A Feasibility Study Evaluating a Family-Centered Web-Based Intervention to Promote Physical Activity Among Children

by

Dimas Adiputranto
M.Sc., Loughborough University, United Kingdom, 2013

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Supervisory Committee

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Abstract

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Background: Family-centered web-based lifestyle interventions have the potential to be a scalable and cost-effective strategy to promote physical activity for children. However, program engagement and attrition are key challenges facing self-guided web-based interventions. Human email-mediated support may be a solution to these challenges. Currently, there is a lack of research examining whether the addition of human email-mediated support to self-guided family-centered physical activity interventions can improve engagement and intervention effectiveness. Thus, a feasibility study is needed to further understand ways to enhance web-based intervention delivery.
Objective: (i) Evaluate the feasibility (recruitment, attrition, engagement, satisfaction) of a human email-mediated support compared to a self-guided web-based intervention (ii) examine the potential efficacy of a human-supported versus self-guided web-based intervention in improving children's physical activity and parental support behaviours.
Methods: Children aged 8-12 years old who did not meet the Canadian physical activity guidelines were recruited. Families were allocated to either 10-week human email-mediated support or self-guided program. The programs were developed using the multi-process action control (M-PAC) framework. The programs provided information and interactive online activities targeting healthier lifestyle behaviours. The human support group received multiple weekly support emails as needed. The self-guided only received one generic email per week. Both parents and children completed validated questionnaires assessing physical activity and parental support behaviours pre- and post- 10-week intervention. Descriptive statistics were used to analyze recruitment rate, attrition and website engagement. Repeated measures analysis of variance (ANOVA) were used to evaluate intervention effectiveness. Post-program interviews were added to further explore program satisfaction.
Results: Fifty-one families contacted the researcher and eighteen families completed follow-up measures. The overall recruitment rate over a 16-month period was 41% (21/51). The attrition for human email-mediated support and the self-guided group was 10% and 18.2%, respectively. The attrition for both groups was 14% (3/21). The human email-mediated support group showed a significantly higher login frequency (4.7±2.1 vs. 2.3±1.4, respectively; $p = 0.02$), percentage of core pages accessed (35.8±19.6 vs. 13.1±18.2, respectively; $p = 0.02$), and total time spent in minutes (180.6±110.6 vs. 108.8±88.1, respectively; $p = 0.01$). The human email-mediated support group was more satisfied with the program compared to the self-guided group ($p < 0.05$). Both human support and self-guided groups improved their informational and appraisal-emotional support ($p < 0.01$; $\eta_{p2} = 0.9$), parent self-efficacy to support their child's physical activity ($p = 0.03$; $\eta_{p2} = 0.27$), and child physical activity confidence ($p = 0.04$; $\eta_{p2} = 0.26$). Children in the human email-mediated group showed a greater increase in the children's physical activity intrinsic motivation ($p = 0.02$; $\eta_{p2} = 0.34$) than self-guided group following the intervention.

Conclusions: Study recruitment was a challenge. The human email-mediated support group had a lower attrition rate and a higher engagement than the self-guided group. Both interventions showed potential efficacy in improving physical activity measures. A full-scale study is recommended to confirm findings.

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List of Abbreviations

ACTS-MG	-	Activity support scale for multiple groups
ANOVA	-	Analysis of variance
CAPL-2	-	Canadian assessment of physical literacy – second edition
MVPA	-	Moderate-to-vigorous physical activity
M-PAC	-	Multi-process action control
PA	-	Physical activity
PACE	-	Patient-centered assessment and counselling for exercise
PAQ-C	-	Physical activity questionnaire for older children
SCT	-	Social cognitive theory
SPSS	-	Statistical package for the social sciences
TPB	-	Theory of planned behaviour

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I wish to thank all the individuals whose assistance was a milestone in the completion of this thesis. First and foremost, I would like to pay my regards to my supervisor, Dr. Sam Liu, for his continued support, constructive feedback, and presence throughout this project. I would like to thank my departmental member, Dr. Patti-Jean Naylor, for lending moral and academic support along the way. Without their contributions, this study would not have been realized. I also wish to express my deepest gratitude to past and present Digital Health Lab members (Alyssa Roehrich, Amanda Willms, Brenda Adams, Henry La, Megan Perdew, Sam Lapusniak, Si Ning Yeo, Tamara Kopchyk), and the Childhood Obesity Foundation that supported me with the data collection and encouraged me to stay focused on my goals.

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Chapter 1: Introduction

1.1. Overview

The latest Canadian 24-hour Movement Guidelines for Children and Youth have suggested that children need to perform at least 60 minutes of moderate-to-vigorous physical activity (MVPA) per day at least 3 days a week (Tremblay et al., 2016). Despite the array of information that reveals the benefits of regular physical activity, only 4% of Canadian girls and 9% of Canadian boys aged 5 to 11 managed to meet these recommendations (Colley et al., 2017; Tremblay et al., 2016). Family-based physical activity interventions have been cited as the key to behaviour changes in children because parents are the gatekeepers that have the authority to shape children's health-related behaviours (Ash, Agaronov, Young, Aftosmes-Tobio, & Davison, 2017; H. E. Brown et al., 2016; Gustafson & Rhodes, 2006; Rhodes et al., 2013). Family-based interventions are traditionally delivered through face-to-face approaches. Face-to-face interventions have limited reach and can be resource intensive. Therefore, there is a need to extend these family-based physical activity interventions to families (Anderson-Bill, Winett, & Wojcik, 2011; Blake et al., 2016; Chen, Weiss, Heyman, Cooper, & Lustig, 2011).

Web-based interventions are one approach to extending the reach and flexibility of interventions for families. Web-based interventions enable health care providers to deliver health interventions using *World Wide Web* (Barak et al., 2009). Web-based interventions can range from human supported interventions to self-guided automated (e.g. with no input from the health care provider required). The human supported web-based intervention in this context can range from low-intensity to more synchronous support forms (Jiménez-Molina et al., 2019). A range of studies have shown the effectiveness of human support and self-guided web-based interventions to improve physical activity and health-related outcomes (Campbell & Wright, 2011; Chung, 2013; DeHoff, Staten, Rodgers, & Denne, 2016; Eysenbach, 2001;

Griffiths, Lindenmeyer, Powell, Lowe, & Thorogood, 2006; Hu & Sundar, 2010; Rains, 2014; Wright, 2016).

Although self-guided web-based interventions have the potential to be more scalable and offer flexibility than face-to-face interventions, these types of interventions delivery methods often have challenges with program engagement and attrition (Stassen, Grieben, Froböse, & Schaller, 2020; Wangberg, Bergmo, & Johnsen, 2008; Winett et al., 2011). A potential way to overcome these challenges is to incorporate human support with self-guided web-based intervention delivery model. A scalable way to implement human support web-based intervention is the use of emails. Existing literature has shown that email could be an effective medium through which the intervention program's messages are delivered (Gabriele, Carpenter, Tate, & Fisher, 2011; Hatchett, Hallam, & Ford, 2013; Plotnikoff, Pickering, McCargar, Loucaides, & Hugo, 2010; Richards, Ogata, & Cheng, 2017; Richards & Woodcox, 2018; Stewart, Gabriele, & Fisher, 2012). This format allows participants to engage with the information in an asynchronous method, meaning that they do not need to make specific appointments that could potentially interrupt their daily routines (Richards & Woodcox, 2018). Specifically, human email-mediated support can provide emotional (expressions of empathy), instrumental (tangible aid and service), informational (the provision of ideas and suggestions), appraisal (the provision of advice or feedback that initiates self-evaluation) form of support. Through emails, web-based physical activity intervention participants can receive social support through a series of messages of praise, caring, and concern (emotional support), advice, and suggestions (informational support), as well as validations and feedback that aim at reducing one's psychological distress and improving their self-efficacy and positive self-talk (appraisal support) (Dennis, Masthoff, & Mellish, 2013; Kindness, Masthoff, & Mellish, 2016; Malecki & Demaray, 2003; Wing & Jeffery, 1999). Human-mediated support is less resource-intensive compared to full human

support programs, while still offering the potential to maintain participants engagement and improve intervention effectiveness (Petersen, Kemps, Lewis, & Prichard, 2020; Voth, Oelke, & Jung, 2016).

Currently, there is lack of research examining whether the addition of human email-mediated support to a self-guided program can further improve participant engagement, attrition rates or potential intervention efficacy. Thus, a feasibility trial is necessary in order to further the field of web-based interventions by informing future study and intervention design.

1.2. Statement of Purpose

The purpose of this study was to evaluate the feasibility and potential efficacy of a 10-week human email-mediated support compared to self-guided web-based intervention aimed to promote physical activity for children aged 8-12 years old. Specifically, the study addressed the following research objectives.

