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Screen time use patterns and health trends in children attending a children's psychiatric outpatient department

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SCREEN TIME USE PATTERNS AND HEALTH TRENDS IN CHILDREN ATTENDING A CHILDREN'S PSYCHIATRIC OUTPATIENT DEPARTMENT

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A Dissertation Submitted to the Faculty of Health Sciences, University of the Witwatersrand, in fulfilment of the requirements for the degree of Master of Medicine.

Johannesburg, 2021.

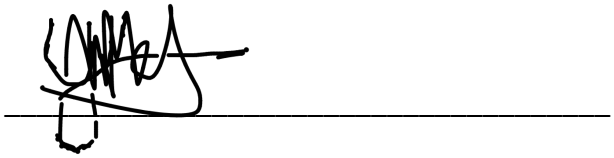
DECLARATION:

I, Liesel Aldrich, declare that this Dissertation Report is my own, unaided work. It is being submitted for the Degree of Masters in Medicine at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



Liesel Aldrich (Student)

Date: 17 November 2021 Place: Johannesburg



Yvette Nel (Supervisor)

Date: 17 November 2021 Place: Johannesburg

Dedicated to my Husband,

F.P. Aldrich

and my children,

Heike and David.

PRESENTATIONS ARISING FROM THIS STUDY:

Poster presented at the 20th Congress of The South African Association of Child & Adolescent Psychiatry and Allied Professions (SA-ACAPAP), 23 to 25 May 2019, at The Wanderers Club, Illovo, Johannesburg, South Africa

ABSTRACT:

Background: Screen time use can be defined as time spent on electronic devices; this includes computers, televisions, smartphones, gaming devices and tablets. It is hypothesised that higher amounts of screen time use could be associated with mental health conditions amongst children and adolescents.

Aim: This study described screen time use patterns as well as patterns of family socialisation, sleep, eating and body mass index (BMI) and psychiatric conditions in a group of children attending the Tara Children's Outpatient Department, Johannesburg.

Methods: A convenience sample of 75 families with children and adolescents aged five to seventeen were recruited in the children's clinic outpatient department at Tara Hospital over a nine-month period from August 2019 to May 2020. Families were invited to participate while waiting for scheduled follow up appointments. A self-report questionnaire was completed by the caregiver, and the psychiatric diagnosis was obtained from the file. Weight and height measurements were completed by the attending health care professional and attached to the questionnaire.

Results: Four questionnaires were excluded from further analysis as the primary question regarding screen time use was not completed. All children in the sample had access to some form of device with a screen. Smartphones were the most common device the sample had access to (n=45, 69.0%). Most of the sample used more than two hours of screen time during weekdays (n=37, 52.1%) and weekends (n=62, 87.3%). The majority of the respondents reported a restriction on the amount of time the children and adolescents were allowed in front of a screen (n=52, 73.2%). The majority of children were diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) (n=52, 73.2%).

Conclusion: This study is representative of a small group of families attending the Tara Children's Outpatient Department. International and local guidelines recommend screen time use of less than two hours per day in school-going children. Although parents or caregivers in this study implemented screen time use restrictions, this study noted a dissimilarity between those who implemented screen time restrictions and screen time use of less than or equal to two hours per day. Families and health care professionals should be educated about international and local recommended screen time use guidelines, and families should be encouraged to develop their own media use plan.

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NOMENCLATURE:

ADHD: Attention Deficit Hyperactivity Disorder.

CJCP: Centre for Justice and Crime Prevention.

NIH: National Institute for Health.

REM: Rapid eye movement.

UNICEF: United Nations Children's Emergency Fund.

U.S.: United States.

USA: United States of America.

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CHAPTER 1: INTRODUCTION

1.1 LITERATURE REVIEW

1.1.1. Screen time in children and adolescents

Time spent using devices such as computers, televisions, tablets, smartphones or game consoles, all defined as screen time use, is increasing worldwide among children and adolescents.[1-3] Screen time can be categorised into broadcast and interactive media. Television, movies or media streaming through web-based applications are examples of broadcast media, while social media, blogs, websites, user-generated content and gaming are examples of interactive media. Screen time can also be viewed as recreational or educational, depending on the context and content. The impact of increasing amounts of time spent in front of screens by children and adolescents, as well as the content of the screen time, is beginning to be described in the literature and includes both positive and negative effects on mental and physical well-being. As a result, recommendations were developed to guide screen time use in children and adolescents.[2-5]

1.1.2. Physical effects of screen time use on children and adolescents

Research regarding the physical effects of screen time use in children and adolescents is inconclusive as the quality of studies and results are inconsistent, and the differentiation between active and passive screen time is often not made.

Stiglic *et al.*[6] conducted a systematic review that concluded an association between higher television screen time use and obesity, but no association between obesity and non-television screen time or overall screen time. A decrease in BMI was noted with an intervention of decreased television screen time.[6] An association between higher energy intake and television screen time was also noted. The systematic review noted some limitations amongst the studies reviewed regarding the difference in defining screen time use, defining health outcomes and measurement tools.

Compulsive screen time use has been associated with poor nutritional habits in adolescents.[6] Franckle *et al*.[7] conducted a study on children aged eight to thirteen and found a significant association amongst children who slept less than ten hours per night and poor dietary habits. A Dutch study amongst adolescents aged 11-17 found an association between watching television longer than 14 hours per week and being overweight.[8]Wethington *et al*.[9]concluded that children and adolescents who combined excessive screen time with a television in the bedroom are a risk factor for developing obesity.[9]

Bruni *et al*.[10] conducted a comparative study on technology use and sleep quality in Italy, which included 850 pre-adolescent and adolescent children. They found a negative association with sleep quality in the sample that utilised screen time after 21h00. Delayed bedtimes, shorter sleep duration, and a higher level of sleep disturbances were associated with the group which had more than four devices available in their rooms. [10] Screen time use could affect sleep through different mechanisms.[11] Night time screen time use can lead to bedtime delay in order to prolong the entertainment available on media devices.[11]Arousal in different forms (psychological, emotional and physiological), as well as the light emitted by media devices, impacts the onset of sleep as well as decreases REM sleep.[11]

A longitudinal study conducted in Australia between 2010 and 2014 found associations between screen time use and children's physical health, the impact varying based on the type of screen time use.[12] No adverse outcomes were associated with educational screen time use. This study proposed that the risk of screen time use is not necessarily linked to the amount of screen time use, but the content should also be taken into consideration. [12]

1.1.3. Mental health effects of screen time in children and adolescents

Screen time use can assist with beneficial emotional well-being outcomes for children, which can include: learning and creating, connecting with others and community action and engagement. [3] With the increased amount of screen time use, there is a concern about the internet and online safety as well as possible adverse effects of screen time use; however, families are noted to invest in digital devices to further their children's education, for social and family connection and entertainment. [3]

The data looking into the possible benefits of screen time use is limited. A review conducted in the United States of America (USA) suggested that the core qualities of friendship, including validation, companionship and conflict, are present in online peer relationships. [13] The American Association of Pediatrics listed benefits of screen time which included exposure to new information or ideas, promoting community participation, collaboration, communication, access to support systems, social inclusion and behavioural modifications. [2] Some authors suggest that screen time helps children to unwind, and may offer opportunities to stimulate their minds in fun ways.[14] Watching or reading educational content could be a good learning platform, and it can be used as a means of communicating and strengthening interpersonal relationships.[15] Another benefit of screen time is the use of technology-aided media devices to improve communication in children with disabilities.[15]

Risks to emotional well-being associated with screen time use can be categorised as conduct risks, content risks, contact risks and commercial risks. [3] Bullying, 'sexting', exploitation of children by sex offenders and misuse of personal information are examples of conduct risks. Content risks could include violent, racist, or false content. Contact risks include harassment or stalking, and advertising or hidden marketing are examples of commercial risks. [3] Cyberbullying can take many forms, including spreading rumours, impersonation, exclusion or harassment. The available USA and Canadian studies reported between 11-25% of children and adolescents falling victim to cyberbullying. Victims of cyberbullying can always be reached, and lack of supervision makes it the ideal form of bullying. [2,3,16]

Screen time use and violent, fast-paced content activate the dopamine reward pathway, which can lead to ADHD-related behaviour. It is also suggested that Dopamine release within the striatum during video gaming could be compensating for dopamine deficiencies in children and adolescents diagnosed with ADHD. Screen time behaviour can lead to addictive behaviour in the form of cognitive control and emotional regulation, which can lead to poor social coping and craving behaviour similar to substance dependence behaviour.[17,18]

Weiss *et al.*[19] found a higher risk of developing internet addiction amongst children with ADHD when compared to controls. Children who were thought to be addicted to the internet and diagnosed with ADHD, but were treatment naïve, were treated for eight weeks with methylphenidate, which lead to a decrease in internet and screen time use. [20] The two-year prospective study by Chih-Hung *et al.*[18] found that ADHD and hostility were risk factors for developing internet addiction. Amongst female adolescents, depression and social phobia were also leading risk factors for developing internet addiction. [18] It is suggested that children with ADHD can be easily bored and seek immediate gratification, which could put them at risk of seeking screen-based activities. [19] Busch *et al*.[8] conducted a study on adolescents aged 11-18, which found that adolescents using the internet for more than 14 hours per week reported higher incidents of hyperactivity.

Twenge *et al*.[21] looked at the association between screen time use and psychological well-being. The authors' defined psychological well-being as relationships with parents or guardians, emotional stability and self-discipline.[21] The also included diagnoses of mood disorders and treatment of mental health difficulties.[21] The well-being of children and adolescents who spend more than one hour on screen time per day was impacted; however, spending less than one hour on screen time per day was associated with no effect on well-being. [21]

All children aged two – seventeen using more than four hours of screen time per day had a decrease in curiosity when compared to children with less than one hour of screen time per day. [21] There was also an association between screen time use of more than four hours per day and difficulties with task completion in children aged six to seventeen compared to those who used less than one hour of screen time per day.[21] Adolescents aged 14-17 had a higher association with being diagnosed with anxiety and depression when using more than four hours of screen time per day. [21]

Dickson *et al*.[22] conducted a systematic review looking at the screen time use and mental health associations, longitudinal risk factors and consequences in 11 studies including children and young adults aged 25 and below. In this review, nine of the studies looked at associations, and six of the nine studies found an association between screen time use and depression.[22] Aggression, anxiety, suicidality and ADHD were less frequently associated with screen time use. [22]

Chinese Adolescents who reported more than two hours of television viewing per school day were found to have an associated risk of developing depression, anxiety, emotional, behavioural and social problems, and oppositional defiant problems when compared to adolescents with no television exposure. [23]

1.1.4. Guidelines and recommendations regarding screen time use in children and adolescents

In addition to international guidelines, local guidelines are consistent with regards to recommended limits on screen time for children and adolescents. The American Academy of Pediatrics recommends that screen time should be restricted, and each family should create their media use plan. [2] It is further recommended locally and internationally that children younger than 18-24 months should avoid screen time, or the use of screen time should only be limited to video chatting if needed, and that children aged two to five should have a maximum of one hour screen time per day. There is a consensus internationally regarding time limit recommendations for screen time use for older children and adolescents. Guidelines from Australia, Canada and South Africa suggest children and adolescents aged five to seventeen should have less than two hours of screen time use per day.[2,24-27] In addition, the American Academy of Pediatrics also recommends that children and adolescents get one hour of physical activity per day and eight to twelve hours of sleep at night. [2] Parents are urged to understand the context, content and connections of their children's media use.[2-4]

Schmidt *et al*.[28] found statistically significant reductions in screen time use where clinic-based interventions were implemented. These interventions included counselling and training provided by health care professionals.[28] The authors attributed this to the fact that caregivers might be more amenable to change given the setting where information is provided.[28]

1.1.5. International patterns and trends in screen time in children and adolescents

Worldwide, there has been an increase in screen time and access to devices among children and adolescents, with the Pew Research Centre's online survey conducted in 2018 in the USA finding that 95% of teenagers between the ages of 13-17 have access to a smartphone, an increase from 73% in a similar study conducted by the centre in 2014.[1] This study also found that 88% of teenagers reported having access to a computer in 2018, increasing from 87% in 2014. [1,29] Similarly, only 47% of British children aged between three and seven years of age used tablets with internet access in 2005. This figure increased to 61% in 2015.[2,3]

