

Supporting Young Children Post-Pandemic: Benefits of Daily Physical Literacy in Canadian Child Care

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Abstract

This study sought to provide evidence of the benefits of enhanced physical literacy programming in Canadian child care settings. Data were collected pre- and post-intervention from study and control groups from 2018 to 2020. Benefits for children included increased confidence and self-efficacy, improved language and communication skills, enhanced self-regulation, and reduction of challenging behaviours. Early Childhood Educators felt calmer and more playful, and built stronger relationships with children and families. While this study was not designed to look specifically at supporting young children throughout the pandemic, many of the study findings align and may address some of the impacts on young children in Canada being disclosed in current literature.

Keywords: Early childhood development, child care, physical literacy, self regulation, post-pandemic

1. Background

The *Physical Literacy Proof of Concept Study in Child Care Settings* was conducted between August 2018 and June 2020 to determine potential benefits for young children of enhanced daily active play and physical literacy. At the inception of the study in 2018, no-one imagined the impacts of a global pandemic. However, by the time the research team was collecting post-intervention data in March 2020, many child care settings across Canada were being closed as an emergency measure during the first wave of COVID-19.

Over the ensuing months, young children, their families, and early childhood educators (ECEs) in Canada experienced emergency lock-downs of various severity, child care centres closing, schools switching between in-person and online learning, adults working from home or losing their jobs, and growing fear of the virus. Studies published since the first wave of the pandemic have indicated that young children in Canada have been impacted, sometimes severely, by the disruptions and anxieties in their lives. While this study was not designed to look specifically at supporting young children throughout the pandemic, many of the study findings align and may address some of the impacts being disclosed in current literature.

2. Literature Review

2.1 Active Play and Physical Literacy

Physical activity (PA) is essential to living a healthy life (World Health Organization, n.d.). Health, as broadly defined by the World Health Organization, encompasses physical, mental, social, and spiritual well-being (World Health Organization, 1946). Insufficient PA puts children at risk for cardiovascular, musculoskeletal, and neurological disease later in life (World Health Organization, n.d.; Government of Canada, n.d.). Alternatively, a Canadian evidence-based position statement on active outdoor play found that children provided with opportunities for increased PA and active play, especially outdoors and in natural spaces, may develop enhanced resilience, increased self-regulation, and more coping strategies to better deal with stress and anxiety (Tremblay, Gray, Babcock, et al, 2015).

Physical literacy (PL) is a concept originally proposed in 2010 by Margaret Whitehead, a British philosopher. Her rationale for adopting the term ‘literacy’ was to ensure that physical development is seen to be as important for children as are other literacies including language, reading, writing, and numeracy. Whitehead’s original definition for physical literacy was the motivation, confidence, and competence to move for a lifetime (Whitehead, 2010), a simple definition that the research team chose to use for this study of Canadian preschool children in child care. The acquisition of fundamental movement skills (FMS), through enhanced physically literate environments, is a prerequisite for children’s continued involvement in recreation or sport activities (Sport for Life, 2021).

To date, the majority of PL research has focused on school-aged children and youth; however, one-third of Canadian preschool children are either overweight or obese (Peirson, Fitzpatrick-Lewis, Morrison, et al, 2015) and indoor sedentary behaviour, including screen time, is increasing (Particip ACTION, 2015). Regular opportunities for PA and PL may increase preschool children’s motivation, confidence and competence to move for a lifetime (CSEP, 2017) thus potentially reducing health risks later in life. Research with preschool children is showing that enhanced opportunities for PA and PL for young children may improve school readiness (Bedard, Bremer, Campbell, & Cairney, 2018), and social and emotional development specifically in the areas of peer relationships, confidence, persistence, and creativity (Tremblay, et al, 2015). A systematic review of 100 studies from 36 countries found that PA for young children is associated with improved motor skills, cognitive and language development, executive function, and socioemotional health (Carson, Lee, Hewitt, et al., 2017).