1.3. Research Objectives

The objectives of this research were:

1. To evaluate the feasibility (recruitment, attrition, engagement, satisfaction) of a human email-mediated support compared to a self-guided web-based lifestyle intervention.
2. To evaluate the potential efficacy of a human email-mediated support compared to a self-guided web-based intervention in improving:
    a) parent's perceived social support;
    b) parent's physical activity self-efficacy to support their child physical activity level and behaviour;

c) parents' physical activity perceived capability to support their child physical activity level and behaviour, and;

d) parents' physical activity perceived opportunity to support their child physical activity level and behaviour.

3. To evaluate the potential efficacy of a human-supported relative to self-guided web-based intervention in improving:

    a) child physical activity level;

    b) child physical activity intrinsic motivation;

    c) child physical activity competence;

    d) child physical activity confidence, and;

    e) child sedentary behaviour.

1.4. Hypotheses

The following hypotheses were proposed at the outset of the trial:

1. Both groups (human email-mediated support and self-guided interventions) would be feasible as defined by comparability of recruitment to studies with similar design and population.
2. The attrition rate for the human email-mediated support would be lower compared to the self-guided group.
3. The human email-mediated support group would have higher levels of website engagement and program satisfaction compared to the self-guided group.
4. Parents enrolled in the human email-mediated support group would report higher levels of perceived social support, self-efficacy, perceived capability, and perceived opportunity to support their child in regular physical activity compared to the self-guided group.

5. Children in the human email-mediated support group would have higher levels of physical activity, intrinsic motivation to do physical activity, physical activity competence, and physical activity confidence, and reduce their sedentary behaviour than the self-guided group.

Chapter 2: Literature Review

2.1. Physical Inactivity and Web-Based Family Interventions

Physical inactivity is defined as not meeting the guidelines of 60 minutes of MVPA per day at least 3 days a week (Tremblay et al., 2016). It is often associated with sedentary behaviours, which refer to certain activities (e.g. sitting, reclining, lying down) that involve very low energy expenditure during waking hours (Panahi & Tremblay, 2018; Tremblay, 2012). There is growing evidence that suggests that the potential risks of both physical inactivity and sedentary behaviours in children contribute to the burden of chronic diseases, such as childhood overweight and obesity (González, Fuentes, & Márquez, 2017; Tremblay, 2012; Tremblay et al., 2016). Physical inactivity and sedentary behaviours exist on a continuum and have different layers of complexity, and thus creating and developing interventions that work effectively for all individuals is not as straightforward as it seems (Rhodes & Yao, 2015). It is then important for public health scientists, policy leaders, and other domain experts to propose effective intervention that covers not only the physical components, but also other elements that are interwoven with behaviour change principles.

A large array of studies posits that parents have the biggest role in directing children toward desirable health-related behaviours (Ash et al., 2017; Brown et al., 2016; Gustafson & Rhodes, 2006; Rhodes et al., 2013). Brown et al. (2016) conducted a systematic review and meta-analysis examining family-based interventions to increase physical activity in children. Referring to previous reports (Gustafson & Rhodes, 2006; Kipping et al., 2014; McMinn, Griffin, Jones, & Van Sluijs, 2013; Van Sluijs & McMinn, 2010; Van Sluijs, McMinn, & Griffin, 2008), they suggested that parents should be considered a constitutive integrant in physical activity intervention research considering their salient role in determining four behaviours (i.e. physical activity, diet, screen time, and sleep) associated with children's energy balance. Kalavainen et al. (2011) seconded these findings by postulating that

inefficient health interventions were intertwined with the failure to get parents involved in the programs as agents of change. Therefore, family-centered interventions need to empower parents to take a pivotal role in the implementation of an intervention design (Ash et al., 2017; Hingle, O'Connor, Dave, & Baranowski, 2010; Wald et al., 2018). Traditionally, family-based interventions use face-to-face approaches, such as weekly group meetings or individual consultations. Existing literature has suggested that conventional face-to-face family-centered interventions to promote physical activity in children have been effective (H. E. Brown et al., 2016; Garriguet, Colley, & Bushnik, 2017). Despite their effectiveness, face-to-face interventions can still be problematic. Studies have reported common barriers to treatment including intervention cost, geographical and time constraints, and high labour intensity for both the provider and the family (Alley, Jennings, Plotnikoff, & Vandelanotte, 2014; Griffiths et al., 2006; Lustria, Cortese, Noar, & Glueckauf, 2009)

Web-Based Family Interventions

Web-based health interventions are interchangeable with other terms such as "*eHealth interventions*" and "*Internet-based interventions".* This terminology also has the same concept as other "*e-words*" (e.g. *e-commerce, e-business* etc.) (Eysenbach, 2001). Web-based health interventions refer to a technique that is used by related parties (i.e. researchers, practitioners, and policy leaders) to deliver health-related services and information using the Internet (Barak et al., 2009). The content of web-based health interventions usually focuses on behavioural treatments that mimic proven one-on-one interventions. The content is "personalized and tailored to the user; highly structured; semi self-guided to fully self-guided; interactive; enhanced by graphics, animations, audio, and video; and often able to provide follow-up and feedback" (Ritterband et al., 2009, p. 18).

The adoption of web-based health interventions in the last two decades has created a new platform for researchers and health care professionals to extend the reach and effectiveness of behaviour change interventions in a way that resembles face-to-face interventions and minimizes geographical, time, and cost limitations (Anderson-Bill, Winett, & Wojcik, 2011; Blake et al., 2016; Chen, Weiss, Heyman, Cooper, & Lustig, 2011). Moreover, from a practical point of view, there are significant constituents that act as the foundation of web-based interventions (Barak et al., 2009). These components rely on each other and should be taken into account when creating a web-based intervention program. They will be briefly discussed in turn.

i. Content of the Program

As the main piece of web-based health interventions, program content dictates the direction of the website. The content of the web-based health interventions focuses on educating the user to encourage behaviour change. The content given can be either in a one-way method where the direction is from the professional to the patients, or two-way, where the goal is to create a culture of reciprocity between both parties (Barak et al., 2009).

ii. Multimedia Use/Choices and the Provision of Interactive Online Activities

The use of multimedia largely determines the overall appearance of a web-based intervention. Text is the most common approach to disseminating the content of a program. However, studies have also suggested that adding other features such as animations, audio, images, graphics, and user-friendly interactivity would increase user engagement because they make the site more dynamic and visually appealing

(Barak et al., 2009; Ritterband, Andersson, Christensen, Carlbring, & Cuijpers, 2006; Ritterband et al., 2009).

iii. Provision of Feedback and Guidance

Guidance and supportive user feedback refer to an established process in which users receive additional information regarding their well-being and progress in the program. Web-based interventions usually encourage patients to take initiative and take control of their own health (Eysenbach, 2001; Melchiorre, Lamura, & Barbabella, 2018; Wantland, Portillo, Holzemer, Slaughter, & McGhee, 2004). However, there are certain forms of guidance and feedback that need to be provided before patients have the ability to perform a new behaviour. According to Barak et al. (2009), the degree of feedback varies from none (i.e. no provision of guidance or feedback at all) to high (i.e. sufficient amounts of personalized feedback). The provision of feedback and guidance manifests in a variety of forms that support self-management skills (e.g. self-monitoring tools, email reminders, goal setting activities, skill building activities, and links to different resources and interactive activities) displayed in a number of formats such as email, chat room, discussion board, animation, and quizzes (Lustria et al., 2009).

Using these components, the objectives of web-based intervention programs are to provide interactive online environment for users, increase their program engagement level, and support the psychological and social components that may lead to positive behaviour change and increased health-related knowledge, awareness, and understanding (Barak et al., 2009; Eysenbach, 2001; Lustria et al., 2009).

2.2. Web-Based Interventions with Human Support vs. Self-guided

Web-based interventions can be guided and enhanced by human support or self-guided. More intensive human input may consist of more frequent updates and interaction with the provider, more extensive employment of dialogues between the provider and the user, more therapist support, tailored feedback, and even the provision of digital avatars (Ludden, van Rompay, Kelders, & van Gemert-Pijnen, 2015). The level of human support can also be varied from low-intensity asynchronous (e.g. motivation, reminders) to more synchronous meetings, therapy, supervision, and feedback (Jiménez-Molina et al., 2019). Moreover, email, text messages, telephone support, chat rooms, forums, and teleconference have been cited as the common platforms used by the provider to facilitate human support (Faith, Thorburn, & Sinky, 2016). Self-guided interventions have no human input and consist of automated support providing general information on the intervention themes (Little et al., 2016). This type of support can be delivered through different platforms, such as email and text messages. Existing literature has suggested that self-guided interventions require the user to take more control over an expected and unexpected occurrence or situation (Bücker, Westermann, Kühn, & Moritz, 2019).