A 2007 United States (U.S.) based survey of Children's Health found that 20.8% of Children aged six to 11 years of age spent more than two hours per day using screens, and 27.6% of these children reported having a television in their room. They also found that 26.1% of children aged 12-17 spent more than two hours per day using screens, of which 30.5% had access to a television in their room.[9] The common sense census report published in 2019 looked at media use of U.S. children aged eight - eighteen. [30] Tweens (children aged eight to twelve years of age) used on average four hours forty-four minutes of screen time per day, and teenagers aged 13-18 years of age used on average of seven hours twenty-two minutes per day. These figures are excluding time spent on screens for education purposes. A recent study by Twenge *et al.*[21] based in the USA as part of the National Survey of Children's Health found that children aged two to five used an average of 2.28 hours of screen time per day, and children aged six to ten used 2.78 hours per day. The group aged 11-13 used 3.80 hours of screen time per day, and children aged 14-17 spent 4.59 hours per day on screens.[21]

A longitudinal study conducted by Twenge *et al*.[5] found that the adolescent's self-reported screen time use measured in hours per day during leisure time increased between 50-75 for the period 2006 to 2016. This increase was not influenced by race, gender or socioeconomic situations. [5]

1.1.6. South African patterns and trends in screen time use in children and adolescents

There is a paucity of data from South Africa regarding screen time averages and usage among South African children and adolescents, as well as patterns and trends in usage. A recently published South African Study looking at screen time use and sleeping habits of preschool children aged three to six years in urban and rural areas of South Africa found that South African children spent on average 3.38 hours per week during weekdays and 3.44 hours during weekends using all types of screens. There was a significant difference in usage patterns between high income and low-income families and urban and rural settings. It was also found that 81.9% of preschool children in this study population used less than the recommended screen time of one hour per day.[31]

As part of the Global Kids Online initiative, a pilot study was conducted by the Centre for Justice and Crime Prevention (CJCP) and the United Nations Children's Emergency Fund (UNICEF) in South Africa in 2016. [32] Children aged nine to seventeen residing in Gauteng, Western Cape and Eastern Cape were interviewed. The researchers found that 70.4% of children had access to the internet, and 80.2% of children had access to a Smartphone. Most children reported using their devices for instant messaging (85.8%), to learn something new (76.5%), to visit a social network site (64.2%) or to listen to music (63.1%). One in five children from the sample experienced unwanted sexual content exposure, including receiving messages about advertisements for X-rated websites (20.5%), messages or links of naked people or people having intercourse (19.2%) and sexual messages about someone else (20.3%). This report is an underrepresentation of the South African population due to sample bias. [32]

1.1.7. Factors associated with differences in patterns of screen time in children and adolescents

1.1.7.1. Socioeconomic factors

The research looking into the association between socioeconomic factors and screen time use is limited. Rodrigues *et al*.[33] conducted a cross-sectional study in Portugal from 2016 to 2017, looking at social inequalities and screen time use amongst 8430 children aged three to ten. They found that children from higher socioeconomic status were more likely to spend less time per day using screen time. A longitudinal cohort study in England from 2012 until 2016 looking at children aged six and nine found an association of lower screen time use in children coming from a higher socioeconomic status.[34]

In contrast, a cross-sectional study conducted in Iran in 2015 found some association between children aged ten to twelve who used more than two hours of screen time per day and parents with higher socioeconomic status linked to parental academic backgrounds. [35]

It is suggested that families with lower-income often invest and make considerable sacrifices to purchase media equipment.[3] Low-income families might use free or low-cost educational content or use screen time for distraction. [3] Some parents from lower-income households might also spend less time mediating screen time use and prioritise unstructured screen time.[3]

1.1.7.2. Caregiver imposed limits on screen time use

Children with heavy restrictions on their access to the internet have less exposure to risk; however, they also have fewer opportunities for learning and engagement .[3] Heavy, restrictive parents often do not involve their children in decision-making which could lead to a missed opportunity to culture a sense of trust.[3] Activity constraints which include rules about specific screen-based activities or applications (e.g. WhatsApp or Twitter) are easier to enforce than context-specific rules about screen time use (e.g. no phones at the table). [3] Banning social media or involvement in other media-based activities could lead to children feeling cut-off from their peers. [3] Avoiding risks could lead to impaired coping strategies and reduce resilience. [3]

The effects of screen time use are subject to the type of device used and the content that the child is exposed to.[15] Limits regarding screen time should therefore include time as well as content limits. The American Association of Pediatrics recommends that families develop their own Media Use Plan that takes into consideration the age, temperament and developmental stage of children when imposing restrictions on screen usage. [15]

There is evidence to suggest that imposing limits and conditions on screen time usage can result in decrease screen time usage and improve physical health. [36-38] A randomised controlled study in the USA providing counselling, or counselling in addition to an electronic television time manager, reported decreased screen time use in both study groups. [38]

Goldfield *et al*.[36] conducted a randomised controlled study in Canada, encouraging children to accumulate a certain amount of physical activity to earn one hour of screen time. This intervention resulted in an increase in daily physical activity, decreased daily screen time use and improved body composition in the intervention group.[36]

The USA National Institute for Health (NIH) has published a list of caregiver imposed strategies and restrictions on screen time in order to reduce screen time usage and increase physical activity. [37] These strategies include knowing how much screen time and physical activity the family is getting, setting time limits on screen time, avoiding access to a computer or television in bedrooms, encouraging extracurricular activities and socialising and taking a break from screen time every 30 minutes. [37,39] Schmidt *et al*.[28] found that the most effective strategy to reduce screen time use was by means of electronic monitoring systems.

1.1.7.3. Family dynamic factors

Tang *et al*.[40] looked at cross-sectional associations between family stress and parenting screen time practices. In this study based in Canada, data was collected from 39 families – in which they found a decrease in parental monitoring of screen time and subsequent higher parental screen time use in front of their children in the background of parents with higher levels of stress. The study also theorised that children who get involved in the activities of the house created more chaos by trying to help organise compared to being occupied with screen-based activities – making it easier for parents to complete household chores whilst children are occupied with screens, which would lead to increased screen time use.[40]

1.1.7.4. Family Mealtimes, Convenience Meals and Caffeine

Family dinners have changed drastically across generations. The silent generation (people born 1929-1945) and baby boomers (people born 1946-1964) enjoyed daily family dinners together at the table during their childhood years. Generation X (people born 1965-1980) and Millennials (people born 1981-2001) enjoyed family dinners together at the dinner table four to five times per week during their childhood years. [41] Millennials currently only enjoy dinner two to three times per week together as a family, and it should be noted that this dinner could be shared in front of the television or in a restaurant or at the dinner table at home.[41]

The American Academy of Pediatrics recommends that families have screen time free periods by spending family dinner together. [2]

The Importance of Family Dinners II conducted in 2005 found that 24% of teens desired more frequent family dinners; this increased to 52% in adolescents who had less than three dinners with their families in a typical week. [42] This same study found that 37% of adolescents reported that the television was on during family dinners, which increased to 45% in the group of families who enjoyed less than three family dinners together per week. Some families consider the fact that the television is on during mealtimes an educational opportunity.[42] Parents of children younger than seven years of age reported that it was a way to try and avoid conflict. [42,43]

Family mealtimes have also been shown to have a direct association with mental health. Children who had less than two meals per week with both parents were found to have a higher score on the Children's Depression Inventory compared to children who had three or more meals per week with both parents. [44]

1.1.8 Summary of literature review

Screen time use is increasing worldwide among children and adolescents. The possible impact, effects and benefits are being described in the literature. Guidelines regarding screen time use have been developed. [1,2,3,4,5] International guidelines recommend that children and adolescents limit their screen time use to less than two hours per day. In addition, it is recommended that children and adolescents get one hour of physical activity per day and eight to twelve hours of sleep at night.[2,3,4,25]

A large number of children and adolescents worldwide use more than two hours of screen time per day. Increasing numbers of children and adolescents have access to devices with screens. [1,2,3,5,18,27,28] There is emerging evidence that the majority of children and adolescents in South Africa have access to the internet or smartphones. [30]

Obesity, poor nutrition, increased sedentary behaviour, and poor sleep outcomes are possible physical associations with higher screen time use. The amount of family dinners shared per week is also decreasing. This could also contribute to depressive symptoms, negative impacts on emotional well-being and mental health.[5,6.7,8,9,10,38,39,42,43,44]

Children exposed to screen time are at risk of being exposed to various emotional detrimental effects, including conduct, contact or commercial impacts. Violent and fast-paced content activates the Dopamine reward pathway, which could result in addictive behaviour. Screen time use was mostly associated with depression and anxiety in children and adolescents. [3, 11,12,13,14,15,16,18,19]

Screen time use can have beneficial outcomes for children and adolescents. Learning and creating, connecting with their peers or the community and engagement are some of the positive emotional outcomes of screen time use. Technology aided devices to assist communication in children with disabilities is another positive outcome of increased screen time use. [3, 11,12,13]

Regular screen-free family dinners could lead to improved psychological, emotional and physical well-being. Discretional activities and leisure time should also be part of the regular family routine. This can include screen-free or screen-based activities. [42,43,45-49]

There is no clear research on the associations between screen time usage and socio-demographic and clinical factors in children and adolescents with mental health disorders in South Africa, nor on the relationship between mental health disorders and screen time patterns. Family dynamic factors and screen time usage in children and adolescents with mental health conditions in South Africa have also not been studied.

1.2 AIM OF THE STUDY

This study aims to describe the screen time usage, the patterns of family socialisation, individual sleep and eating habits of children and adolescents attending the Tara Hospital children's outpatient department, and to determine associations between screen time use and family socialisation, sleeping and eating habits, body mass index (BMI) and psychiatric disorders in a group of children and adolescents attending the Tara Hospital's children's outpatient department.

1.3 OBJECTIVES OF THE STUDY

- To describe the nature of the screen time usage of children attending the Tara children's outpatient department, including duration of screen time usage per week and type of screen used.
- To determine the statistical relationship between screen time patterns (duration and type of device) with demographic data, current psychiatric diagnosis, the social contact time of families and caregivers, individual sleeping and eating patterns and body mass index (BMI).

CHAPTER 2: MATERIALS AND METHODS

2.1 STUDY DESIGN AND SETTING

This was a quantitative cross-sectional study conducted at the Tara Hospital Children's Outpatient Department, which made use of a structured self-administered questionnaire completed by the attending caregiver. The questionnaire consisted of two parts, the first part to be completed by the attending caregiver consisting of six categories including demographics, clinical information, screen time use, eating habits, sleeping habits, and family habits. The second part was clinical information obtained by the attending health care professional from the patient file as well as by obtaining weight and height measurements from the patient. Most answers to questions were categorized into tables by the researcher to simplify completion of the questionnaire. The categories were selected to assist in determining associations between screen time use and demographics, clinical information, eating habits, sleeping habits and family habits. A convenience sample of 75 participants was obtained by inviting 100 families attending the Tara Children's Outpatient Department for routine follow up and new appointments to complete the questionnaire. Tara Hospital is a public sector specialised psychiatric hospital that renders specialised inpatient and outpatient services to adults and children with serious mental illness. The Tara Children's Outpatient Department sees approximately 250 children, adolescents, and parents/caregivers per month for new and follow-up appointments and provides tertiary level multidisciplinary child and family mental health services. Data were collected from 19 August 2019 until 31 May 2020 and was terminated due to the COVID-19 national shutdown as clinic attendance was limited to emergency visits and resulted in decreased clinic attendance. Approximately 951 patients attended with their caregivers during the study period.

2.2 SAMPLE SIZE

The initial sample size calculation was based on two studies conducted by Pew Research Centre and Blum-Ross et al. [1,3] Based on these studies, 61-95% of children have access to a smartphone, tablet or both. Based on this, an average of 70% was used to calculate the sample size. Precision levels were set at 5% and the confidence interval at 95%. The estimated sample size required was 241. The sample size for prevalence was calculated using the formula:

$$n = \frac{Z^2 P(1-P)}{d^2}$$

n = Sample size

Z = Z-statistic for the chosen level of confidence

P = Expected prevalence

d = Precision

The initial repose rate was low, and due to the COVID-19 national shutdown, the response rate further slowed, and it was determined that the initial targeted sample size would not be reached within a reasonable time frame; hence data collection was terminated with a sample of 75 completed questionnaires. The final sample size was found to be adequately powered for large effect sizes.