2.2 The Impact of the Pandemic on Young Children in Canada

Research into the impacts of COVID-19 on young children and their parents/caregivers is only just beginning in Canada and most of the studies have relied on parent reports. Direct research on the impacts on young children in child care and their educators is limited to date. StatsCan (2020) determined that during the first wave of the pandemic, only 9% of preschool children in Canada were attending child care. However, it may be possible to extend parent-report findings to impacts on young children in child care and to their educators.

2.2.1 The COVID-19 pandemic in Canada has revealed that some sectors of the population are more adversely affected than others (StatsCan, 2021). While young children do not appear to contract COVID-19 as frequently or become as ill as adults, they have experienced other direct and indirect impacts of the pandemic. Some of these impacts may be relatively temporary while others may be more deeply embedded and long-lasting (National Scientific Council on the Developing Child, 2005/2014).

StatsCan (2020) data are showing that the impacts of the pandemic are disproportionately borne by those with lower-paying jobs without paid sick leave, working several part-time jobs, working in essential frontline positions, and living in multi-generational or crowded housing conditions. Many of these families are relative newcomers to Canada, experience language difficulties and systemic racism, or have family members with diverse abilities.

2.2.2 Young children become confused and worried when they experience the closure of in-person schooling for their siblings and child care for themselves. A StatsCan crowd-sourced survey in October 2020 indicated that 70% of parents of children four years and younger were very or extremely concerned about being able to balance child care, schooling, and work. Children are impacted by household stress and anxiety when the adults in the family are required to work from home or lose their jobs (Ontario Agency for Health Protection and Promotion, 2021).

Household stress can occur when family members who work in front-line positions providing essential services are concerned about contracting and bringing home the virus (Raising Canada, 2020). Young children are negatively impacted when family members experience severe anxiety over loss of income, food and housing insecurity, caring for children while working from home, unsafe home situations, and systemic discrimination (Raising Canada, 2020).

A study by McMaster University, Offord Centre for Child Studies in Ontario (2020) found that when parents/caregivers are negatively impacted, their parenting or care giving suffers. One in three parents/caregivers reported moderate to high levels of anxiety due to the pandemic and resulting emergency measures while almost two-thirds reported symptoms of depression. As a result, one in three parents/caregivers struggled to manage their children's behaviours and almost half struggled to support their children's anxiety. Young children who are able to attend child care may likewise be impacted by the anxiety, stress, and exhaustion experienced by their educators.

A recent Ontario study conducted two to four months after the initial implementation of emergency measures starting in March 2020, looked at three dimensions of health and well-being among two- to five-year-olds (Tombeau Cost, Crosbie, Anagnostou, et al, 2021). Parent reports indicated that 66% of young children were faring worse in at least one of three dimensions: emotional (anxiety), hyperactivity (inattention), and conduct (irritability) as measured on the Strengths and Difficulties Questionnaire. The study found that the strongest predictor of faring worse was increased stress caused by social isolation among children and family members.

2.2.3 Children's opportunities to play outdoors have been declining over the past number of years and the restrictions imposed by pandemic emergency measures have exacerbated this trend by ordering the closure of playgrounds, parks, recreation centres, and restricting outdoor social gatherings (Joshi & Stone, 2021). A national Canadian survey (Maximum City, 2020) found that 56% of young children were experiencing an overall decrease in PA, including 47% decrease in outdoor play (often less than once per day), and 79% increased amount of screen time. Sleep quality was also affected; one out of three parents reported that their young children had poorer quality sleep yet almost half were sleeping longer. While not providing separate preschool age data, two additional studies looking specifically at play and movement behaviours provided similar results (Mittra, Moore, Gillespie, et al, 2020; Moore, Faulkner, Rhodes, et al, 2020).

2.2.4 Adverse childhood experiences such as poverty, abuse, neglect, household dysfunction (including violence, mental illness, and addiction), and systemic racism may create toxic stress which may affect lifelong learning and health (National Scientific Council on the Developing Child, 2005/2014). The pandemic has exposed vulnerabilities in Canada's social safety net for young children; children who were vulnerable before the pandemic have become more so while others whose families were only just managing before the pandemic may be among those hardest hit in terms of job, food, and housing insecurity (Ontario Agency for Health Protection and Promotion, 2021). The literature on the impact of the COVID-19 pandemic on children identifies a range of challenges experienced by children, their families, and educators. Data from this study demonstrate the positive impact PL can have for a child even during a time such as the global COVID-19 pandemic.