Some studies have shown that human supported are equally as effective as self-guided web-based interventions, whereas others suggest that human supported is more effective. A randomized controlled trial study comparing human and automated support found that there were no significant improvements between the two groups in terms of clinical outcomes and program adherence (Kelders, Bohlmeijer, Pots, & van Gemert-Pijnen, 2015). Titov et al. (2013), however, revealed that adherence and program engagement are problematic in self-guided web-based interventions, indicating that more personalized human support is needed to get overall better outcomes. This is supported by a systematic review by Richards & Richardson (2012) that suggested that self-guided interventions were less effective compared

to web-based interventions with additional human support in terms of maintaining retention and improving clinical outcomes.

An advantage of self-guided web-based interventions is that it can be less labour-intensive for the provider since no extra human intervention is required. Consequently, they may be more cost-effective in comparison to human-supported web-based interventions (Bücker et al., 2019). However, individuals with more complex health issues or less motivation, confidence, and knowledge on their condition may benefit more from web-based interventions with enhanced human support as they may need more specific support to gain more confidence and motivation (Schueller, Tomasino, & Mohr, 2017). The effectiveness of human email-mediated support versus self-guided web-based intervention aimed to promote physical activity among children is not well studied. Therefore, a study comparing these forms of intervention is necessary to help advance the field of web-based interventions.

2.3. The Role of Human Support in the Web-Based Health Intervention Setting

Despite the potential benefits of Internet-based physical activity interventions of all types, continuous program engagement and attrition remained a challenge (Dadds et al., 2019; Shah, Chaiton, Baliunas, & Schwartz, 2019). Thus, in order to overcome these challenges, there is a need to consider the concept of human support by applying more personalized approaches that are based on a theoretical framework which overarches different affective and cognitive components of behaviour (Kelders et al., 2015; Schueller et al., 2017). Human support in this context is defined as extrinsic social support gained from human (e.g. a spouse, parents, friends, colleagues, professionals) that provides an individual with a sense of being cared for (Beets, Cardinal, & Alderman, 2010; Schueller et al., 2017). Moreover, this extrinsic social support can be interpreted as “verbal and nonverbal communication between recipients and providers that reduces uncertainty about the situation, the self, the

other, or the relationship, and functions to enhance perception of personal control in one's experience" (Ko et al., 2013, p. 195). The rapid development of technology in the last two decades has created a new medium for scholars and professionals to expand the scope of social support in the context of web-based health interventions (Maher et al., 2015; Wright, 2016; Zhang et al., 2016). To the best of the my knowledge, a consensual definition of online support is not yet agreed to in the literature. Nevertheless, Preece (2001) defines the online social support as "any virtual social space where people come together to get and give information or support, to learn, or to find company" (p. 348). In a more thorough manner, online social support can be described as "the cognitive, perceptual, and transactional process of initiating, participating in, and developing electronic interactions or means of electronic interactions to seek beneficial outcomes in health care status, perceived health, or psychosocial processing ability" (LaCoursiere, 2001, p. 66).

Social support provided by human can be classified into four dimensions in which all acts of support are designated (Beets et al., 2010; House, 1981). They are explained below.

i. Emotional Support

Stressful events and constant pressures may lead to the decline of self-esteem, and thus emotional support exists to offer acceptance, reassurance, approval, and encouragement aimed at overcoming negative emotions as well as increasing one's positive emotional states (Schwarzer & Leppin, 1989). Emotional support is also defined as the expressions of empathy, love, trust, understanding, affirmation, validation and caring (House, 1981). The physical presence of a significant other providing the support may or may not be required depending on the contextual circumstances (Finfgeld-Connett, 2005). Unlike in the offline communication setting where emotional support can be easily noticed through visible cues (e.g. facial

expressions, eye contact, and body movements), online support providers rely on empathetic messages to convey the emotional support cues to the recipient (Preece, 1999). Appropriate emotional support has been shown to strengthen the bond between the care provider and the receiver, whereas inappropriate emotional messages may aggravate the recipient's stress (Kindness et al., 2016; Robinson et al., 2019). Thus, the support provider needs to recognize what kind of messages should be included for each type of situation because different conditions may require different approaches.

ii. Instrumental Support

Instrumental support relates to the act of supporting the recipient by means of tangible aid and service (House, 1981; Malecki & Demaray, 2003; Rackow et al., 2017). As the name implies, this type of support can be expressed through various practical help and services, such as a father driving his son to a junior hockey practice session, or a mother enrolling her daughter to a summer camp where she can be physically active. A study by Siceloff, Wilson, & Van Horn (2014) demonstrated that young adolescents relied on adult family members to facilitate their physical activity opportunities, further emphasizing the importance of family-based interventions to promote physical activity in children and youth. However, within the online setting, the provision of instrumental support is difficult to be exhibited due to a little opportunity to be physically present for the recipient. Instrumental support can still be performed indirectly in the context of online family-based interventions by providing informational support pertaining to different physical activity-related topics to build or increase parents' self-efficacy, perceived capability, and perceived opportunity. Parents can then transfer new information to various types of practical help and

resources that facilitate their child's thinking and learning skills through tangible assistance mentioned earlier.

iii. Informational Support

This type of social support refers to the provision of ideas, facts, advice, information, and suggestions (House, 1981; Schwarzer & Leppin, 1989). All these different components can help an individual discover the best possible next steps that can give them the expected results. When people perceive the health information as being more useful, they are more likely to continue using the resources provided as guidelines for healthier lifestyle decisions (Escoffery et al., 2005; McKinley & Wright, 2014). Physicians, family members, as well as traditional forms of mass media, such as radio and television, have been regarded as resources that are able to provide health information (Napoli, 2012). Internet-based health interventions extend these services by including features such as the ability to acquire information tailored to the user's needs and a safe space (e.g. email, forum, chat room) where users can interact with one another, allowing information exchange among them (McKinley & Wright, 2014). Informational support further assists the health consciousness perspective by initiating people to seek more information pertaining to their condition on the World Wide Web. It can be used in conjunction with other psychosocial variables (e.g. self-efficacy, intrinsic motivation, perceived capability, perceived opportunity, self-competence, behavioural regulation) and may offer an in-depth structure that elucidates how social support promotes positive health behaviours (McKinley & Wright, 2014; Rhodes, 2017).

iv. Appraisal Support

Almost similar to emotional and informational support, appraisal support is achieved through the provision of praise, encouragement, advice and feedback. The difference is that appraisal support encourages honest self-evaluation by assessing how one's personal state of affairs alter their life (House, 1981). For instance, an online care provider giving advice to her client who is struggling with extra weight that he has been in a similar situation and managed to control his ravenous hunger by being part of a local running community. This reminds him that he has the ability to plan an approach that will help him lose weight. Together with other forms of social support mentioned earlier, appraisal support can help reduce doubts pertaining to new exercise behaviour by providing access to relevant sources of peer information that enable an individual to initiate self-evaluation and eventually find a way to increase their perceived capability and opportunity (Rhodes, 2017; Wing & Jeffery, 1999).

Collectively, these four types of support in the web-based health intervention setting facilitate an exchange of reciprocal supportive actions and contribute to the perception of positive physical activity outcomes (Li, Chen, & Popiel, 2015; Robinson et al., 2019). Previous investigations have also suggested that social support as a concerted unit has the potential to improve physical activity engagement considering their association with increased self-efficacy, a significant predictor of physical activity behaviour (Allam et al., 2015; Petersen et al., 2020). Recognizing the dynamic process when providing human social support in web-based family-centered physical activity interventions is equally important because challenging circumstances may occur as one progresses with the program. With this in mind, the support provider (i.e. the human) needs to be an advocate that motivates and empowers the recipient to act on their own behalf while maintaining as much control as

possible to make sure the participant follows the physical activity intervention protocol (Finfgeld-Connett, 2005).

2.4. Social Support and the M-PAC Framework

As previously mentioned, the role of social support in the web-based health intervention context should be understood through theories that encompass cognitive, affective, and behavioural change components in relation to physical activity. Theory-based physical activity interventions have shown promise in promoting positive behaviour change (Glanz & Bishop, 2010; Stacey, James, Chapman, & Lubans, 2016). As a meta-theory that combines components of other behaviour change theories, such as theory of planned behaviour (TPB) (Ajzen, 1991) and social cognitive theory (SCT) (Bandura, 1991), the multi-process action control (M-PAC) provides a comprehensive understanding of the translation of initial intention into behaviour and gradual building to identity and habit (Rhodes, 2017; Rhodes, Berry, et al., 2019; Rhodes & de Bruijn, 2013; Rhodes & Yao, 2015). M-PAC asserts that intention is a decisional construct which translates to two possible outcomes: *intend* or *do not intend*. This intention formation initiates *reflective processes* that consist of: (i) *instrumental attitude* or outcome expectations; (ii) *perceived control* (perceptions of personal capability and opportunity to perform a certain behaviour), and; (iii) *affective attitude* (enjoyment of a particular behaviour). These processes result in an intention to perform a behaviour, which will be followed by an *action control* (i.e. one's cognitive processes that stand between intention and physical activity behaviour). This phase relies on *ongoing reflective processes* (i.e. positive affective judgments and perceived opportunity) and *behavioural regulation* (e.g. active planning and self-monitoring). These regulation processes dictate one's strategies to interpret intentions into action. The results of continuous action control are *reflexive processes* (i.e. self-identity/concept and habit/automaticity) that drive

one to perform a particular behaviour more regularly (Rhodes, 2017; Rhodes & de Bruijn, 2013; Rhodes & Yao, 2015) (Figure 1).