2.3 DATA COLLECTION

The questionnaire and information sheet with consent and assent were handed out by the attending health care professional. After completing consent and assent, the attending parent or caregiver completed the questionnaire. The questionnaire was then handed back to the attending health care professional, who weighed and measured the attending child. The attending health care professional also completed the diagnoses available from the file. [Appendix C] [Appendix D] [Appendix E] [Appendix F] [Appendix G]

The researcher formulated the questionnaire based on experience with screen time use and family time, the literature review, and standard census demographics. Screen time was defined as all activities done in front of a screen. Examples were included in the questionnaire. The questionnaire also included eating habits, sleeping habits, and family habits. For instances where the answer to a question was not listed, there was the option to choose “other” with space available to specify. [Appendix C]

The diagnosis was obtained from the patient file to classify the diagnosis according to the DSM-5 diagnostic criteria. The patient's Body Mass Index (BMI) was calculated with the weight and height measurements taken by the attending health care professional. The diagnosis, weight and height were written at the back of the questionnaire on a separate page. Weight and height were used to calculate the BMI using the formula: Weight (kg)/Stature (cm)/Stature (cm) x 10000.[50] BMI was plotted in the BMI-for-age for boys and BMI-for-age for girls charts. [Appendix H] [Appendix I]

The researcher maintained patient confidentiality by ensuring no identifying data was used during data collection.

2.4 OPERATIONAL DEFINITIONS

Body mass index (BMI): Weight (kg)/Stature (cm)/Stature (cm).

Family social contact time: Screen-free time spent together as a family by means of reading books, visiting a local park, playing board games, walking outside, sitting in the garden, eating out, and so forth.

Obese: Equal to or greater than the 95th percentile of BMI-for-age chart [Appendix H] [Appendix I]

Overweight: 85th to less than 95th percentile of the BMI-for-age chart [Appendix H] [Appendix I]

Post-adolescent: All children aged 13 and above.

Pre-adolescent: All children aged 12 and below.

Screen time: Screen time was defined as all activities done in front of a screen. Examples of this included watching television, working or playing on a computer or tablet, playing video games and working or playing with smartphones. Devices were categorised into Smartphones, Television and Media/Gaming devices, which was further categorised into the duration of use per day.

Sleeping habits: The average time spent sleeping per night.

Weight for age: Centres for Disease Control and Prevention BMI-for-age Boys and BMI-for-age Girls. [Appendix H] [Appendix I]

2.5 INCLUSION CRITERIA

Families attending the Tara Children's Outpatient Department with children aged 18 years and less were included.

2.6 EXCLUSION CRITERIA

This study only looked at families of children aged 18 or less. If the patient attending the clinic was aged 19 or more, they were excluded. If the amount of screen time use was not specified, the questionnaire was excluded from the sample.

2.7 DATA ANALYSIS

Statistical analyses were conducted in R software (version 4.00; www.R-project.org). The normal distribution of the continuous data was checked using the Shapiro–Wilk test and by examining Q-Q plots. Data were analysed for the total sample and by gender, as appropriate. Continuous data were analysed using Welch's t-test. To ensure adequate power of the data, categorical data were analysed using chi-squared contingency table analyses, Pearson's chi-squared analyses (with Yates correction) and Fisher's exact test depending on sample sizes. Tests were two-tailed, and model significance set at 0.05. Data are reported descriptively as mean and standard deviation (S.D.) and counts and parentages, as appropriate, and presented as figures, tables, or text.

2.8 ETHICAL CONSIDERATIONS

Informed consent and assent were obtained from participants and children. Participants and children were given a written copy of the participation information sheet in English. Participants were reassured that there would be no negative consequences should they elect not to participate. Informed consent and assent included weight and height measurements as well as accessing the file for the clinical diagnoses.

Ethical clearance was obtained from the Human Research Ethics Committee of the University of the Witwatersrand. Approval was obtained from the Tara research committee, and the study protocol was loaded onto the National Health Research Database. The participants were given contact details for both the researcher and supervisor should any questions arise from the questionnaire. [Appendix A] [Appendix B]

2.9 COMPENSATION

There was no compensation for participating in this study.

CHAPTER 3: RESULTS

3.1 DESCRIPTION OF THE STUDY POPULATION

A total of 75 questionnaires were completed during the study period; however, four questionnaires were excluded from further analysis as the primary question regarding screen time use had not been completed. The final sample therefore comprised of 71 questionnaires, completed by the adult accompanying the 71 children and adolescents attending the Tara Children's outpatient department. Data collection was terminated due to the COVID-19 national shutdown, as clinic attendance was limited to emergency and urgent visits.

Of the 71 participants, 47 (66.2%) were male, and 24 (33.8%) were female. The mean age of the children and adolescents in the sample was 10.7 (±3.2 S.D.). The mean age (±SD) of the pre-adolescent group (children aged 12 and below) was 9.2 (±2.0) years old, and that of the post-adolescent group (children aged 13 and above) was 15.3 (± 1.6) years old. (Table 3.1) There were more male (n=38, 74.5%) than female (n=13, 25.5%) participants in the pre-adolescent, whereas, in the post-adolescent group, there were more female (n=11, 61.1 %) than male (n=7, 38.9 %) participants. (Figure 3.1)

Table 3.1 Comparison between age, gender and screen time use

		Total		Weekday screen time				p-value	Weekend screen time				p-value
				≤2hours		>2 hours			≤2 hours		>2 hours		
		N=71	%	N=34	%	N=37	%		N=9	%	N=62	%	
Gender	Male	47	66.2	24	70.6	23	62.2	p=0.618	5	55.6	42	67.7	p=0.682
	Female	24	33.8	10	29.4	14	37.8		4	44.4	20	32.3	
Age (category)	Pre adolescent	51	71.8	29	85.3	22	59.5	p<0.001*	6	66.7	45	72.6	p<0.001*
	Post adolescent	18	25.4	3	8.8	15	40.5		1	11.1	17	27.4	
	Unspecified	2	2.8	2	5.9	0	0		2	22.2	0	0	
Age	(mean ±SD)	10.7 (3.2)		9.5 (2.9)		11.8 (3.4)		p=0.003[a]	9.1 (4.49)		10.9 (3.2)		p=0.339[a]

***=significant**

p-value calculated using chi-squared contingency tests (with Yates correction) unless otherwise stated; a=Welch's t-tests.

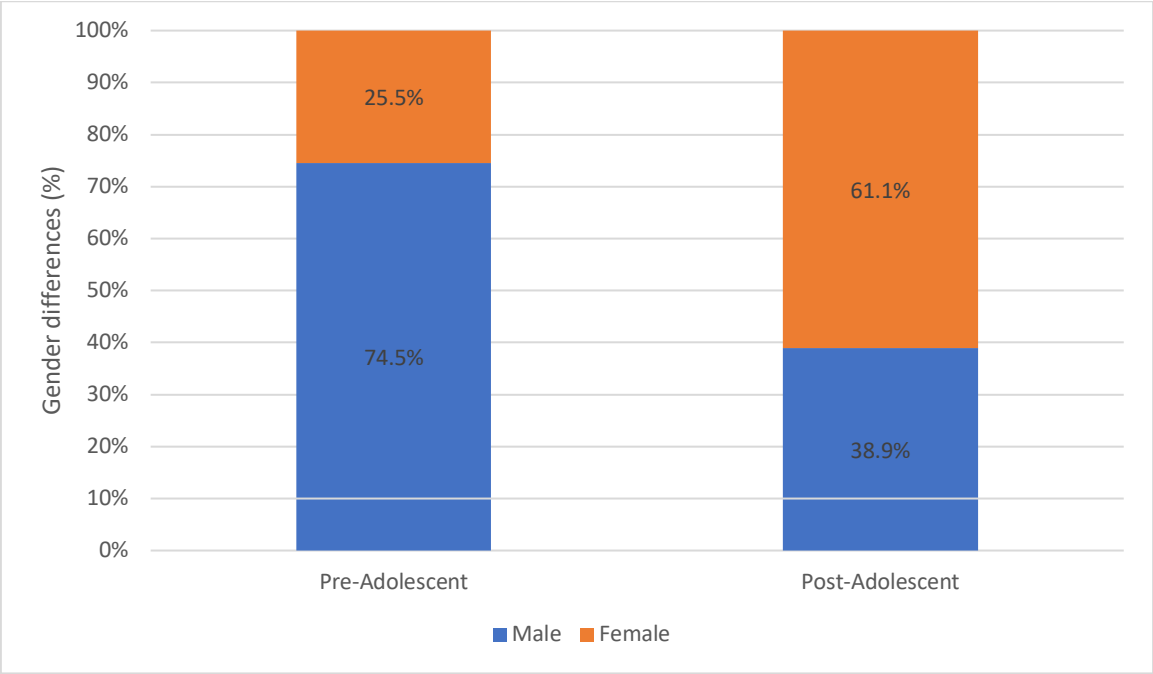


Figure 3.1 Gender differences between pre-adolescent and post-adolescent participants (n=71)

The majority (n=69; 97.2%) of the children were accompanied by a parent or legal guardian rather than a caregiver (n=1; 1.3%). The majority of the families in the sample earned between R3201 and R51200 (n= 45, 63.4%). (Figure 3.2) Almost all parents of the children considered in the study were employed (n=63, 88.7%). (Figure 3.3)

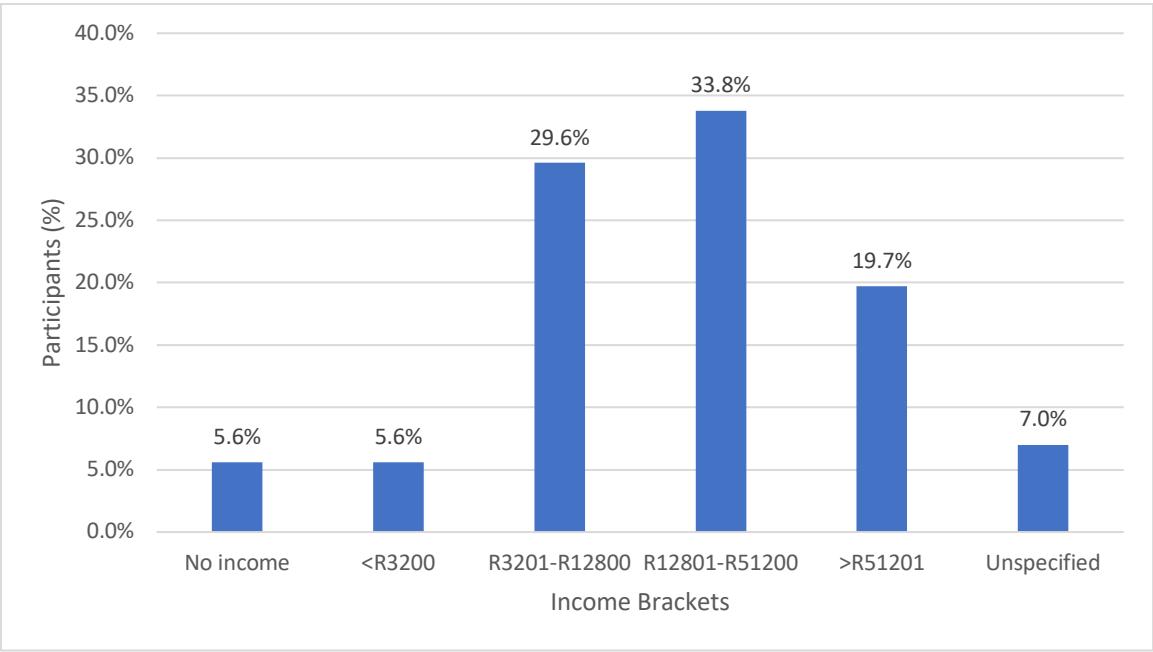


Figure 3.2 Income ranges of families (n=71)

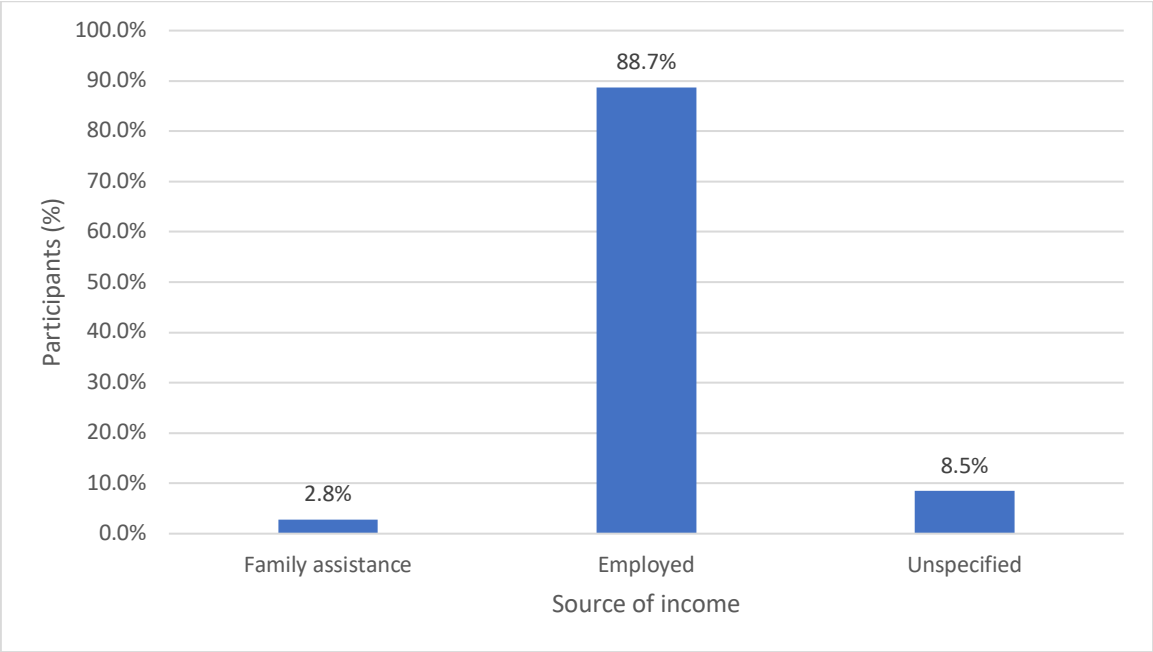


Figure 3.3 Source of income for families (n=71)

Most of the families in the sample lived in formal housing (n= 68, 95.7%). (Figure 3.4) The mean number of rooms in the house (±SD) was 4.3 rooms per house (±2.7). The mean number of people living in a house for the sample (±SD) was 4.3 (±1.7).