3. Purpose of the Study

Research has shown that the early years between birth and five set the course for a child's life trajectory (National Scientific Council on the Developing Child, 2007); therefore, healthy active lifestyles need to be developed in these early years. It is crucial to begin to build a body of evidence demonstrating how PA and PL can be fostered during the early years (Center on the Developing Child, 2021; CSEP, 2017).

From August 2018 to June 2020, a proof-of-concept study was conducted to provide evidence that quality physical literacy programming in child care settings delivered by knowledgeable and supported early childhood educators can be a simple and cost-effective approach that provides multiple benefits for young children ages birth through five years. The objectives of the study were: 1) Determine and provide evidence about potential benefits – cognitive, social, emotional, and physical – for young children when they are provided quality PL programming in their child care settings. 2) Measure change in motivation, confidence, and competence of ECEs to provide quality PL programming for young children in child care settings. 3) Demonstrate how relationships,

mentorship, and education can support and build capacity of educators and facilitate the scaling of PL programming in child care settings.

4. Methodology

The study involved comparison groups in two western provinces of Canada, Alberta and British Columbia: consented children and educators (97) in study settings (23) where educators received professional development, resources, and mentorship, with those in control settings (16) where educators provided their usual standard of care. Child care settings included both group child care and family day homes with four or five playrooms or family day homes included from each agency where size allowed. Settings represented urban and rural locations, not for profit and for profit, large (one as large as 600 children in five locations) and small (16 children in total). One urban centre was located in an immigrant serving agency where the children were all recent immigrants or refugees to Canada.

Two phases of the study were conducted beginning in August 2018 and concluding in June 2020. Quantitative and qualitative data were collected pre- and post-intervention using the Ages and Stages Questionnaire–Social-Emotional (ASQ-SE2) (Squires, Bricker, Heo, Twombly, 2002), the Physical Literacy Observation Tool (PLOT), (Early Years Physical Literacy, 2017c), online surveys, focus groups, and individual interviews. A Parent Questionnaire was completed at the beginning of each phase of the study. The APPLE Model and APPLE Seeds Program were used as interventions (Early Years Physical Literacy, 2017a &b). A developmental evaluation was conducted between the two phases to enable the research team to strengthen the second phase. For the purpose of data analysis, data from both phases of the study were combined.

5. Findings

5.1 Home Context: Parent Questionnaire

The Canadian 24-Hour Movement Guidelines (2017) recommend amounts of physical activity, screen time, and hours of sleep for children from birth through age 18. Children under two should be physically active throughout the day; screen time is not recommended. Children age's two to four should be physically active for a minimum of 180 minutes and have no more than one hour of daily screen time.

To better understand the families consenting to participate in the study, parents/caregivers were asked to complete a Parent Questionnaire. The Parent Questionnaire asked about the families' participation in structured and unstructured physical activity, screen time, as well as potential barriers to physical activity.

A total of 717 Parent Questionnaires were collected in the two phases of the study. The most significant finding from the questionnaire was that, while parents did not identify any major barriers to children being physically active while at home, some children did not meet the recommended guidelines. Some children spent more time engaged with a screen (30% for one hour or more on weekdays and 60% for one hour or more on weekends) than being physically active (only 26% for one hour or more per day). These results highlighted the importance of ensuring that children have ample opportunity to be active during their time at child care in order to meet the recommended guidelines. (See Figures 1 and 2.)

5.2 Benefits for Children

The study was designed to determine if enhanced daily active play and PL programming would provide benefits for young children in four areas of development: cognitive, social, emotional, and physical. Of the original 717 consented children, 663 were available for post-intervention data collected in both study and control groups. Comparing data from study and control groups, study group children experienced benefits in all four areas including language and communication skills, ability to focus and pay attention, problem-solving, more cooperative and imaginative play, showing care and concern for others, more able to regulate emotions resulting in fewer challenging behaviours, and increased PL skills. For the purpose of data analysis, infants were considered to be under the age of 24 months, toddlers were ages two and three, and preschoolers were ages four and five.