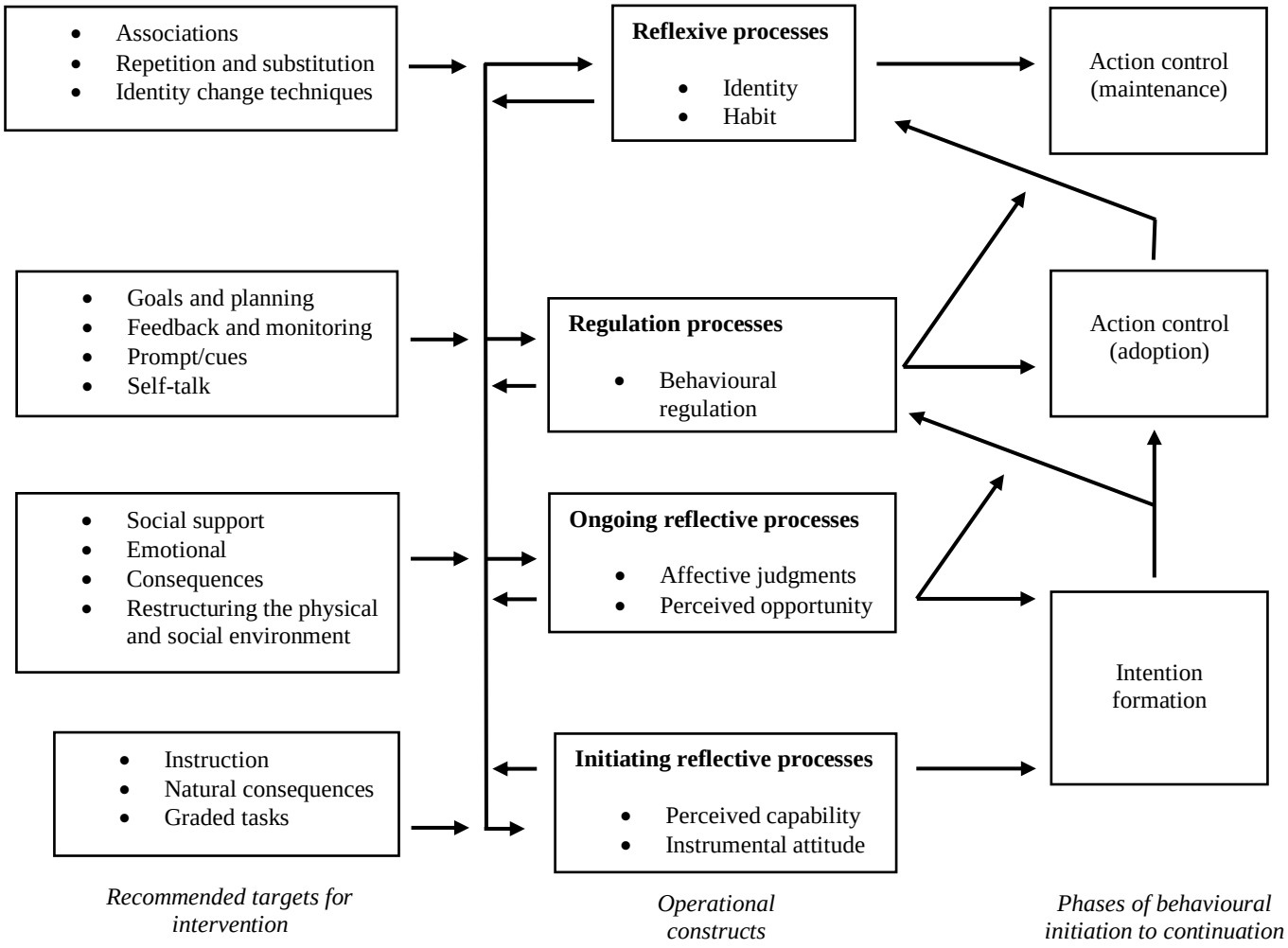

Figure 1. The Multi-Process Action Control (Rhodes, 2017).

Within the M-PAC framework, social support is one of the key components in the reflective processes that stand between intention formation and a new behaviour (Rhodes, 2017; Rhodes et al., 2019). Social support is associated with a person's emotional experience and psychosocial factors in which they feel supported, understood, and respected. This means the more they feel supported and empowered, the bigger their chance to commit to the gradual processes of developing a new habit and identity (Yao & Rhodes, 2015). Once an

intention has been formed, there is an element of increased self-efficacy and perceived control (e.g. "*I know as a family we haven't really embraced a healthy lifestyle. We definitely can do this as a unit, as a family!*"). This intention can be preserved and encouraged through the application of appraisal-emotional support since it propels their goals and values their progress and achievements (Simons, Hampe, & Guldemond, 2013). Through a series of caring messages, appraisal-emotional support is also an important resource that can help individuals cope with stress, enhance self-efficacy and confidence, which in turn will increase their perceived capability and opportunity to restructure their physical and social environment. In addition, informational support plays a prominent role in determining a person's perceived opportunity and behavioural regulation through prompts and cues, as well as goals and planning (Rhodes, 2017; Rhodes et al., 2018). These recommended targets will make a person aware of opportunities they can utilize to improve their physical activity level and what extent of improvement they can possibly reach in their current state (Rhodes, 2017; Simons et al., 2013). For example, providing concrete goals that participants have to accomplish on a weekly basis (e.g. *Here are Family Challenges you can do this week!*) to indirectly support participants choose their own ways of performing new behaviours through different methods that work for them. This approach may offer more benefits in the long run since there is mental ownership, positive self-talk and self-monitoring that can arise as a result of finishing a task using their own choice and approach, while still maintaining their choice of action within the program's framework (Rhodes, 2017; Simons et al., 2013). In conclusion, not only does social support as a collective unit enhance one's self-efficacy, it also encourages more self-assurance, perceived capability, perceived opportunity, and independence to restore the adoption of action control (i.e. engaging with the program and following the intervention protocol) should life events push them out of the intervention patterns (Rhodes, 2017; Simons et al., 2013).

Further, following the SCT concept (Bandura, 1991), choosing to be physically active relies on one's belief in their ability to perform a physical activity behaviour as well as the consequences of performing that particular behaviour through a series of personal, behavioural, environmental, and psychosocial factors that influence one another (Rhodes, McEwan, & Rebar, 2019). The SCT implies that people with higher self-efficacy and knowledge of physical activity are more likely to initiate a specific exercise behaviour and may continue to maintain it. Therefore, in order to facilitate positive behaviour change to physical activity among individuals who do not possess sufficient self-efficacy, there is a need to create supportive social and physical environments that can trigger higher self-efficacy to perform a behaviour. Social support in this context can be performed through the provision of goal-setting, positive reinforcement for effort or progress towards a new behaviour (i.e. appraisal-emotional support), and the provision of instruction and information on consequences of behaviour (i.e. informational support). Appropriate social support can also lead to enjoyment of performing a new physical activity behaviour, which is important in improving one's self-efficacy (Bandura, 1991; Eather, Morgan, & Lubans, 2013; Petersen et al., 2020). Moreover, adding TPB (Ajzen, 1991) as a comparison, Rhodes, Jones, & Courneya (2002) asserted that physical activity was not solely related to an individual's subjective norm. Performing a physical activity behaviour can be determined by the perceived social pressure that may lead a person to behave specifically in order to comply with views of others that they deem significant. Physical activity, however, is non-volitional, meaning an individual still needs assistance and help from others (i.e. social support) in order to perform the behaviour (Courneya, Plotnikoff, Hotz, & Birkett, 2000; Rhodes et al., 2002). Social support in this regard may complement the other two constituents within the TPB constructs (i.e. attitude, perceived behavioural control) that predicate the formation of a physical activity intention which determines one's behaviour (Rhodes et al., 2002).

2.5. Why Individuals Would Want to Join Web-Based Interventions

Online social support has also been identified as a multifaceted construct which contains a number of behavioural and psychological predictors that help explain why certain individuals would consider joining web- and/or Internet-based intervention programs (Faith et al., 2016; Li et al., 2015; Wright, 2016). First, online social support offers relevant, more updated health information (informational support) and greater access to social support networks (appraisal, emotional, and instrumental support) without having to consider the geographical boundaries (Chung, 2013). For instance, if a person lives in a remote location where they are unlikely to meet people living with the same health concerns, an online social support network may offer a reliable alternative for receiving support, gathering relevant health information, and reducing anxiety and concerns about their condition regardless of their physical location (Wright, 2016). Additionally, research has revealed that individuals who feel socially disconnected may perceive online communities as a coping mechanism to battle loneliness by digitally socializing with others (Wright, 2016; Wright & Bell, 2003).

