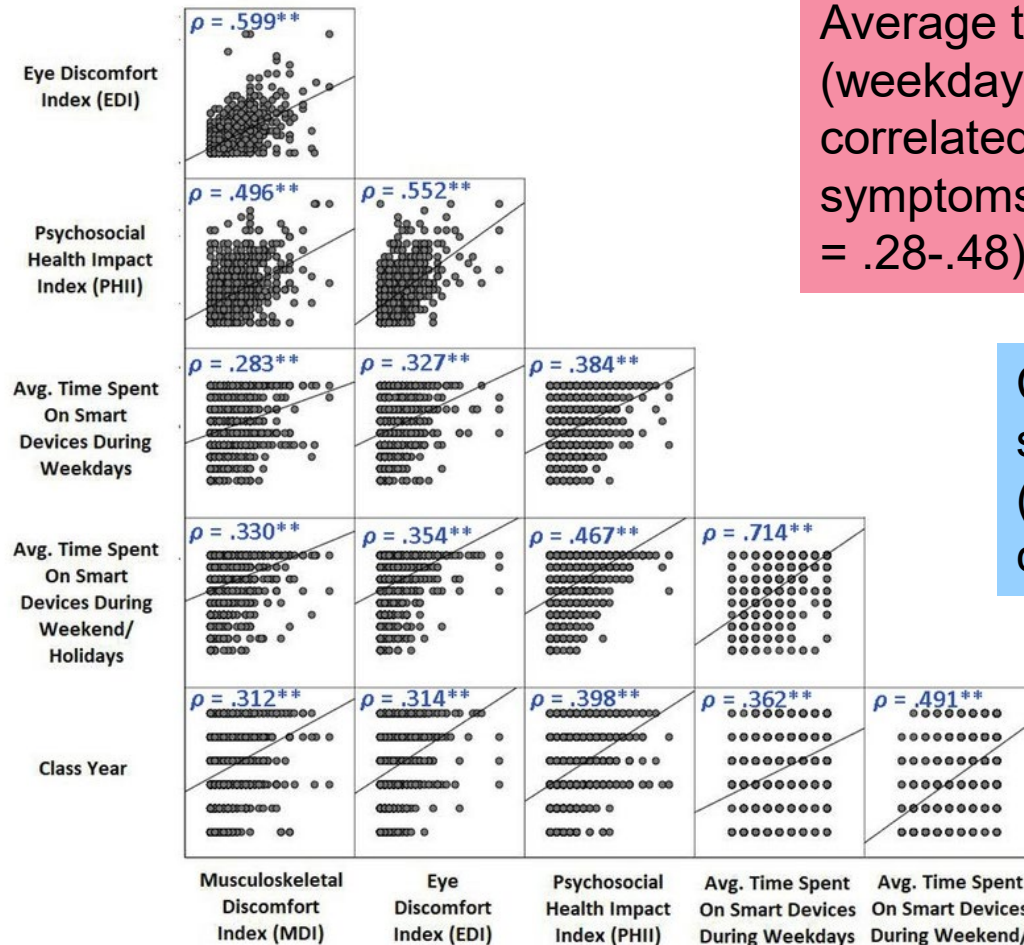
Followed by Academic performance

Reduced engagement with other activities like study, exercise, outdoor, chores.

Frequency of Psychosocial Health Impact in Primary (P) & Secondary (S) School Students