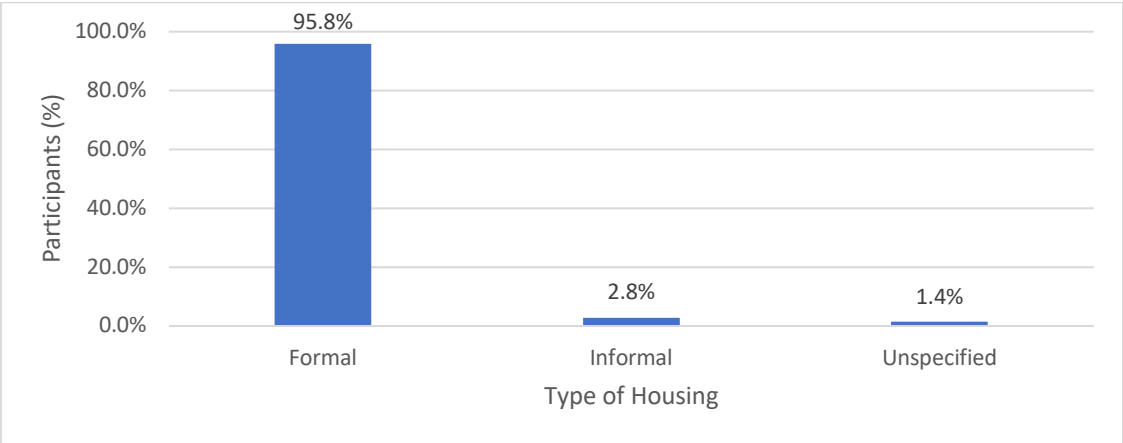


Figure 3.4 Type of housing of families (n=71)

Table 3.2 Comparison between the mean number of rooms and mean number of people per house and screen time use

Variable	Weekday screen time use				p-value	Weekend screen time use				p-value
	≤2 hours (mean) (n=34)		>2 hours (mean) (n=37)			≤2 hours (mean) (n=9)		>2 hours (mean) (n=62)		
	mean	±SD	mean	±SD		mean	±SD	mean	±SD	
Rooms[a]	4.3	2.1	4.4	3.1	p=0.965	4.1	2.7	4.4	2.7	p=0.790
People[b]	4.5	1.9	4.1	1.4	p=0.345	5.0	2.2	4.2	1.6	p=0.305
p-values calculated using welsh's two-sample t-test [a] Mean number of rooms per house [b] Mean number of people per house										

The most common diagnostic category for the children and adolescents in the sample was "neurodevelopmental disorders", with ADHD being the most common diagnosis overall (n=52, 73.2%). (Table 3.9) Most of the children and adolescents fell into the normal weight category with regards to BMI for age (n=44, 62.9%), with 30.0% (n=21) being classified as overweight or obese. (Table 3.6)

3.2 SCREEN TIME USE

All of the children in the final sample had access to some form of device with a screen, and caregivers reported screen time usage for all children. Smartphones (n=49, 69.0%) were the most common device with a screen available, followed by television (n=45, 63.4%). (Figure 3.5) The majority of children had access to more than one device, with 39.4% having access to only one device (n=28). (Figure 3.6) In this sample, there was no association found between screen time use and access to more devices. (Table 3.3) Most of the sample (n=39, 54.9%) had access to a device in their room. (Table 3.5) Most of the sample used more than two hours of screen time per day during weekdays (n=37, 52.1%) and weekends (n= 62, 87.3%), with only 47.9% of the sample (n=34) using less than or equal to two hours of screen time per day during the weekdays, and only 12.7% (n=9) of the sample using less than or equal to two hours screen time per day during weekends. Children and adolescents who used less than or equal to two hours of screen time during weekdays were significantly younger (mean ± S.D., 9.5±2.9) than those who used more than two hours of screen time during the week (mean ± S.D., 11.8±3.4) (Welch t-test, p=0.003). However, there was no significant difference in mean age between the two categories of screen time usage over weekend days (Welsh t-test, p=0.339). (Table 3.1)

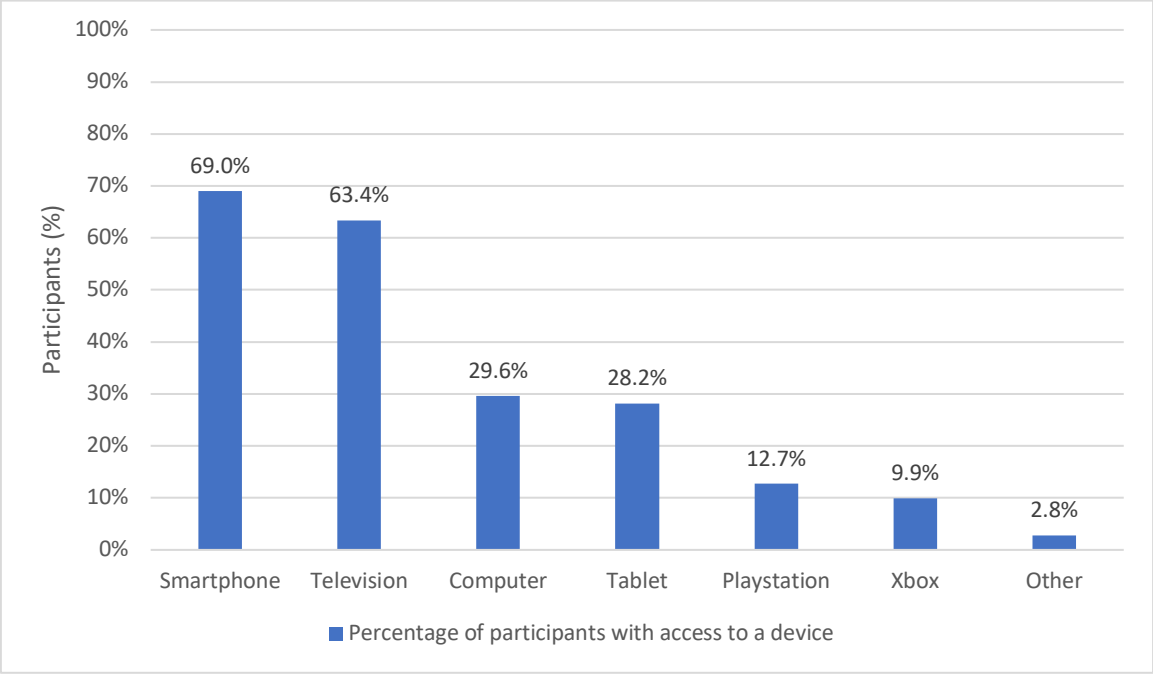


Figure 3.5 Percentage of participants with access to a device with a screen (n=71)

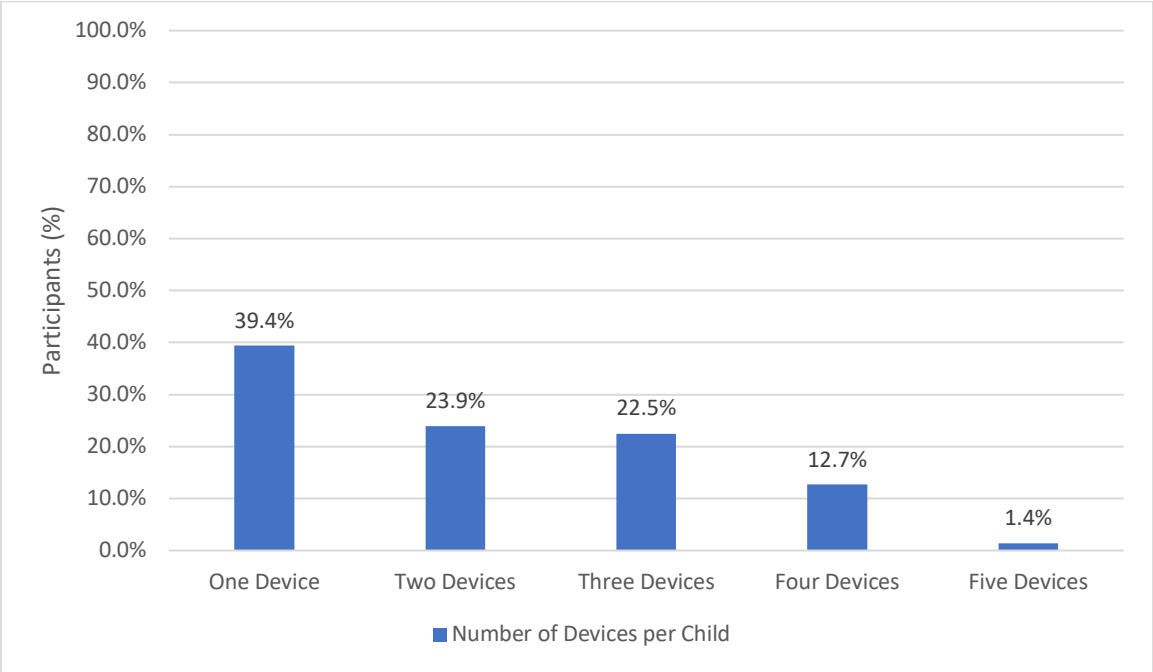


Figure 3.6 Percentage of children with access to devices, categorised by the number of devices (n=71)

Table 3.3 Comparison between screen time use and number of devices per child

Number of devices	Total		Weekday screen time				p=value	Weekend screen time				p=value
			≤2 hours		>2 hours			≤2 hours		.>2 hours		
	N=71	%	N=34	%	N=37	%		N=9	%	N=62	%	
One device	28	39.4	15	44.1	13	35.1	p=0.701	4	44.4	24	38.7	p=0.220
Two devices	17	23.9	8	23.5	9	24.3		4	44.4	13	20.9	
Three devices	16	22.5	6	17.6	10	27.0		1	11.1	15	24.2	
Four devices	9	12.7	4	11.8	5	13.5		0	0	9	14.5	
Five devices	1	1.4	1	2.9	0	0		0	0	1	1.6	
p-value calculated using Pearson's chi-squared contingency test												

There was a significant association with having a device in the room (n=39) and spending more than two hours on screen time over weekdays (n=26, 70.3%) (Fisher's exact test, p=0.010), but no significant association was noted on weekend days (n=37, 59.7%) (Fischer's exact test, p=0.069). (Table 3.4).