Equally important is the issue of stigmatization. Stigmatization is caused by one's perception that they are classified by the society in an undesirable stereotype as a result of their health problem (e.g. being overweight or obese). It may lead to certain social conditions that hinder an individual from expressing their feelings, thoughts, fears, goals, and dislikes. A web-based intervention program with online social support is a platform for individuals living with stigmatized health issues to share their thoughts, feelings, fears, and form relationships with providers and other members without having to feel self-conscious about the discrediting characteristics of their concerns (Rains, 2014; Wright, 2016). The anonymity feature of online social support is a component that can bridge the gap between illness-related embarrassment and self-disclosure (Campbell & Wright, 2011; Rains, 2014). In addition, the asynchronous and mediated nature of online social support allows users/patients to

communicate with care providers in a more flexible manner without having to worry about time and space barriers which often exist in physical support setting (Turner, Grube, & Meyers, 2001; Wright, 2016).

Perceived similarity among individuals living with rare diseases or conditions is another potential benefit for participating in web-based interventions with online support system. Research has demonstrated that perceptions of similarity in both face-to-face and online social networks are significantly important for people living with specific conditions (Wright, 2016). The similarities of the experiences (e.g. "*I totally understand where you are coming from, I have been through the same thing*.") add more positive dimensions to perceptions of emotional support (i.e. empathy, validation of issues, words of encouragement) (Campbell & Wright, 2011). Those who have not experienced the same situation and/or condition may not have the ability to offer adequate support to people facing the problem. The collective experience based on similar health concerns or problems can stimulate dialogue among members of online social support groups in a forum or group chat (Li et al., 2015). Individuals with similar experiences have the ability to provide emotional, informational, and appraisal support based on their indistinguishable journeys, and hence the support provided in this context may even be considered more credible than the support received from health care providers (DeHoff et al., 2016; Hu & Sundar, 2010; Wright, 2016).

2.6. Email as a Social Support Instrument

In a practical domain, previous investigations have demonstrated that email can be an effective medium through which an intervention program's messages are delivered (Gabriele et al., 2011; Hatchett et al., 2013; Plotnikoff et al., 2010; Richards et al., 2017; Richards & Woodcox, 2018; Stewart et al., 2012). Compared to face-to-face sessions or telephone support, this format allows users to engage with the information sent by email in an

asynchronous method, meaning that they do not need to make specific appointments that potentially interrupt their daily routines (Richards & Woodcox, 2018). Web-based health intervention participants can receive social support through a series of messages of praise, caring, concern, and validation (emotional support), advice, and suggestions (informational support), as well as validations and feedback that aim at reducing one's psychological distress and improving their self-efficacy (appraisal support) (Dennis et al., 2013; Kindness et al., 2016; Malecki & Demaray, 2003; Wing & Jeffery, 1999). From a provider's perspective, emotional support message can be conveyed through either a sentence without language indicative of judgment (e.g. *Congratulations on finishing all the goals this week!*) or more direct manner (e.g. *We know that last week's challenge was tough, but don't give up – you got this!*). Table 1 outlines emotional support categories and messages that have been validated and used in social support and health intervention studies (Dennis et al., 2013; Kindness et al., 2016).

Table 1. Emotional Support Categories and Statements; Adapted from Dennis et al. (2013) and Kindness et al. (2016).

Category	Statement
Encouragement	*You can do this*
	Cheer up
	You will be excited
	Why don't you take a deep breath
	Don't give up
	It will be all right
	Be proud of your achievements
	Believe in yourself
Praise	*Great work*
	Good job
	You are doing a great job
	Good job at keeping your cool
	Thank goodness that you are knowledgeable
	I am proud of you
	You should be proud of yourself
	Your efforts are appreciated and valued
	You work great against pressure
	You are a pro at this
	You are doing well
	You are capable and competent
	You are handling it well
	You are really helping this situation
	That was hard but you did it
Reassurance	*It is going to be fine*
	It will be OK
	You will get through this
	This will be over soon
	You can do this
	You can handle this
	You will get there eventually
	I am here for you
	You can do it
	This is complex but you can work through it
	It is not your fault
	We have got plenty of time
	You can only do so much
Sympathy	*I know how you feel*
	I understand that this is frustrating
	I know what you are going through
	I know this is hard
	You must be really happy

Turning to informational support, in the email context, an example of support is to give an instruction to the recipient to perform a particular mental health activity (e.g. *This week's activity you can do as a family is a 15-minute morning meditation. We have provided meditation guidelines for you, please click on the link below*.); or provide the recipient with mental health activity options and let the participant decide what works best for them (e.g. *Your mental health is as important as your physical health. Here are some ideas you can do as a family.)*. The nature of email gives access to participants to share their condition, required treatments, and other related components with the care provider. In a similar setting, appraisal support is operationalized through affirmations, validations, feedback, and praise for one's accomplishments with the goal to reduce an individual's psychological distress and improve their self-concept (Malecki & Demaray, 2003; Wing & Jeffery, 1999). Appraisal support coming from reliable resources plays a significant role in determining one's psychological well-being when they are participating in an intervention program as they may be subjected to a barrage of exclusionary online and offline messages that make them question their self-efficacy and perceived control. In a practical context, the provision of appraisal support can be associated with self-monitoring activities and the use of goal-setting (e.g. *How are you feeling now that you have finished your task this week?*; *Make a difference by walking 10,000 steps a day!*; *Congratulations on achieving 10,000 steps today, give yourself a pat on the back!*). This approach may help the recipients embrace a sense of freedom to perform what they want to do and encourage them to do self-evaluation and apply their own ideas responsibly to perform a new behaviour (Malecki & Demaray, 2003). In addition to email, the provision of forum or chat room may encourage peer discussion that can indirectly provide social support coming from other participants. Through forum discussions, it is expected that other recipients will eventually become significant sources of

social support, creating a sense of community among members of the online social network (Petersen, Prichard, & Kemps, 2019; Wang, Zhao, & Street, 2014).

In a recent study, Richards & Woodcox (2018) postulated that an email-mediated program based on Bandura's (1991) SCT was effective at increasing and maintaining physical activity in a community population, with participants reporting that the email messages were easy to read and easy to understand. Additionally, participants mentioned that the frequency of the emails they received was acceptable and the overall messages encouraged them to increase their walking. Around 63% of participants reported reading the emails very frequently, and 25% reported reading the emails quite often. Two features of the intervention emails that participants found useful were: (i) weekly tips on how to incorporate more walking, and; (ii) email messages that provided encouragement and reminders to increase walking. Overall, the email format was considered as a strong point of this program since it gave the participants to engage with the information sent in a flexible manner. It also enhanced the effectiveness of the program because it could reach more individuals compared to face-to-face programs where individuals would be asked to attend a face-to-face session at a certain time that might interrupt their existing daily commitments (Richards & Woodcox, 2018).

Similarly, Richards et al. (2017) conducted a 3-month email-mediated intervention to increase walking among dog owners and non-dog owners. The email messages for both group were also aligned with SCT (Bandura, 1991) and targeted social support, self-efficacy, and goal-setting principles. The messages for the dog owner group focused on dog walking, whereas all non-dog owners received more generic walking emails. These emails were delivered bi-weekly for the first 4 weeks and then once a week for the next 8 weeks. In addition, both groups received one email focusing on current physical activity guidelines. At 6 months, the non-dog owner intervention group significantly increased their weekly walking

minutes compared to baseline measures. In a similar manner, the dog owner intervention group significantly increased their weekly dog walking minutes in comparison to the dog owner control group.

Although these investigations have revealed positive results associated with web-based email-mediated interventions, to researcher's knowledge, no studies have compared human versus automated email support to promote physical activity among children using the M-PAC framework. These approaches combined may hold considerable potential as a method to increase the effectiveness of web-based family-centered lifestyle interventions. In addition, the feasibility analysis can be used to determine the viability of the human email-mediated support family-centered web-based intervention. The feasibility outcomes of the present study can provide valuable information, such as recruitment capability, attrition rate, website engagement, program satisfaction, study procedures and resources. By understanding intervention feasibility, researchers will be able to better prepare for a larger randomized trial in the future.

Chapter 3: Research Methods

3.1. Research Design

This study was a 10-week feasibility trial and was a sub-study of a larger childhood obesity management trial (Family Healthy Living Early Intervention Program, National Clinical Trial identifier: NCT03643341). Using a quasi-experimental, pretest-posttest design, this study evaluated the feasibility of a 10-week human email-mediated support relative to self-guided web-based lifestyle intervention, with secondary analyses on the effectiveness of the intervention on parent perceived support, self-efficacy, perceived capability and opportunity to support their child physical activity, intrinsic motivation, competence, confidence, and sedentary behaviour. Participants were assigned to treatment groups (i.e. human email-mediated support or self-guided) and provided with a unique participant identifier. Randomization was not possible due to small number of participants in each intervention group. Participants were unaware of the program assignments, but the researcher was aware of group allocation. Figure 2 outlines the data collection process and timeline of this research project.