5.2.1 *Cognitive development* includes language, learning, and executive function. Delayed language and communication skills among young children are areas of common concern for ECEs across Canada. Data on cognitive development were collected using three online surveys (n=45) and the ASQ-SE2 (n=663). In an online survey, 88% of study group educators reported that the children's communication skills had improved, that they listened better, and talked to each other more.

Executive function skills include working memory, ability to focus and pay attention, and problem-solving. These skills are very important for success in school. In online surveys, 100% of study group educators reported that children were better able to transition calmly from one activity to another and to problem solve. Additionally, 91% of study group educators reported that PL programming promoted a wide range of learning styles, better met children's needs, and enabled them to better pay attention, concentrate, and retain information.

Results from the ASQ-SE2 indicated that while all ages of children showed improved executive function skills, toddlers benefited the most:

- Study group **infants** (under 24 months) and **toddlers** (ages two and three) engaged in more imaginative pretend play than control group infants and toddlers.
- Study group **toddlers** stayed engaged with an activity for longer periods of time than control group toddlers.
- Study group **toddlers** and **preschoolers** (ages four and five) were more able to transition calmly from one activity to another than control group toddlers and preschoolers.

5.2.2 *Social development* includes the abilities to play well with others, make friends, and share. In an online survey, 87% of study group ECEs reported improvements in children's social development:

- Children were playing with a wider range of children.
- Children were better able to take turns and share toys and materials.
- Children's confidence improved leading to better problem solving and more cooperative play.

Results from the ASQ-SE2 indicated that:

- Study group **preschoolers** shared more often/were more willing to share than control group preschoolers.
- All study age groups showed increased care and concern for others over control group children.

5.2.3 *Physical development* in the context of this study included the acquisition of three categories of Fundamental Movement Skills (FMS) - balance, locomotion, and manipulation (e.g., throwing and kicking) - and the impact of these FMS on daily living skills. Data from the Physical Literacy Observation Tool (PLOT) (n=663) highlighted that infants and toddlers experienced the most improvement in FMS (stability, locomotion, and manipulation):

- Study group **infants** showed a strong increase in locomotor skills over control group infants (88% vs 40%) with an overall improvement in FMS of 81% vs 60%.
- Study group **toddlers** showed improvement in manipulative skills over control group toddlers (62% vs 56%) and across all FMS (72% vs 61%).
- Study group **preschoolers** showed improvement in manipulative skills over control group preschoolers (57% vs 50%).
- Across **all ages**, study group children showed the strongest improvement in manipulative skills over control group children (60% vs 21%) and a total overall improvement in all FMS (68% vs 64%).

Physical development also includes using FMS to explore and interact with their environment. In an online survey, 87% of study group educators reported that the children engaged in more risky play and were becoming more willing to explore, especially infants and toddlers. Additionally, in focus groups, study group ECEs indicated that their children's physical development flourished in areas such as:

- more able to sit tall and balanced in a circle and on chairs (stability),
- moving about the room and playground without knocking into objects or people (locomotion),
- showing improved small motor skills when using crayons and scissors (manipulation).

5.3 Changes in Educators' Practice

5.3.1 The study looked for evidence of increased motivation, confidence, and competence among ECEs to provide PL programming for young children. These characteristics were seen as key to ECEs adopting and continuing to

provide PL programming within their programs after the study and to broaden the provision of quality PL programming in child care. An online survey of study group educators determined the following:

- *Motivation:* 96% of ECEs indicated that they better understood the importance of PL for young children and, as a result, were more motivated to provide PL programming going forward.
- *Confidence:* 93% of ECEs indicated that they felt more confident and were more able to provide PL programming for both indoor and outdoor spaces.
- *Competence:* 93% of ECEs felt they had more tools to provide PL programming and identified clear benefits for children, especially infants and toddlers.