There was a significant difference in the pattern of screen time usage between pre-adolescents and post-adolescents. The majority of pre-adolescents (n=51) spent less than or equal to two hours in front of a screen during weekdays (n=29, 56.9%), compared to the post-adolescent group (n=18), where the minority reported less than or equal to two hours of screen time per day during weekdays (n=3, 16.7%) (chi-squared contingency tests (with Yates correction),p<0.001). In addition, most of the pre-adolescents (n=45, 88.2%) and post adolescents (n=17, 94.4%) spent more than two hours on screen time per day during weekends (chi-squared contingency tests (with Yates correction), p<0.001). (Figure 3.7) (Table 3.1)

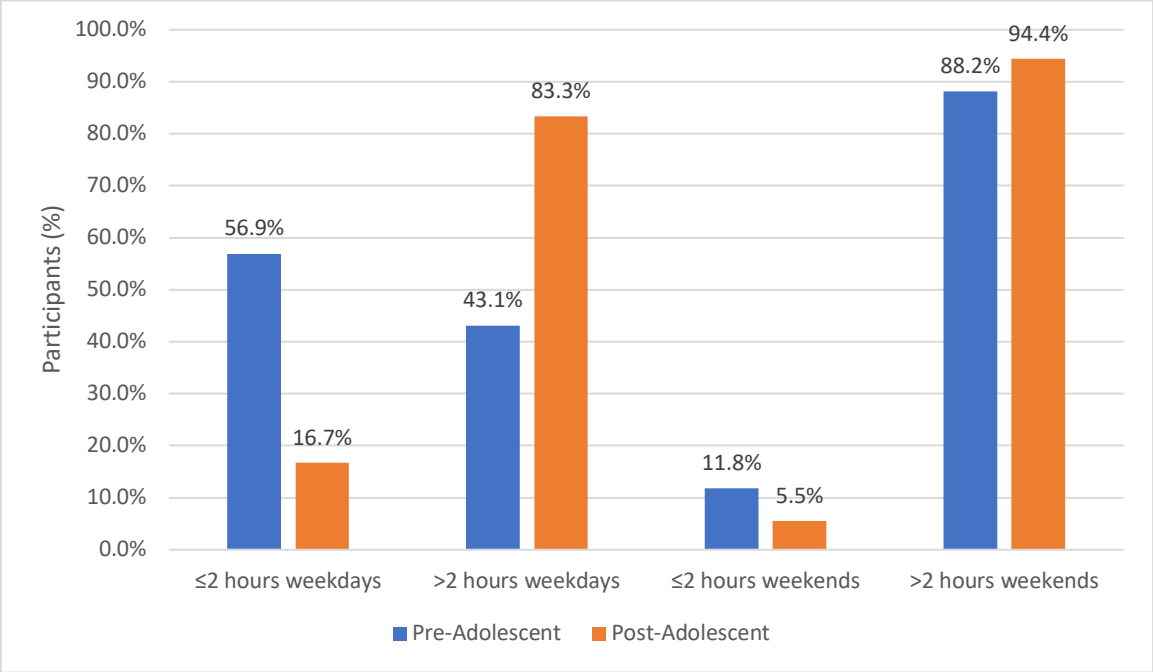


Figure 3.7 Comparison between weekday and weekend screen time use of pre-adolescents and post-adolescents

3.2.1 Restriction of screen time use

The majority of the respondents reported a restriction on the duration the children and adolescents were allowed in front of a screen (n=52, 73.2%). A greater percentage of children who had a restriction on the amount of screen time used less than or equal to two hours of screen time per day over weekdays (n=29, 55.8%) (Fisher's exact test, p=0.034). (Table 3.4)

When asked to specify the restriction duration, only 67.3% of respondents specified the restriction duration (n=35). The remaining respondents described how they would restrict screen time use or what limits they have in place for the children and adolescents. This was also a space where some respondents wrote down what limit-setting they struggled with. A smaller percentage of the sample had specified screen-free areas in the house (n=24, 33.8%). (Table 3.4) The most common listed screen free area was the bedroom (n=8, 33.3%).

Table 3.4 Comparison between family habits, restriction of screen time use and actual screen time use

Limitation/habit		Total		Weekday screen time				p-value	Weekend screen time				p-value
				≤2 hours		>2 hours			≤2 hours		>2 hours		
		N=71	%	N=34	%	N=37	%		N=9	%	N=62	%	
Limits on screen time usage	Restriction on amount	52	73.2	29	85.3	23	62.2	p=0.034*	8	88.9	44	70.9	p=0.428
	Screen-free areas in the house	24	33.8	10	29.4	14	37.8	p=0.616	1	11.1	23	37.1	p=0.154
	Screen-free periods in the day	29	40.9	14	41.2	15	40.5	p=1.000	3	33.3	26	41.9	p=0.729
Family dinner habits	In front of the TV	42	59.2	18	52.9	24	64.9	p=0.342	4	44.4	38	61.3	p=0.299
	At the table as a family	34	47.9	18	52.9	16	43.2	p=0.480	6	66.7	28	45.2	p=0.156
	Dinner alone	9	12.7	2	5.9	7	18.9	p=0.155	0	0	9	14.5	p=0.591
	In room	6	8.5	1	2.9	5	13.5	p=0.201	0	0	6	9.7	p=1.000
Family time together	Never	10	14.1	5	14.7	5	13.5	p=1.000	1	11.1	9	14.5	p=1.000
	1-6 times per week	33	46.5	15	44.1	18	48.7	p=0.813	3	33.3	30	48.1	p=0.489
	Daily	28	39.4	14	41.2	14	37.8	p=0.812	5	55.6	23	37.1	p=0.304
Family activities	Indoor	43	60.6	25	73.5	18	48.7	p=0.051	7	77.8	36	58.1	p=0.462
	Outdoor	54	76.1	27	79.4	27	72.9	p=0.586	8	88.9	46	74.2	p=0.677
	Eating out	39	54.9	18	52.9	21	56.8	p=0.814	4	44.4	35	56.4	p=0.034*
Device in room	Yes	39	54.9	13	38.2	26	70.3	p=0.010*	2	22.2	37	59.7	p=0.069
	Tv	13	18.3	4	11.8	9	24.3	p=0.225	0	0	13	20.9	p=0.195
	Smartphone/computer/tablet	32	45.1	11	32.4	21	56.8	p=0.056	2	22.2	30	48.4	p=0.171

*=significant
p-values calculated using Fisher's exact test

3.3 EATING HABITS

Dinner was most commonly enjoyed in front of the television (n=42, 59.2%). The majority of children who spent more than two hours on screen time over weekdays (n=24, 64.9%) and weekends (n=38, 61.3%) ate dinner in front of the television. Less than half of the sample enjoyed dinner at the table as a family on a regular basis (n=34, 47.9%). However, there was no association between family dinner habits and screen time usage. (Table 3.4)

More than half of the sample spent time eating out regularly as a family together (n=39, 54.9%) (Table 3.2). There was a significant association between weekend screen time and eating out as a family, and children who spent more than two hours on screen time over weekends (n=62) were more likely to spend family time together by means of eating out (n=35, 56.4%) (Fisher's exact test, p=0.034). (Table 3.4)

This study sample found a significant association between BMI and screen time, both during the week and over the weekend. A higher proportion of children who spent more than two hours on screen time over weekdays (n=37) were overweight or obese (n=16, 43.2%) when compared to those who spent less than or equal to two hours on screen time per day (n=5, 15.2%) (Chi-squared contingency test- Yates correction, p=<0.001). This was also true for weekend screen time of more than two hours per day (n=62), where 32.3% (n=20) were found to be overweight or obese compared to those that spent less than or equal to two hours on screen time per weekend day (n=1, 12.5%) (Chi-squared contingency test- Yates correction, p=0.001) (Table 3.5).

The number of families who ate takeaways one to three times per week represented 38% of the sample (n=27). Of the children who ate takeaways one to three times per week, 29.6% were found to be overweight or obese (n=8).

The majority of the sample did not drink coffee or caffeinated drinks (n=42, 60.0%). The majority of caffeine use was described as coffee, although two (7.1%) of the participants reported using caffeinated cold drinks (Coca-Cola or energy drinks). The majority of the sample who did enjoy regular caffeine used less than or equal to one cup per day (n=20, 74.0%). The mean age (±SD) of the sample that used less than or equal to one cup of caffeine per day was 11.8 (±3.4). The mean age (±SD) of the sample that used more than one cup of caffeine per day was 14.1 (±3.8). (Table 3.5)

Table 3.5 Comparison between caffeine use measured in cups and mean age (±SD)

	Total		Mean Age (±SD)
	N=27	%	
≤1 cup per day	20	74.0%	11.8 (± 3.4)
>1 cup per day	7	25.9%	14.1 (± 3.8)

Table 3.6 Comparison between BMI for age and screen time use

	Total		Weekday screen time				p-value	Weekend screen time				p-value
			≤2hours		>2 hours			≤2 hours		>2 hours		
	N=70	%	N=33	%	N=37	%		N=8	%	N=62	%	
Underweight	5	7.1	3	9.1	2	5.4	p<0.001*	0	0	5	8.1	p=0.001*
Normal weight	44	62.9	25	75.8	19	51.4		7	87.5	37	59.7	
Overweight/obese	21	30.0	5	15.2	16	43.2		1	12.5	20	32.3	
*=significant p-value calculated using chi-squared contingency tests with Yates correction												

3.4 SLEEPING HABITS

Most of the sample had less than or equal to ten hours sleep per night (n=39, 55.7%) during weekdays and less than or equal to ten hours sleep per night (n=36, 52.9%) during weekends (Table 3.7). Most children did not take daytime naps (n=58, 81.7%). There was no association noted between children who took or did not take daytime naps and screen time use during weekdays (Pearson's chi-squared contingency table analysis, p=0.289) or weekends (Pearson's chi-squared contingency table analysis, p=1.000) (Table 3.7). The majority of the group that spent more than two hours of screen time during weekdays slept less than or equal to ten hours during weekdays (n=25, 69.4%), and the majority of the group that spent less than or equal to two hours of screen time per day during the week slept more than ten hours per night during weekdays (n=20, 58.8%) (Pearson's chi-squared contingency test, p=0.030). (Table 3.7)

Table 3.7 Comparison between sleeping patterns and screen time use

		Total		Weekday screen time				p-value	Weekend screen time				p-value
				≤ 2 hours		>2 hours			≤2 hours		>2 hours		
		N=70	%	N=34	%	N=36	%		N=9	%	N=61	%	
Sleep hours weekdays	≤10 hours	39	55.7	14	41.2	25	69.4	p=0.030*	5	55.6	34	55.7	p=1.000
	>10 hours	31	44.3	20	58.8	11	30.6		4	44.4	27	44.3	
		N=68	%	N=33	%	N=35	%	p-value	N=9	%	N=59	%	p-value
Sleep hours weekends	≤10 hours	36	52.9	21	63.6	15	42.9	p=0.100	4	44.4	32	54.2	p=0.725
	>10 hours	32	47.1	12	36.4	20	57.1		5	55.6	27	45.8	

*=significant
p-value calculated using Pearson's chi-squared contingency table analysis

3.5 FAMILY HABITS

Most of the sample spent screen-free family time together on a regular basis (n=61, 85.9%), between one to six times per week (n=33, 46.5%) or daily (n=28, 39.4%). There was no significant association between the frequency of screen-free family time and screen time use. (Table 3.4)

There was no significant statistical association found between screen time use and screen-free family activities. The majority of the sample enjoyed outdoor activities (n=54, 76.1%), while others enjoyed indoor activities (n=43, 60.6%) or time together eating out (n=39, 54.9%). (Table 3.4) Details on family activities are further described in table 3.8.

Table 3.8 Indoor and outdoor screen-free family activities

Type of family activity		Total	
		N=71	%
Indoor Activities	Boardgames	25	35.2
	Reading books	33	46.5
Outdoor activities	Walking outside	42	59.2
	Sitting in the garden	29	40.8
	Visit local park	29	40.8

3.6 DIAGNOSES

The total number of diagnoses for the sample group was 224. Most of the sample had two diagnoses (n=19, 26.8%). The mean number of diagnosis per child in the sample was 3.2 diagnoses per child. The majority of the children were diagnosed with Neurodevelopmental Disorders, which was subdivided further into Attention Deficit Hyperactivity Disorder (ADHD) (n=52, 73.2%) and non-ADHD (Learning disorders, Intellectual disability, Developmental delay and Autism) (n=28, 39.4%). There was a significant association between a diagnosis of ADHD and screen time usage over weekdays, with 88.3% (n=30) of the children with less than or equal to two hours of screen time per day during weekdays (n=34) carrying a diagnosis of ADHD, compared to 59.5% (n=22) diagnosed with ADHD in those with more than two hours screen time during weekdays (n=37) (Fisher's exact test, p=0.008). This sample found no association between weekend screen time and diagnosis. There were no other associations with diagnosis and screen time usage. (Table 3.9)