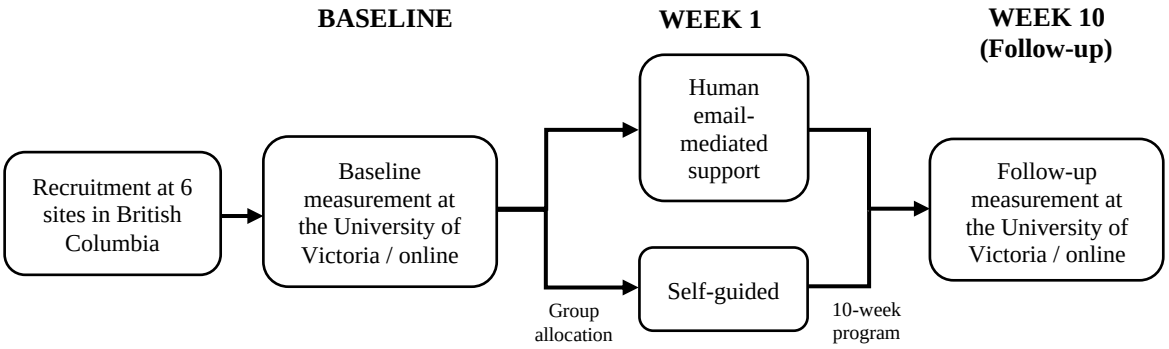

Figure 2. Data Collection and Timeline.

3.2. Participants

The inclusion criteria were families with children between ages 8 to 12 that did not meet the Canadian physical activity guidelines at the time (i.e. 60 minutes of MVPA per day

at least 3 days a week) (Tremblay et al., 2016). The ability to communicate in English sufficiently well and willingness to dedicate 45-60 minutes a week to learn and finish weekly e-Session provided on the online portal were also necessary. The exclusion criteria were families with children younger than 8 years old or older than 12 years old, families with children that met the Canadian physical activity guidelines at the time, families with children with physical disabilities, non-English speaking families or unable to dedicate 45-60 minutes a week to learn and finish weekly e-Session provided on the online portal.

3.3. Study Procedures

Participants in this study were recruited via posters, social media platforms, and online advertisement on a centralized website (i.e. childhoodobesityfoundation.ca/early-intervention-program/) between November 2018 and February 2020. Once a family showed interest in the study, a screening interview to determine eligibility and to explain the study protocols via telephone would be conducted within less than 24 hours. All phone calls used a telephone script that was prepared as part of recruitment strategy (Appendix A). A personalized email was sent within less than 24 hours if the researcher did not manage to communicate with them via telephone after multiple attempts (Appendix B). Participants also received information on the $50 gift card if they could finish the program and complete post-intervention questionnaires. Once the family consent to participate, a baseline appointment was booked. Study consent was obtained from all participants (Appendix C). Participants completed three validated questionnaires: (i) parents completed a parent questionnaire (Appendix D) and a social support questionnaire (Appendix E) to determine their baseline characteristics, perceived social support, physical activity support self-efficacy to support their child's physical activity, perceived capability and opportunity to support their child's physical activity; (ii) the child completed a physical activity questionnaire (Appendix F) to

determine their baseline physical activity levels, physical activity intrinsic motivation, physical activity competence, physical activity confidence, and sedentary behaviour. Participants repeated the same assessment at 10-week follow-up, with an additional post-program interview with satisfaction measures. The first two families started the program one week after being assigned to either human support or self-guided group. After this, rolling recruitment system was applied to prevent dropout and the intervention protocols would begin one week after the family did their baseline measurements rather than putting them in a waitlist control group or in different cycles.

3.4. Ethics

Ethics approval for this study was obtained from the University of Victoria Human Research Ethics board in October 2019 (Protocol Number BC18-024).

3.5. Outcomes

3.5.1. Feasibility Outcomes

Recruitment Rate

Recruitment rate for this study was calculated by dividing the families scheduled for a baseline measure by the number of families who contacted the researcher and multiplying the result by 100 (Husband, Wharf-Higgins, & Rhodes, 2019). The recruitment rate was collectively quantified based on four phases over the 16-month recruitment period: (i) phase 1: November 2018 – February 2019; (ii) phase 2: March 2019 – June 2019; (iii) phase 3: July 2019 – October 2019; (iv) phase 4: November 2019 – February 2020.

Attrition

Attrition was defined as participants who dropped out of the study and did not consent to a follow-up assessment (Brooker, Gomersall, King, & Leveritt, 2019). It was calculated at the 10-week follow-up by dividing the number of participants that did not complete follow-up measures by the number of participants at baseline and multiplying the result by 100.

Website Engagement

Website engagement was defined as usage metrics which consisted of total number of logins, number of core pages accessed, percentage of core pages accessed, and total time spent in minutes over the 10-week intervention period (Bricker, Mull, McClure, Watson, & Heffner, 2018). Number of logins was defined as the number of occurrences of which the user logged in to the program. Number of pages was defined as the amount of core pages accessed each week. Core pages were defined as specific pages available in a particular week that a participant was expected to access. Percentage of the core pages accessed was defined as the number of particular pages accessed each week shown in a fraction of 100 and translated to the percent symbol (%). Time spent per page was defined as the duration that the user spent reading a page in minutes.

Program Satisfaction

Program satisfaction level was obtained using a questionnaire from a previous study (Liu et al., 2019). The questionnaire consisted of 14 open-ended questions designed to evaluate participants' perspectives about the portal and the intervention. Open-ended questions included: "*What were the major lessons you learned through participating in the Generation Health program?*" and "*To what extent was the program meaningful to you?*". In addition, 12 quantitative questions designed to measure the website's components rated on a

5-point frequency scale which ranged from 0 (strongly disagree) to 4 (strongly agree) was included in the questionnaire (Appendix G).

3.5.2. Secondary Outcomes

Parent measures

Parent Perceived Social Support

Perceived social support was measured by a modified Multidimensional Scale for Assessing Positive and Negative Influences on Physical Activity (Chogahara, 1999). This instrument has also been used in the eHealth intervention domain (Cavallo et al., 2013, 2014). For the purpose of this study, the scale was modified to include only types of social support (i.e. informational, appraisal, emotional) the parent received in the past month prior to participating in the intervention program. This subscale yielded high internal reliability (α = .90) (Chogahara, 1999). The scale contained 11 questions rated on a 5-point frequency scale which ranged from 0 (never) to 4 (very often) (Appendix E).

Parent Self-efficacy to Support Their Child's Physical Activity and Behaviour

Parent self-efficacy was measured by the Activity Support Scale for Multiple Groups (ACTS-MG) (Davison et al., 2011) which measured self-efficacy and the reflective processes (i.e. perceived capability, perceived opportunity) within the M-PAC construct. ACTS-MG is a multidimensional measure of physical activity parenting that has demonstrated good internal reliability for this subscale (α = .83) (Davison et al., 2011). For the purpose of this study, the scale contained 8 questions using a combination of a 5-point and 7-point Likert scaling and measured how confident the parent in terms of setting goals for how they could provide support for their child's physical activity, making physical activity-related plans for

their child, and analyzing what went wrong if they did not manage to meet the goals to support their child's physical activity in the past month (Appendix D).

Parent Perceived Capability to Support Their Child's Physical Activity and Behaviour

Parent perceived capability was measured by the Activity Support Scale for Multiple Groups (ACTS-MG) (Davison et al., 2011). For the purpose of this study, the scale contained 15 questions using a 5-point Likert scaling and measured physical activity parenting in terms of perceived capability in providing logistic and emotional support for their child (Appendix D). This subscale yielded good internal reliability ($\alpha = .82$) .

Parent Perceived Opportunity to Support Their Child's Physical Activity and Behaviour

Parent perceived opportunity was measured by the Activity Support Scale for Multiple Groups (ACTS-MG) (Davison et al., 2011). For the purpose of this study, the scale contained 7 questions using a 5-point Likert scaling and measured physical activity parenting in terms of perceived opportunity in finding ways for their child to be active through logistic support and role modeling as well as encouraging the child to be physically active using different resources (Appendix D). This subscale yielded good internal reliability ($\alpha = .72$).