5.3.2 The increased motivation, confidence, and competence led to a number of specific changes in the educators' practice as defined in the APPLE Model framework (one of the intervention materials) (Early Years Physical Literacy, 2017a): environment, play, engagement, and relationships. In online surveys, study group educators reported:

Environment:

- 86% provided more PL programming in their indoor environments,
- 79% provided more PL programming in their outdoor spaces.

Play:

- 94 % of children were more physically active,
- 69% of children played for longer periods of time during free play,
- 87% of children played more independently,
- 100% of children exhibited more imagination and creativity during free play.

Engagement:

- 100% of educators were more actively engaged in play with the children as opposed to only watching and supervising the children during play.

Relationships:

- Educators reported that their relationships with children, staff, parents, and others improved. (See Figure 3.)

5.4 Benefits for Educators

As the study progressed, study group ECEs spoke about the benefits they received as a result of providing increased PL programming for children. This became an important finding as educators indicated that they were more inclined to continue PL programming when they felt they also benefited.

During focus groups, study group ECEs reported that children were better able to adapt to change, problem-solve, calm themselves in times of distress, and improve focus and concentration through increased PL programming. In an online survey, 100% of study group ECEs indicated that:

- The number of challenging behaviours declined enabling educators' days with children to go more smoothly.
- The children's needs for play and physical activity appeared to be met through increased PL programming and children and adults appeared to be happier and calmer.

These benefits were perceived by educators to be so powerful that 100% of the study group educators indicated that they would continue PL programming after the end of the study. One ECE commented that PL had made her a better educator; she felt more relaxed, secure, positive, and encouraging.

5.5 Parent Comments

The only formal data collected from families was the Parent Questionnaire completed at the time of consent; however, the research team offered in-person and online workshops to all consented families (both study and control) and control group ECEs (303 participants) after the final data collection, and anecdotal comments were collected at those opportunities.

Parents/caregivers of children involved in the study group attending these workshops commented that they saw increased confidence and physical competence, eagerness to go outside to engage in adventurous play, increased emotional self-regulation and ability to transition, and improved sleeping and eating among their children.

6. Discussion

The *Physical Literacy Proof of Concept Study in Child Care Settings* provided evidence that, when children can engage in daily active play and PL in their child care settings, they experience benefits in four areas of development – cognitive, social, emotional, and physical. Educators' practices changed as they began to see opportunities for active play in most areas of daily programming, indoors as well as outdoors. Educators found integrating PL and active play into their daily programming was simple and inexpensive and resulted in calmer and more playful days for everyone. Benefits were identified for children, ECEs, and families which encouraged educators to continue to offer PL programming after the conclusion of the study.

6.1 The Center on the Developing Child (2021) discusses how helping children become more resilient may help to offset the negative impacts of toxic stress. Three counterbalancing factors to toxic stress are: facilitating supportive adult-child relationships, building a sense of self-efficacy and perceived control, and providing opportunities to strengthen adaptive skills and self-regulatory capacities. Current research into outdoor and risky play is demonstrating the importance of children being allowed to test their boundaries, build confidence and competence, and develop coping strategies which allow them to manage stress and enhance resilience (Sando, Kleppe, & Sandseter, 2021).

This study found that daily active play and PL programming, especially outdoors, contributed to these factors for building coping strategies and resilience among children. Study group ECEs reported that relationships among children, between children and ECEs, and between ECEs and families improved during the study. Data indicated that children in study group centres experienced increased confidence, competence, and self-efficacy. One important finding was that, through enhanced opportunities for active play and PL, language and communication skills among study group children improved. Educators observed that children were better able to control their emotions and self-regulate, exhibiting fewer challenging behaviours. Many educators noted that everyone felt calmer, happier, and more productive. These results would seem to support children in areas identified as concerns in the recent Canadian study of the impact of COVID-19 such as emotional (anxiety), hyperactivity (inattention), and conduct (irritability) (Tombeau Cost, Crosbie, Anagnostou, et al, 2021).