Correlations

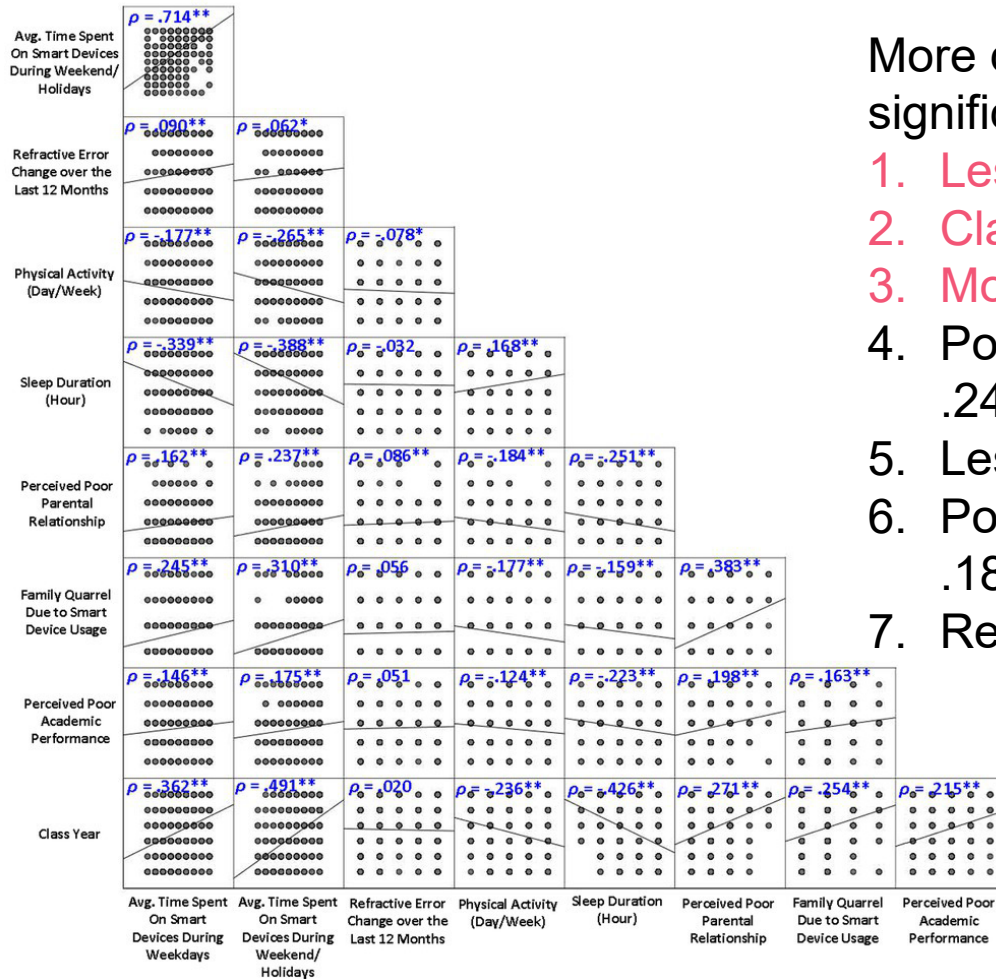


Average time spent on devices (weekdays or weekend/holidays) correlated moderately with MSK, eye symptoms, & psychosocial health ($\rho = .28-.48$)

Class Year correlated significantly with symptoms ($\rho = .31$ to $.40$). Higher class \rightarrow more symptoms.

Three groups of symptoms are moderately correlated ($\rho = .50$ to $.60$).

Correlations



More device use correlated (ρ) significantly with:

1. Less Sleep (-.34 to -.38)
2. Class Year (.36 to .49)
3. More Family Conflicts (.35 to .31)
4. Poor relationship with parents (.16 to .24)
5. Less Physical activity (-.18 to -.27)
6. Poorer academic performance (.15 - .18)
7. Refractive Error (.09 to .06)

Conclusion

- All three hypotheses are supported.
- Time use of devices far exceed health guidelines.
- Impact on musculoskeletal > psychosocial > vision symptoms.
- Intensity of symptoms tends to be mild to moderate.
- Some aspects are prevalent in over 50% of participants: e.g. neck pain and tiredness, eye dryness, sleep deprivation, conflict with parents.
- Mild to moderate correlations between device use and all three types of symptoms
- Symptoms are significantly higher in secondary than primary school students.

Other Aspects of Research Project 18 July 2024

Health screening activities.

Workshop for parents on managing gaming behaviour of children.

Group motivational interviewing programme for adolescents with risk for gaming disorders.

Paper published:

[Tsang, S.M., Cheing, G.L., Lam, A.K., Siu, A.M., Pang, P.C., Yip, K.C., Chan, J.W. and Jensen, M.P., 2023. Excessive use of electronic devices among children and adolescents is associated with musculoskeletal symptoms, visual symptoms, psychosocial health, and quality of life: a cross-sectional study. *Frontiers in Public Health*, 11, p.1178769.](#)