Child measures

Physical Activity Level

Physical activity was measured by the Physical Activity Questionnaire for Older Children (PAQ-C) (Kowalski, Crocker, & Donen, 2004) and the Canadian Assessment of Physical Literacy – second edition (CAPL-2) (Longmuir et al., 2018). The PAQ-C is a validated questionnaire that has been used in similar population group (Kowalski et al., 2004; Riggs, Chou, Spruijt-Metz, & Pentz, 2010). Using a 5-point Likert scaling, the present study

utilized PAQ-C to evaluate how physically active (i.e. playing hard, running, jumping, and throwing) the child was in their physical education classes, at recess and lunch break (i.e. talking and reading to running around and playing hard), and how many days (i.e. 0 to 5 days) and evenings they were involved in a physical activity in the last week. CAPL-2 measures multidimensional components of physical literacy in children including physical activity behaviour and provides valid and reliable results in children ages 8 to 12 (Longmuir et al., 2018; MacDonald et al., 2018). In the present study, the physical activity subscale contained 8 questions and used an 8-point Likert scaling and evaluated how many days in the last 7 days the child engaged in a physical activity that increased their heart rate or made them breathe hard for a total of at least 60 minutes per day (Appendix F). This subscale has demonstrated good internal reliability in children ages 9 to 15 ($\alpha = .89$) (Crocker, Bailey, Faulkner, Kowalski, & Mcgrath, 1997).

Physical Activity Intrinsic Motivation

Intrinsic motivation was measured using another subscale of CAPL-2 (Longmuir et al., 2018). Using a 5-point Likert scaling, the scale contained 3 questions and evaluated if the child thought that being active was fun, if they enjoyed being active, and if they liked being active (Appendix F). This subscale had good internal reliability ($\alpha = .84$).

Physical Activity Competence

Physical activity perceived competence was measured by a CAPL-2 subscale (Longmuir et al., 2018). Using a 5-point Likert scaling, the subscale contained 3 questions and evaluated how the child felt about being physically active by measuring how good they thought they were at playing active games, if they did well at being active compared to other

children, and if they thought they had good skills when it came to being active (Appendix F). This subscale yielded good internal reliability (α = .81).

Physical Activity Confidence

Physical activity confidence was measured by the Patient-centered Assessment and Counselling for Exercise (PACE) (Prochaska, Zabinski, Calfas, Sallis, & Patrick, 2000). This instrument has indicated good internal reliability (intraclass correlation coefficient (α = .77) of the MVPA confidence-related measure for adolescents (mean age 12.1 years (SD 0.9 year)) (Prochaska, Sallis, & Long, 2001). Using a 5-point Likert scaling, the scale had 6 questions which assessed whether the child felt confident if they could do physical activity when they felt sad, dedicated time for physical activity on a typical week, committed to doing physical activity when their family wanted to do something else, woke up early on weekdays and weekends to do physical activity, did physical activity when they had school-related work, and did physical activity despite the weather (Appendix F). This subscale had good internal reliability (α = .78).

Sedentary Behaviour

Child sedentary behaviour was measured using PACE instrument (Prochaska et al., 2000). Using a 7-point Likert scaling, the scale contained 2 questions that evaluated the amount of hours the child spent on doing sedentary habits on a typical school day and on a day they were not in school (Appendix F). This subscale yielded good internal reliability (α = .76).

3.6. Human Email-Mediated Support Intervention

Adopting the M-PAC (Rhodes, 2017) as a theoretical framework on which the curriculum was built, this study was part of the Generation Health program, a free interactive program for families with children who are off the healthy weight trajectory (Liu et al., 2019) (see Table 2 for program outline). The present study focused on families with children within a similar age range that were categorized as a healthy weight according to self-reported height and weight (<85th BMI percentile) but did not meet the Canadian physical activity guidelines. It consisted of 10-week e-Sessions delivered through an online portal. This portal provided information and interactive online activities targeting healthier lifestyle behaviours, such as active living, healthy living, positive parenting, getting active outdoors, healthy body image and self-esteem, and stress management. It took approximately 45-60 minutes to finish each week's e-Session. Table 2 delineates different health-related topics that were covered throughout the 10-week period and their intervention alignments with the M-PAC constructs (Rhodes, 2017) and behaviour change techniques (Michie et al., 2013). A screenshot of an example of the intervention can be found in Appendix K.

Table 2. The Generation Health Program.

Week	Topic	M-PAC Constructs	Behaviour Change Techniques
1	Welcome to the Generation Health Program	Instrumental attitude; perceived opportunity	Social support (informational and practical), instruction on how to perform a behaviour
2	Introduction to Active Living and S.M.A.R.T. Goals Setting	Behavioural regulation; affective judgment	Goal-setting, self-monitoring, action planning
3	Healthy Eating with the Canada Food Guide	Instrumental attitude; perceived capability; perceived opportunity	Goal-setting, problem solving, behavioural contract
4	Making Healthy Food and Drink Choices	Behavioural regulation	Information on health consequences, social support, restructuring the physical environment, instruction on how to perform a behaviour
5	Body Self-compassion and Appreciation and Active Living for EveryBODY	Affective judgment; perceived capability	Social support (emotional); information about social & environmental circumstances; goal-setting
6	Creating Positive Family Mealtimes	Affective judgment; perceived capability	Social support (emotional), behavioural practice, instruction on how to perform a behaviour
7	Family Eating Style and Getting Active Outdoors	Perceived capability; perceived opportunity; affective judgment	Information about social and environmental circumstances, restructuring the physical environment, goal-setting, action planning
8	Sleepy Hygiene and Brain Gain	Perceived capability; affective judgment	Information about health consequences, social support (practical)
9	Habits and Cooking Together	Perceived capability	Demonstration of the behaviour, behavioural practice, instruction on how to perform a behaviour
10	Continuing Positive Change, Dance and Celebration	Behavioural regulation; identity; habit	Self-monitoring, behavioural contract, identity associated with changed behaviour, prompt/cues

Participants in the human email-mediated support were given a username and password two days (Saturday, 9 A.M.) before they had access to the online portal and they would be notified by an automated email when this process had been done. In the first week of the program, they received an automated email on Monday at 5 P.M., informing them that they had access to their week 1 e-Session. This email was notably longer as it was used to

communicate the overall protocol expectations of the program to participants. The human email-mediated support families were given an option to choose tailored days and time to receive their email. These emails had social support components (i.e. emotional, informational, appraisal support) and contained links that led them to the e-Session they were doing in that particular week (Appendix H).

As the program progressed, the human email-mediated support group received two weekly emails. The first email was delivered to inform them that they had access to a new e-Session, along with information on what they could expect from that particular session and link to the portal. The second email was sent to check their progress (see sample email in Appendix H). If the participant replied and informed the research team that they managed to meet the goals, email number three would be sent to recognize their effort, creating a sense of accomplishment. If the participant failed to meet the goals, email number four would be delivered to offer them reassurance, encouragement, and information (i.e. articles or activities from the program that could be useful for them) that were going to motivate them to get back on track. This email also asked if they were happy with the advice and suggestions provided. If they answered yes to email number four, email number two would be delivered again to see if they managed to meet the goals, followed by email number three to appreciate their effort if they said yes (see sample email in Appendix H). If they answered no to email number four, a more personalized email number five containing different articles and resources from the portal would be delivered to further address their issues (see sample email in Appendix H). It was expected that the researcher would spend 30 to 45 minutes per participant each week to provide extra support if required. The email decision tree for the human email-mediated support group is displayed in Figure 3.