Table 3.9 Comparison between diagnoses and screen time use

Diagnosis	Total		Weekday screen time				p-value	Weekend screen time				p-value
			≤2hours		>2 hours			≤2 hours		>2 hours		
	N=71	%	N=34	%	N=37	%		N=9	%	N=62	%	
Neurodevelopmental disorders (non-ADHD: Learning disorder/intellectual disability/ developmental delay/autism)	28	39.4	12	35.3	16	43.2	p=0.628	2	22.2	26	41.9	p=0.467
Neurodevelopmental disorders (ADHD)	52	73.2	30	88.2	22	59.5	p=0.008*	8	88.9	44	70.9	p=0.428
Personality disorders	1	1.4	0	0	1	2.7	p=1.000	0	0	1	1.6	p=1.000
Anxiety disorders	22	30.9	7	20.6	15	40.5	p=0.079	1	11.1	21	33.9	p=0.257
Trauma and stressor-related, PTSD/ Reactive attachment	13	18.3	6	17.7	7	18.9	p=1.000	1	11.1	12	19.4	p=1.000
Depressive disorders	11	15.5	4	11.8	7	18.9	p=0.518	0	0	11	17.8	p=0.337
Disruptive, impulse control and conduct disorders	22	30.9	11	32.4	11	29.7	p=1.000	2	22.2	20	32.3	p=0.711
Elimination Disorders	6	8.5	3	8.8	3	8.1	p=1.000	1	11.1	5	8.1	p=0.571
Relational problems	26	36.6	9	26.5	17	45.9	p=0.139	1	11.1	25	40.3	p=0.141
*= significant p-value calculated using Fisher's exact test												

CHAPTER 4: DISCUSSION

4.1 DESCRIPTION OF THE STUDY POPULATION

Children in this sample group were predominantly male (66.2%). This sample showed no significant association between screen time use and gender. This is different from Hawi *et al*.,[51] who found that the average screen time use amongst male children was higher than amongst their female counterparts. Bucksch *et al*.[52] also found that the mean screen time use was higher amongst males than females in a cross-national study across 30 countries. There was a significant association between screen time use and age. During weekends, the screen time use was above the recommended two hours per day for 72.6% of the pre-adolescent group. Screen time use for the post-adolescent group was above the recommended two hours of screen time use per day during weekdays (40.5%) as well as weekends (27.4%). The post-adolescent group findings are similar to research conducted by Wethington *et al*.,[9] who found that more post-adolescent children spent more than two hours of screen time per day than pre-adolescent children. Twenge *et al*. [21] suggested that adolescents are more likely to spend more time online since they have social media accounts and their own smartphones. Adolescents also find peer relationships to be vital, which might contribute to higher screen time use.[21]

Families in this sample group were distributed across the range of income brackets in South Africa, ranging from no income to upper class. Rodrigues *et al*.[33] and Salway *et al*.[34] found an association between socioeconomic status and screen time use, with children from a higher socioeconomic status reporting lower screen time use. This study found no association between screen time use and income or socioeconomic status.

4.2 SCREEN TIME USE

Results showed that 100.0% of the sample had access to some form of device with a screen, with 69.0% of the sample having access to a smartphone. This is less than the 80.2% of children aged nine to seventeen who had access to a smartphone in the South African based pilot study conducted by CJCP and UNICEF. [32] It is also less than the 95% of U.S. children aged 13 to 17 who had access to a smartphone according to the Pew Research Centre. [1]

This study found no relation between screen time use and access to more than one device. This is different to findings by Wiecha *et al*.,[53] who reported increased screen time use with access to more devices.

The number of children who spent more than two hours on screen time per day during weekdays was 52.1%, and over weekends this figure increased to 87.3%. This is more than double the amount of U.S. children who spent more than two hours of screen time per day in a 2007 survey.[9] Only 47.9% of this sample met the international and local screen time restriction guidelines of less than or equal to two hours of screen time per day during the week, with a mere 12.7% of the sample meeting these guidelines during weekends. [2,24-27]Bucksch *et al*.[52] found that the average screen time use amongst children and adolescents was more than two hours during weekdays and weekend days in 2002, 2006 and 2010.

4.2.1 Restriction of screen time use

The American Academy of Paediatrics recommends that screen time be limited, and each family should create their own media use plan.[2] The USA National Institute for Health (NIH) has also published a list of caregiver imposed strategies and restrictions to assist with reducing screen time use and increase physical activity.[37] These guidelines include restricting usage to less than or equal to two hours per day for children and adolescents, talking to children about screen time use, as well as avoiding the use of screens in bedrooms.[37] Although restrictions on screen time were reported by 73.2% of participants; restrictions seem to have been ineffective since only 55.8% of children who had a restriction on the amount of screen time used less than the recommended two hours screen time during weekdays and only 15.4% of the children who had a restriction on the amount of screen time, used less than the recommended two hours per day over weekends. It could be suggested that parents or caregivers are not aware of the recommended guidelines or have difficulties implementing the restrictions. Only 67.3% of respondents specified the duration of the restriction. The remaining respondents described how they would restrict screen time use or what difficulties they experienced with screen time limit setting.

Additionally, the results of this study found a significant association with having a device in the room and weekday screen time use of more than two hours per day. This is similar to research done by Wiecha *et al*.[53], Dennison *et al*.[54] and Schmidt *et al*.,[28] who found an association between having a television in the room and increased average screen time use. Screen-free areas in the house were implemented in 33.8% of the sample, with the bedroom being the most common listed screen free area (33.3%). This is in line with various suggestions to implement screen-free bedrooms.[9-11]

Chassiakos et al.[15] suggested that limits should include time as well as content limits. Blum-Ross et al. [3] suggested multifactorial risk factors in screen time use. This includes conduct, content, contact and commercial risks. Content limits were not described by any of the respondents in this study. The CJCP and UNICEF found that one in five South African children from their sample experienced unwanted sexual content exposure while interacting with screens.[32]

4.3 EATING HABITS AND SCREEN TIME

Parrett [41] described how family dinners have changed across generations, and currently, Millennials only enjoy family dinner two to three times per week together as a family, this should be noted that these dinners that are enjoyed together could be shared in front of the television or in a family restaurant or at the dinner table at home. NIH guidelines also recommend removing the T.V. from mealtimes.[37] However, in this study, dinner was mostly enjoyed in front of the television in 59.2% of this sample. This is higher than the 37-45% reported by The National Centre on Addiction and Substance Abuse at Columbia University in 2005.[42] There was, however no association between screen time and family eating habits in this study.

The National Centre on Addiction and Substance Abuse at Columbia University also found that 24-52% of adolescents desired more frequent family dinners.[42]More than half of the sample spent family time by means of eating out regularly as a family together (54.9%). This is more in line with what the American Academy of Paediatrics recommend for families to have screen-free periods by spending family dinner together. [2] Anderson *et al*.[47] suggested that frequent family meals provide structure. This also helps children develop social and language skills.

Fiese *et al*.[43] found an increase in the popularity of convenience meals over the past 25 years. These meals contain few fruits, fewer vegetables or lean meats and are higher in calories. The number of families who enjoyed convenience meals one to three times per week represented 38.0% of the sample. This is similar to the 40.0% of families who spent money on foods away from home, according to Fiese *et al*.[43]

The number of children drinking coffee or caffeinated drinks represented 40% of the sample. This is less than the 73% of U.S. children and adolescents who were found to be consuming caffeine daily by Branum *et al*.[55]

4.4 BMI AND SCREEN TIME

This sample showed a significant association between screen time use and BMI. The percentage of children and adolescents who spent more than two hours of screen time during weekdays with associated BMI above the 85th percentile of the BMI-for-age chart was 43.2%. Weekend daily screen time use of more than two hours was associated with 32.3% of participants being classified as being overweight or obese. This is similar to Stiglic *et al*.,[6] who concluded that there might be an association between higher television screen time and obesity. Higher screen time and subsequent less sleep put children at risk of poor dietary habits and an increased risk of becoming overweight or obese.[7,54] Busch *et al*.[8] also found an association between higher television screen time use and being overweight. Combining excessive screen time with a television in the bedroom is a risk factor for developing obesity.[9]. Additionally, a decrease in BMI was previously noted with a decrease in television screen time.[6]

4.5 SLEEPING HABITS AND SCREEN TIME

The American Academy of Paediatrics recommends that children have eight to twelve hours of sleep per night. A small number of this sample (8.3%) slept less than eight hours per night during weekdays.

Bruni *et al*. [10] found negative associations with sleep quality and children having screen time after 21h00. These associations include circadian rhythm preference (being more active and alert during the evening) and bad sleep habits.[10] Increased amounts of screen time use can also significantly impact sleep quality and duration.[11] A quarter of this sample was noted to be going to bed after 21h00; it is, however, unclear how much of these children used screens after 21h00, which might have affected their sleep quality. Most of the sample slept less than or equal to ten hours sleep per night during the week and weekends. Additionally, this sample showed a significant association between sleep hours and screen time during weekdays, with a higher proportion (69.4%) of children with less than ten hours of sleep spending more than two hours on screen time during weekdays. Pérez-Farinós *et al*.[56] suggested that children who had more nighttime sleep utilised on average less screen time than children who had fewer hours of nighttime sleep.

4.6 FAMILY HABITS AND SCREEN TIME

Regular screen-free family time was incorporated in 85.9% of this sample. There was, however no association found between screen time use and screen-free family time. Outdoor activities were popular amongst the group at 76.1%, which might encourage children to incorporate physical activity into their daily activities. Encouraging physical activity is in line with international and local guidelines and has been previously associated with decreased screen time.[24-27]

4.7 DIAGNOSES AND SCREEN TIME

Weiss *et al*. [36] suggested that children with ADHD can be easily bored and seek immediate gratification, which could put them at risk of seeking screen-based activities. Busch *et al.*[8] found that children using the internet for more than 14 hours per week reported higher incidents of hyperactivity. Lissak *et al*. [17] suggested that the dopamine release within the striatum during video gaming could be compensating for the dopamine deficiencies in children and adolescents diagnosed with ADHD. These hypotheses were not true for this study sample. Although ADHD was diagnosed in 73.2% of the sample, it was noted that there was a significant association between a diagnosis of ADHD and screen time use of less than or equal to two hours during weekdays. The findings in this study is more in keeping with a systematic review conducted by Dickson *et al*.,[22] who found that ADHD was less frequently associated with screen time use. These findings could also be attributed to adequate treatment of the children in this sample diagnosed with ADHD. Han *et al*.[20] noted a decrease in screen time use in a group of treatment naïve children with ADHD after a trial of methylphenidate.

Twenge *et al*.[21] found an association between higher amounts of screen time use and a diagnosis of anxiety or depression amongst children and adolescents. Although 30.9% of the sample was diagnosed with anxiety disorders and 15.5% of the sample was diagnosed with depressive disorders, there was no significant association between screen time use and a diagnosis of anxiety disorders or depressive disorders.

4.8 LIMITATIONS

There were several limitations in this study. Initial sample size estimates were higher than the final sample size obtained due to poor response rate and the unprecedented impact of COVID lockdowns on clinic attendance and, therefore, on data collection. However, grouping smaller categories together and using categorical measures for statistical analysis, the study was found to be ultimately adequately powered for large effect size. The study was underpowered for medium and small effect sizes. Study design could be improved for future research, using digital tools and incorporating screen time assessments into clinic pre-assessments.

Convenience sampling was used, and the sample is therefore not indicative of the population as a whole. The Tara Children's Outpatient Department is located in Sandton, Johannesburg, South Africa, and might attract families with higher socio-economic standing with better access to devices for screen time use. The fact that the study is based in a suburban area might also have an impact on the results and the amount of screen time use due to longer traveling times of caregivers to and from employment, which could lead to unsupervised screen time use. It was beyond the scope of this study to determine supervision of screen time use. The diagnosis was obtained from the file by the attending health care professional and was dependent on the assessment by the initial contact of the treating health care professional, and was not reassessed by the attending health care professional at the time of questionnaire completion.

The information gathered depended on the completion of the questionnaires by the accompanied caregiver of the children attending the Tara Children's Outpatient Department. Informed consent and assent were obtained. Since this was a self-administered questionnaire, the data was subject to the accuracy and understanding of the different questions by the attending parent or caregiver. The questionnaire was developed by the researcher based on experience with screen time use and family time, the literature review as well as standard census demographics. Standardised questionnaires or screening tools would have provided data that could have been compared more accurately to internationally available research. A quantitative record of screen time use per day would have provided more accurate data for analysis and comparison and would have allowed the researcher to determine the average screen time use of the sample. The inclusion of a control group would have provided more data for comparative analysis.

Caregivers often presented to the Tara Children's Outpatient Department to collect treatment. This complicated the data collection process since consent and assent was required as well as a weight and height measurement of the child or adolescent for the calculation of BMI. Daily dietary intake and physical activity was not taken into consideration during the data collection of this study.

The benefits of screen time use should also be considered as described in the literature, including but not limited to learning, creating, connecting, promoting community participation and strengthening interpersonal relationships. [2,3,14] This was not further explored in this study. It was beyond the scope of this study to differentiate between active and passive screen time use as well as recreational and educational screen time use. It was also beyond the scope of this study to determine if families were aware of current screen time use guidelines.