6.2 While this study did not specifically compare indoor with outdoor play, study group ECEs were encouraged to increase the amount of daily outdoor play. Indeed, study group ECEs reported increased time spent outdoors during the study and that increased outdoor active play seemed to better meet a range of needs among the children. Children were more active and engaged in independent imaginative free play and were better able to focus, pay attention, and concentrate when they returned to the indoor space. Children ate and slept better and were more able to manage transitions, results addressing current parent concerns during the pandemic (Maximum City, 2020).

6.3 It is important to acknowledge that ECEs are also impacted by the pandemic and their abilities to manage children's anxieties and behaviours may be challenged (McMaster University, 2020). Study group ECEs reported benefits for themselves as a result of providing more active play and PL for their children, especially outdoors, and engaging in that play themselves. Many identified that they felt calmer and more energized, and enjoyed spending less time managing behaviours and more time engaging playfully with the children.

6.4 The main strength of the study was the relationships that were built between the research team and the study group ECEs, and among the ECEs, providing support, mentorship, and encouragement which helped to ensure engaged and continued participation of all study group centres. Another strength was the opportunity to conduct two phases of the study allowing for a developmental evaluation after Phase One to highlight potential changes and improvements for Phase Two.

6.5 The major limitation of the study was the impact of emergency measures shutting down child care centres in March 2020 as post-intervention data were being collected. While ECEs in study centres were willing and able to complete both the ASQ-SE2 and PLOT without children in the centre, not all ECEs in control centres were able to do so, resulting in a loss of approximately 30% control centre data for Phase Two. To compensate for that loss of data, the research team combined data from both phases of the project and used three online surveys to further probe findings.

6.6 This study included a mentorship model for ECEs in study centres which involved a one-day in-person workshop, monthly online meetings, research assistant support, and a private Facebook page which was somewhat costly and time intensive. While some studies, such as a recent one from the University of Canberra Australia (Roberts, 2021), have concluded that the “elusive” solution to embedding daily PL in child care centres involves the use of peer coaches, this model is often seen to be very expensive and time intensive making it difficult to take to scale. Further research needs to be conducted to determine reasonable and cost-effective ways to provide education (both pre- and in-service) for ECEs and families about PL and how to include it in daily programming. Policy implications follow in terms of best ways to incorporate this education into college and university early learning and child care programs; provincial/territorial policies, regulations, and professional development opportunities that support ECEs to include more PL time indoors and out; and ways to support families to understand the importance of PL as part of holistic child development.

The COVID-19 pandemic has exposed the vital need for children to be able to work through the stresses and anxieties they and their families have been experiencing. Daily active play and PL, especially outdoors and in nature, appear to be an important mechanism for children, ECEs, and families to play actively, regulate their emotions, develop stronger relationships, and enjoy calm and joyful time together.

Figures

Figure 1. Hours of PA per week

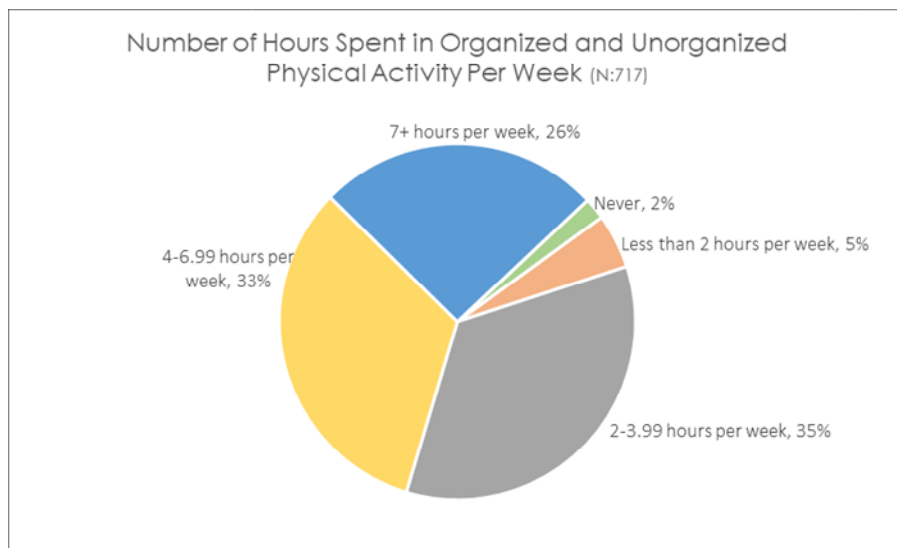


Figure 2. Hours of daily screen time

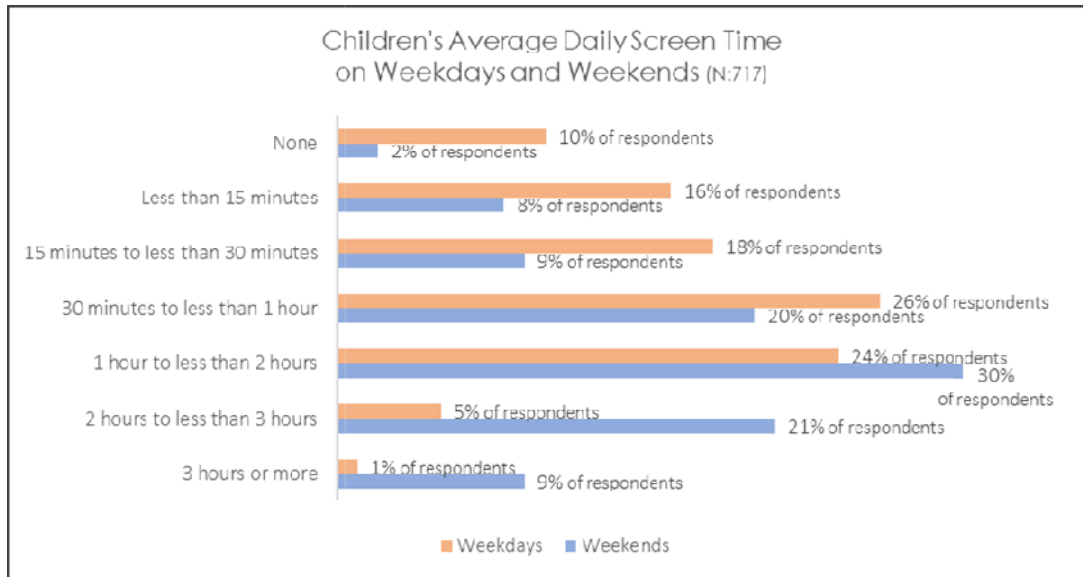
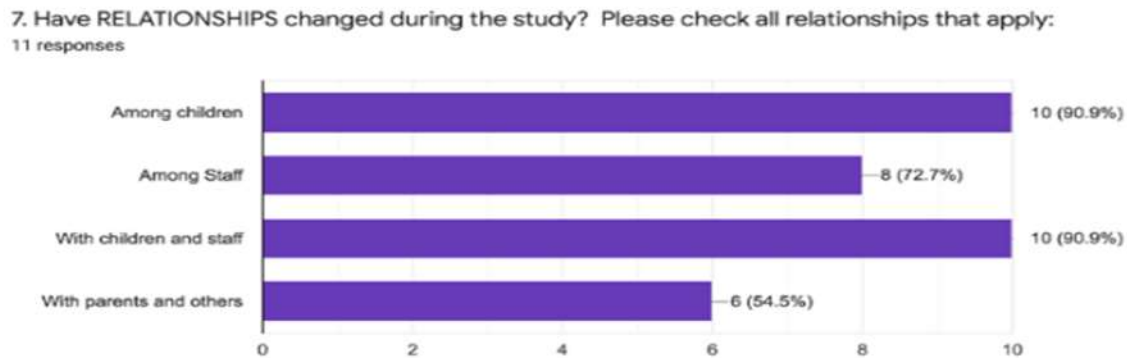


Figure 3. Change in relationships



Declaration of Conflicting Interests

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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