The effect of parental stress and parental screen time use was beyond the scope of this study. These factors may have influenced the reported screen time use. The literature shows that activity constraints that include rules about specific screen-based activities or applications (e.g. WhatsApp or Twitter) are easier to enforce than context-specific rules about screen time use (e.g. no phones at the table).[3] Further research could make these differentiations and determine the level of parental education regarding screen time use and analyse the effects of implementing this knowledge.

Data collection was terminated as the COVID-19 pandemic started. Various sources report that screen time use increased (doubled in the USA) amongst children, adolescents and families since the outbreak of the pandemic.[57,58] It is beyond the scope of this study to determine the impact of the COVID-19 pandemic on screen time use.

4.9 CONCLUSION

This study is representative of a small group of families attending the Tara Children's Outpatient Department. All children from this sample had access to some form of device with a screen. The majority of the sample had access to a smartphone. Most of the sample did not meet the international and local screen time limit of less than or equal to two hours of screen time use per day.

Caregivers did implement restrictions regarding screen time use, although it was noted that despite having restrictions in place, 44.2% of the sample with a restriction on the amount of screen time use still used more than the recommended two hours screen time per day during weekdays. This was noted to be even higher during weekends, as 84.6% of the sample that was subject to a restriction on the amount of screen time reported using more than two hours screen time during weekends. This could be due to caregivers not being aware of the international and local guidelines regarding daily screen time use or difficulties in implementing restrictions, particularly in older adolescents.

Dinner in this sample mainly was enjoyed in front of the television, despite international recommendations against television viewing and mealtimes. This sample also showed a significant association between BMI above the 85th percentile for BMI-for-age chart and screen time use of more than two hours during weekdays and weekends.

Weekday sleeping habits of less than ten hours per day was mostly associated with concurrent screen time use of more than two hours per day.

Regular screen-free family time was reported in the majority of this sample, without any significant association noted between screen time use and screen-free family time.

The most common diagnosis for this sample was ADHD. This sample showed a significant association between the diagnosis of ADHD and screen time use of less than or equal to two hours per day. Reduced screen time use in children with ADHD might be attributed to methylphenidate treatment. [20] Treatment modalities were not included in this study. This sample showed no significant association between depressive or anxiety disorders and screen time use.

4.10 RECOMMENDATIONS

Further research is needed on the impact of screen time on mental health in the South African setting. Although this study did not assess knowledge of screen time recommendations, it is recommended that the South African 24-hour movement guidelines be given to all the families attending the Tara Children's Outpatient Department. The caregiver imposed strategies and restrictions published by the USA National Institute for Health (NIH) could be used as another source for families. Health care professionals attending to the families and children should be educated about the most recent guidelines and strategies to assist and advise the families appropriately. Screen time use should be mediated by parents or caregivers of children and adolescents. The finding of an increase in screen time use associated with increased age should also highlight recommendations for all children and adolescence of less than or equal to two hours of screen time per day, not just for young children.

Associations that were found in this study of increased screen time with increased BMI and less sleep highlight the need to reinforce existing guidelines regarding screen time, sleep and physical activity. All school-going children and adolescents should be encouraged to achieve one hour of moderate to vigorous exercise per day, between nine and eleven hours of sleep per night and not more than two hours of recreational screen time per day. Decreasing the amount of television screen time use in children who is overweight or obese might assist with weight loss. Removing devices from the bedroom might also assist with preventing children from becoming overweight. Avoiding screen media and passive background media for an hour before bedtime could help develop healthy sleeping habits and minimise the negative effects of screen time use on sleep. Encouraging children to accumulate a certain amount of physical activity to earn one hour of screen time as per the randomised control study by Goldfield *et al*.[36] might help increase children's daily activity, decrease screen time use, and improve body composition.

Families and Health Care Professionals should be educated about different applications, programs, or management systems available to restrict screen time content. Individualised family media planning should be encouraged, and the family media plan should be developed by means of involving the children and adolescents within the household. This will assist in children and adolescents developing autonomy and strengthening the interpersonal relationships within the family.

5. APPENDICES

APPENDIX A – ETHICS CLEARANCE FORM

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Dr Liesel Aldrich

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M181170

NAME: (Principal Investigator)	Dr Liesel Aldrich
DEPARTMENT:	Psychiatry Tara Children's Outpatient Department
PROJECT TITLE:	Screen time use patterns and health trends in children attending a children's psychiatric outpatient department
DATE CONSIDERED:	30/11/2018
DECISION:	Approved Unconditionally
CONDITIONS:	
SUPERVISOR:	Heather Alison
APPROVED BY:	Doctor CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	02/08/2019

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in **November** and will therefore be due in the month of **November** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature _____ Date _____

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX B – PERMISSION TO CONDUCT RESEARCH

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

TARA the H. Moross Centre

Private Bag X7
RANDBURG 2125

(011) 535-3110
(011) 535-3026

Ronelle.Price-Hughes@gauteng.gov.za

MEMORANDUM

TO: **DR F.A OTIENO – CEO TARA HOSPITAL**

CC: **DR T. MADIGOE – CLINICAL HEAD**

FROM: **DR. R. PRICE-HUGHES – CHAIRPERSON TARA RESEARCH COMMITTEE**

DATE: **18 JANUARY 2019**

SUBJECT: REQUEST FOR APPROVAL FOR DR LIESEL ALDRICH TO CONDUCT RESEARCH AT TARA HOSPITAL
(NHRD PROPOSAL DETAILS: TBC)

1. Purpose

The purpose of the application is to request permission for Dr Liesel Aldrich to conduct research at Tara Hospital as part of her MMed in Psychiatry.

2. Background

The title of the study is **SCREEN TIME USE PATTERNS AND HEALTH TRENDS IN CHILDREN ATTENDING A CHILDREN'S PSYCHIATRIC DEPARTMENT.** Screen time refers to time spent on media devices including smartphones, televisions and computers. The American Association of Pediatrics have suggested guidelines for screen time use, and also included recommendations for health care providers and parents on how to approach media use. It is estimated that children in 1970 began to regularly watch television at the age of 4 years, whereas today children begin interacting with digital media at the age of 4 months. Screen time has been associated with an increased reporting of attention difficulties and earlier exposure could predict later attention and hyperactivity difficulties. There is also an increased risk of developing obesity. Screen time could also have an adverse effect on the outcome of sleep.

Information will be collected via a voluntary questionnaire after obtaining ethical approval from the WITS HREC.

3. Motivation

The aim of the study is to describe the qualitative and quantitative screen time usage and correlate this with family socialisation, sleeping, eating and body mass index (BMI) patterns and the psychiatric disorders treated of the children attending the Tara Children's Outpatient Department.The request has been circulated to the Tara Research Committee meeting and no concerns were raised.

4. Financial implications

No costs will be incurred by either the institution or the individual participants.

5. Recommendations

In view of the above it is recommended that permission is granted for Dr Liesel Aldrich to conduct research at Tara Hospital pending full ethical clearance and obtaining an NHRD number.

Proposer

Dr. R. Price-Hughes
Chairperson Tara Research Committee
Date: 18 January 2019

Comments:

Recommendation contained in paragraph 5: Recommended / Not recommended / As amended

Dr. T. Madigoe
Clinical Head
Date: 22/1/19

Comments:

Recommendation contained in paragraph 5: Approved / Not approved / As amended

Pending meeting all comments

Dr. F. A. Otieno
Chief Executive Officer
Date: 22/1/19

APPENDIX C – QUESTIONNAIRE

Questionnaire:

Please complete one questionnaire per family.

1. Demographics

1.1 What is your relationship to the child?

Parent/Guardian	Caregiver	Nursing staff member	Aunt/Uncle	Other (specify)

Specify: _____

1.2 What is the age of your child/ what is your age?

_____

1.3 Is your child Male or Female?

Male	Female

1.4 What is your estimated total gross family income per month?

No income	R1-R400	R401-R800	R801-R1600	R1601-R3200	R3201-R6400
R6401-R12800	R12801-R25600	R25601-R51200	R51201-R102400	R102401-R204800	R204801 or more

1.5 What is the source of the income? (full-time employment/part-time employment/social grant/disability policies etc.)

_____

1.6 What type of house do you stay in? (Face brick/informal dwelling etc.)

_____

1.7 How many rooms are there in your house?

_____

1.8 How many people are currently living in your house?

_____

2. Clinical information

2.1 What is the reason for your initial visit to Tara Children's Clinic?

Behavioural	Concentration	Anxiety	Mood	Hyperactivity	Other (specify)	Unsure

2.1.1 Specify: _____

2.2 What condition(s) is your child being treated for at Tara Children's Clinic?

ADHD	GAD/Anxiety	ODD	Conduct disorder	Disruptive Mood Dysregulation	Other (specify)	Unsure

2.2.1 Specify: _____

3. Screen time

Screen time can be defined as all activities done in front of a screen. Examples of this include watching television, working or playing on a computer or tablet, playing video games and working or playing with smartphones

3.1 What device(s) does your child use on a regular basis (mark all that apply)?

Smartphone	Tablet	Computer	Television	PlayStation	Xbox	Other (specify)

Specify: _____

3.2 How many hours per day does your child spend as screen time during the week (Monday to Friday)?

Less than 30 minutes	1 hour	1-2 hours	2-3 hours	3-4 hours	>4 hours

3.3 How many hours per day does your child spend as screen time during the weekend (Saturday and Sunday)?

Less than 30 minutes	1 hour	1-2 hours	2-3 hours	3-4 hours	>4 hours

3.4 Do you have a restriction on the amount of screen time your child may use?

Yes	No

3.4.1 If **yes** in 3.4, please specify the duration (in hours/minutes):

_____

_____

3.5 Does your family have designated screen time free areas in the home?

Yes	No

3.5.1 If **yes** in 3.5 please describe where:

_____

3.6 Does your family have designated screen time free periods?

Yes	No

3.6.1 If **yes** in 3.6 please describe the interval in hours per day:

_____

4. Eating habits

4.1 How does your family enjoy dinner on a regular basis?

In front of the television	At the table	Each on their own	In their rooms

4.2 How many times per week do you order takeout?

_____

4.3 Please select the meals your child has per day (mark all that apply):

Breakfast	Midmorning snack	Lunch	Midafterno on snack	Dinner	Other (specify)

Specify: _____

4.4 Does your child drink coffee or other caffeinated drinks?

Yes	No

4.4.1 If **yes,** in 4.4, please specify type and amount (in cups)?

_____

_____

5. Sleeping habits

5.1 Please specify the times your child goes to bed and wakes up:

Weekdays (Monday –Friday)
Wake-up: _____ Goes to bed: _____

Weekends (Saturday – Sunday)
Wake-up: _____ Goes to bed: _____

5.2 Does your child take a nap during the day?

Yes	No

5.2.1 If **yes,** in 5.2, how long is his daytime nap?

5.3 Does your child have the following devices in his/her room?

Television:

Yes	No

Computer:

Yes	No

5.4 Does your child sleep with the following devices in his/her room?

Smartphone:

Yes	No

Tablet

Yes	No

6. Family Habits

6.1 How often per week does your family spend time together (without screen time involvement)?

Never	1-2 times per week	3-4 times per week	5-6 times per week	Daily

Please specify the types of activities: (Mark all applicable boxes)

Playing board games	Reading books	Walking outside	Sitting in the garden	Visit a local park	Eating out	Other (specify)

Specify: _____

Thank you for taking the time to complete the questionnaire.

To be completed by attending health care professional:

Weight: _____ Height: _____

Please tick the appropriate working diagnoses:

ADHD	ODD	Conduct disorder	Disruptive Mood Dysregulation Disorder	GAD
Intellectual Disability	Autism Spectrum Disorder	Parent-Child Relational Problems	Other:	

STUDY INFORMATION DOCUMENT – PARENT COPY

Screen time use patterns and health trends in children attending a children's psychiatric outpatient department

Dear Sir/Madam

I, Liesel Aldrich, registrar in psychiatry, am doing research on the children and adolescents attending the Tara Children's Outpatient Department. Research is a process used in seeking new knowledge. In this study we want to learn about the screen time usage and health trends of the children and adolescents attending the Tara Children's Outpatient Department.

I am inviting you to take part in a research study and asking for your permission to include your child/children in this study.

This is a cross-sectional study and if you are willing to participate, we will ask that you voluntarily complete a questionnaire regarding your child/children's screen time usage.

Before completing the questionnaire the attending health care professional will do a weight and height measurement of your child/children. This is non-invasive and poses no risk to them.
You can then complete the questionnaire while waiting for your appointment in the Tara Children's Outpatient Department waiting area.It will take approximately 10 minutes to complete.
Although no identifying data will be used, all information collected will remain confidential.
After completion, the questionnaire can be placed in a sealed posting box for processing.

There are no risks involved in the study, and in the event of you requiring additional counselling or guidance after completing the questionnaire, you are welcome to contact me, Liesel Aldrich. Contact details will be available at the end of this information sheet.

This study will not be of any additional benefit to you or your child/children and participation is completely voluntary. Refusal to participate will not result in any penalty or loss of benefits of your treatment. You may complete the questionnaire once consent and assent forms have been completed by you and your child/children. You are entitled to abandon completion of the questionnaire at any point should you choose to withdraw from the study. All information will remain confidential, and no names or file numbers will be completed on the questionnaires If you are interested in the outcome of this study, the results will be available after processing, and could be obtained by contacting me or the University of the Witwatersrand.

All data collected in the course of the study will be securely retained for two (2) years, if a scientific publication arises from the study and six (6) years, if there is no publication. Thereafter it will be destroyed accordingly.

Contact details of researcher/s:
Researcher: Dr. Liesel Aldrich
011 535 3000
Supervisor: Dr. Yvette Nel
011 535 3000

Contact details of HREC administrator and chair:

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg. A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Clement Penny, who may be contacted on telephone number 011 717 2301, or by e-mail at Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretariat are 011 717 2700/1234, and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Thank you for reading this Study Information Sheet.

July 2019

STUDY INFORMATION DOCUMENT – CHILD COPY

Screen time use patterns and health trends in children attending a children's psychiatric outpatient department

Good day,
I, Liesel Aldrich, one of the doctors working in psychiatry, am doing research on the children and adolescents attending this clinic. Research is a process used in seeking new knowledge. I want to learn more about the time you spend on your smartphone, tablet, television, computer or other devices.

I would like to invite you to take part in this study.

If you would like to take part in this study, we will ask your parent or guardian to voluntarily complete a questionnaire about your screen time usage.

Before completing the questionnaire the attending doctor or nurse will do a weight and height measurement of you. All information will remain private.
After completion, the questionnaire can be placed in a closed box for processing.

There are no risks involved in the study, and should you need more information, you are welcome to contact me, Liesel Aldrich. Contact details will be available at the end of this information sheet.

It is your choice to take part and there will be no consequence if you choose not to.You can also stop completing the questionnaire at any point. If you want to know the outcome of this study, you can contact me or the University of the Witwatersrand.

Contact details of researcher/s:
Researcher: Dr. Liesel Aldrich
011 535 3000
Supervisor: Dr. Yvette Nel
011 535 3000

Contact details of HREC administrator and chair:

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg. The function of this Committee is to keep you as a subject safe.
If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Clement Penny, who may be contacted on telephone number 011 717 2301, or by e-mail on Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretariat are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Thank you for reading this Study Information Sheet.
July 2019

APPENDIX F – CONSENT FORM

Consent Form



Screen time use patterns and health trends in children attending a children's psychiatric outpatient department

Researcher: Dr Liesel Aldrich

Qualifications: MBChB

Student number: 1578299

Degree: MMed Psychiatry

Supervisor: Dr Heather Clare Alison

Department of Psychiatry, School of Clinical Medicine

I acknowledge the following:

- I agree to participate in this research project.
- I have read the information sheet and the information it contains.
- I agree to my responses being used for education and research on condition that my privacy is respected, subject to the following:
  - I understand that my personal details will not be used so that I will not be personally identifiable.
  - I understand that I am under no obligation to take part in this project.
  - I understand I have the right to withdraw from this project at any stage.

Signature of Participant / Guardian:

_____

Date: _____

APPENDIX G – ASSENT FORM

Assent Form

Screen time use patterns and health trends in children attending a children's psychiatric outpatient department

Researcher: Dr Liesel Aldrich

Qualifications: MBChB

Student number: 1578299

Degree: MMed Psychiatry

Supervisor: Dr Heather Clare Alison

Department of Psychiatry, School of Clinical Medicine

I acknowledge the following:

- I agree to participate in this research project.
- I have read the information sheet and the information it contains.
- I agree to my responses being used for education and research on condition that my privacy is respected, subject to the following:
  - I understand that my personal details will not be used so that I will not be personally identifiable.
  - I understand that I am under no obligation to take part in this project.
  - I understand I have the right to withdraw from this project at any stage.

Signature of Participant:

_____

Date: _____

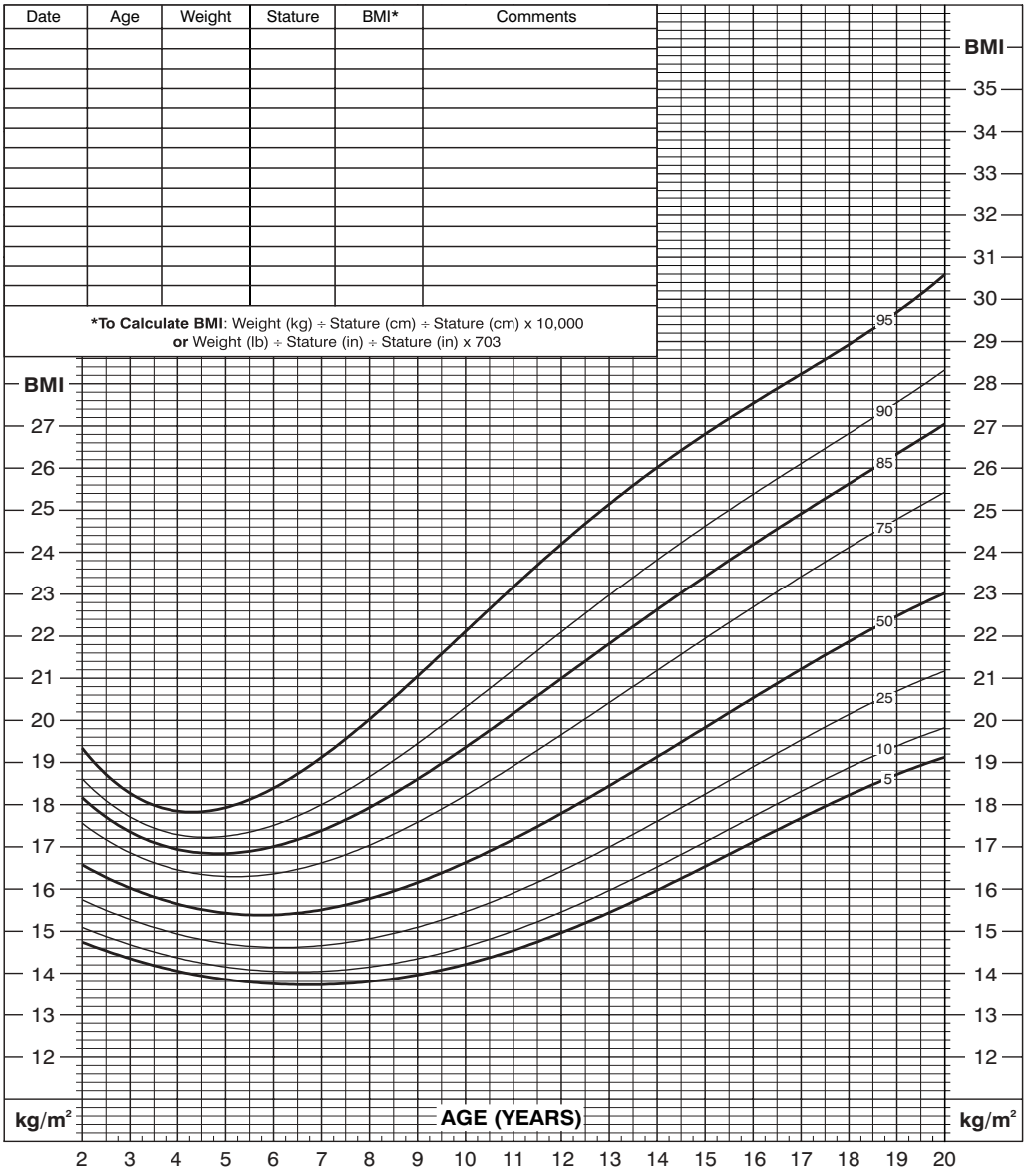
2 to 20 years: Boys
Body mass index-for-age percentiles

NAME _____

RECORD # _____

Date	Age	Weight	Stature	BMI*	Comments

***To Calculate BMI**: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703



Published May 30, 2000 (modified 10/16/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
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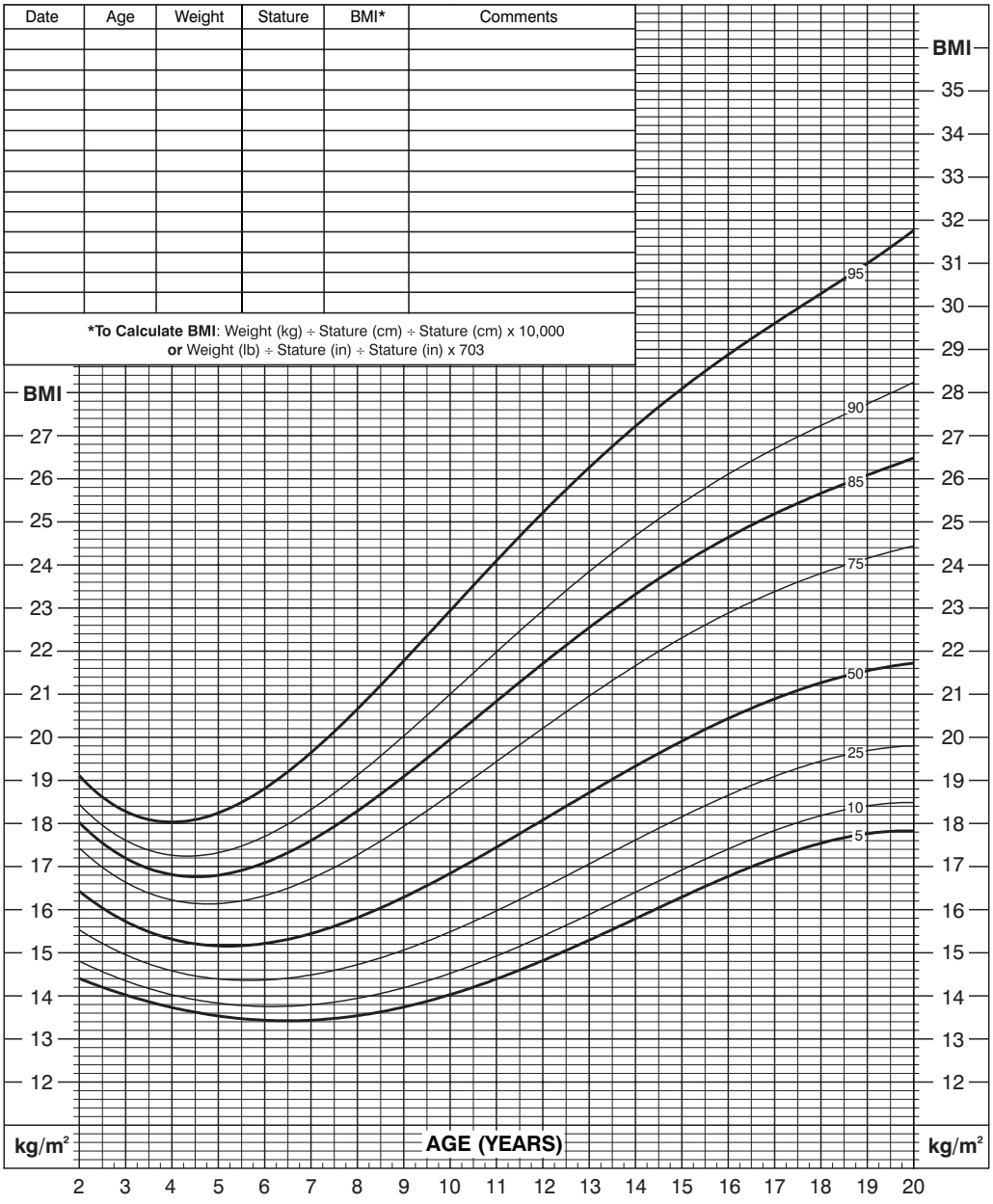
2 to 20 years: Girls
Body mass index-for-age percentiles

NAME _____

RECORD # _____

Date	Age	Weight	Stature	BMI*	Comments

***To Calculate BMI**: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703



Published May 30, 2000 (modified 10/16/00).
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APPENDIX K – PLAGIARISM DECLARATION



PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I Liesel Aldrich (Student number: 1578299) am a student registered for the degree of MMed Psychiatry in the academic year 2021.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature: Aldrich Date: 17 November 2021

1

6. REFERENCES

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