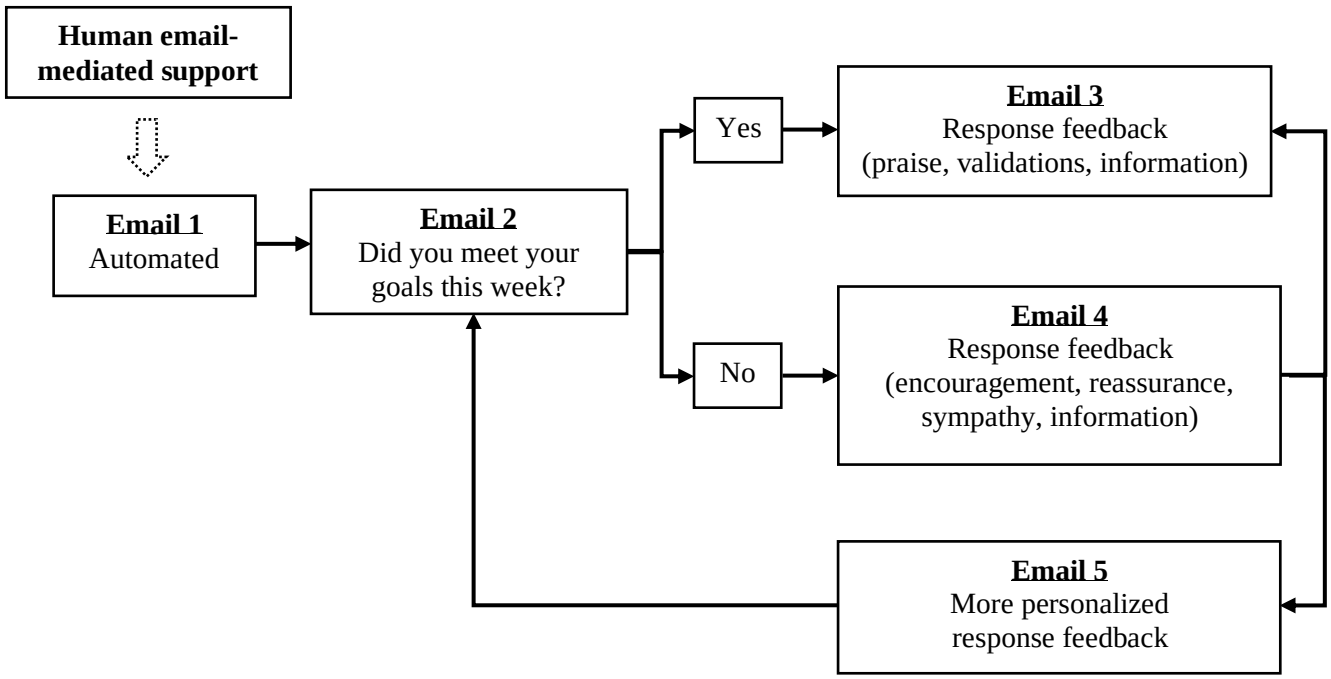

Figure 3. Email Decision Tree for the Human Email-mediated Support Group (see Appendix H for email responses).

Additionally, the online portal for the human email-mediated support group consisted of *Forum* that the participants could use as a platform to share their ideas and thoughts and asked questions pertaining to the topics covered in the program. Participants were also able to talk to each other as well should they choose to do so. The researcher in this regard acted as a mentor and a moderator that responded to questions and discussions in a timely manner.

Self-guided Intervention

Participants in the self-guided group received the same Generation Health program as the human email-mediated support intervention, but without extra email support. Participants were given a username and password two days (Saturday, 9 A.M.) before they could access the portal. Throughout the program, the self-guided group only received one weekly automated email informing them that there was a new weekly e-Session available. The online portal for the self-guided group did not have the *Forum* feature. The email protocol for the

self-guided group is displayed in Figure 4 and Appendix I thoroughly outlines the email protocol for this group.

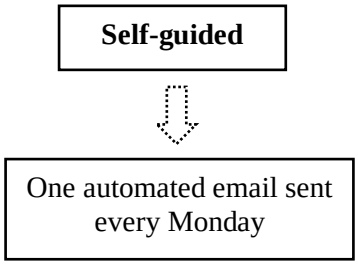

Figure 4. Email Protocol for the Self-Guided Group (see Appendix I for email scripts).

3.7. Data Analysis

The participant recruitment rate for both groups was measured. The recruitment rate for both groups combined was also compared to studies of similar design that measured feasibility of web-based physical activity interventions with similar population (DeFrank et al., 2019; Guagliano et al., 2019). Attrition rates between the human email-mediated support and self-guided groups were compared. Website engagement was calculated by looking at the usage metrics that consisted of the mean number of logins, number of core pages accessed, percentage of core pages accessed, as well as total time spent in minutes (Bricker et al., 2018). Independent t-tests were run on the usage metrics and post-program satisfaction to find out if there were significant differences between human support and self-guided control groups. Post-program interviews were analyzed by summarizing user feedback into common themes (e.g. positive comments and recommendations for program improvements). Recruitment and attrition rates, website engagement levels, as well as post-intervention evaluation surveys built on each other and gave thorough information that was used as a foundation to draw a conclusion on the feasibility of this study.

Additional secondary measures were entered and analyzed to find out if there were any significant differences between group means for parent and child outcome measures. All variables' means and standard deviations were measured in order to describe the sample and both groups unless otherwise stated. Descriptive statistics and chi-square were run on demographic categorical variables to find out if there were significant differences between human support and self-guided groups at baseline. All outcome measures were tested for normality using the Shapiro-Wilk test and log transformation was applied to non-normally distributed outcomes to give a logical estimation of a normal distribution, as per best practice recommendations (Bland & Altman, 1996; Keene, 1995). Additionally, in order to minimize the issue of bias, subjects that did not complete follow-up measures were eliminated from final analysis of the study and complete case analysis was conducted (Beunckens, Molenberghs, & Kenward, 2005; Horton & Kleinman, 2010; Kadengye, Cools, Ceulemans, & van den Noortgate, 2012).

Repeated measures analysis of variance (ANOVA) were used to evaluate whether the human support group had a greater improvement in parents' perceived support and their support for their children to participate in regular physical activity, improve physical activity levels and self-regulation skills relative to the self-guided group. Lastly, partial Eta-squared (η_{p2}), calculations were used to discover the magnitude of difference between the human email-mediated support and self-guided groups over time. Partial Eta-squared was calculated by dividing the sum of squared differences from the mean between groups by sum of squared differences from the mean between groups and sum of squared differences from the mean within groups. The interpretations of the effect size were as follows: (i) small ($\eta_{p2} = 0.01$); (ii) medium ($\eta_{p2} = 0.06$), and; (iii) large ($\eta_{p2} = 0.14$) (Lakens, 2013). All analysis were conducted using the Statistical Package for the Social Sciences (SPSS) version 21.0 for Macintosh and significance was set as 0.05.

Chapter 4: Results

4.1. Demographic Characteristics

Baseline demographics are presented in Table 3. The mean age for parents was 38.9±4.48 years and a majority of families were Caucasian (72%). Over 50% of the parents held a university degree. Moreover, almost 43% families reported that their annual income was $53,000 or more. 72% of the families involved in the study spoke English as their first language. 91% of the parents were mothers, with close to 30% reporting that they were single parents.

Table 3. Baseline Demographic Characteristics.

Variable	**Human Email-mediated Support (*n* = 10)**	**Self-guided (*n* = 11)**	***P*-value**	**Total (*n* = 21)**
Age	39.6±4.58	38.3±4.51	0.51	38.9±4.48
Ethnicity			0.66	
Caucasian	6 (60%)	9 (81.8%)		15 (71.4%)
Other *	4 (40%)	2 (18.2%)		6 (28.6%)
Education			0.72	
High school to university certificate below bachelor's degree	3 (30%)	6 (54.5%)		9 (42.9%)
Bachelor's degree	5 (50%%)	4 (36.4%)		9 (42.9%)
University degree above bachelor's degree	2 (20%)	1 (9.1%)		3 (14.2%)
Primary earner income			0.21	
Prefer not to answer to > $53,000	6 (60%)	6 (54.5%)		12 (57.1%)
$53,000 to > $59,000 or more	4 (40%)	5 (45.5%)		9 (42.9%)
Primary earner status			0.18	
Employed	7 (70%)	10 (90.9%)		17 (81%)
Unemployed	3 (30%)	1 (9.1%)		4 (19%)
Language			0.85	

English	7 (70%)	8 (72.7%)		15 (71.4%)
Other **	3 (30%)	3 (27.3%)		6 (28.6%)
Relationship to child			0.77	
Father	2 (20%)	-		2 (9.5%)
Mother	8 (80%)	11 (100%)		19 (90.5%)
Single parent			0.29	
Yes	4 (40%)	2 (18.2%)		6 (28.6%)
No	6 (60%)	9 (81.8%)		15 (71.4%)

* Chinese, Latin, Self-described Aboriginal ** German, Spanish, Portuguese, Urdu
Descriptive statistics are presented as mean±SD and number of study participants (percentage)
P-values are presented as $p < 0.05$

4.2. Feasibility

4.2.1. Recruitment

A CONSORT flow diagram outlining participant recruitment is presented in figure 4. A total of fifty-one families contacted the researcher over a 16-month recruitment period to participate in this study. Eighteen families were recruited via social media (35%), twelve families were recruited from the online advertisements (24%), sixteen families were referred by the Generation Health program coordinator and facilitators (31%), and five families (10%) said they saw posters for the study in and around Victoria, British Columbia. Thirty-three families were interested in participating. Eight families had to be excluded because they did not respond to numerous follow-up phone calls and emails, two families decided to withdraw upon learning the intervention protocol, and two families could not participate because their children were not old enough. This yielded a total of twenty-one fully eligible families that provided consent. These families were then allocated to either human email-mediated support group ($n = 10$) or self-guided group ($n = 11$). The overall recruitment rate over a 16-month period was 41% (21/51).

Recruitment was also divided into four phases over 16 months, with four months in each recruitment interval. This study used a rolling recruitment. Phase 1 was done between November 2018 – February 2019 and had a 50% (2/4) recruitment rate. Phase 2 (March 2019 – June 2019) yielded in a 47% (8/17) recruitment rate. Phase 3 was conducted between July 2019 – October 2019 and resulted in a 33% (6/18) recruitment rate. Lastly, phase 4 (November 2019 – February 2020) had a 42% (5/12) rate of recruitment.

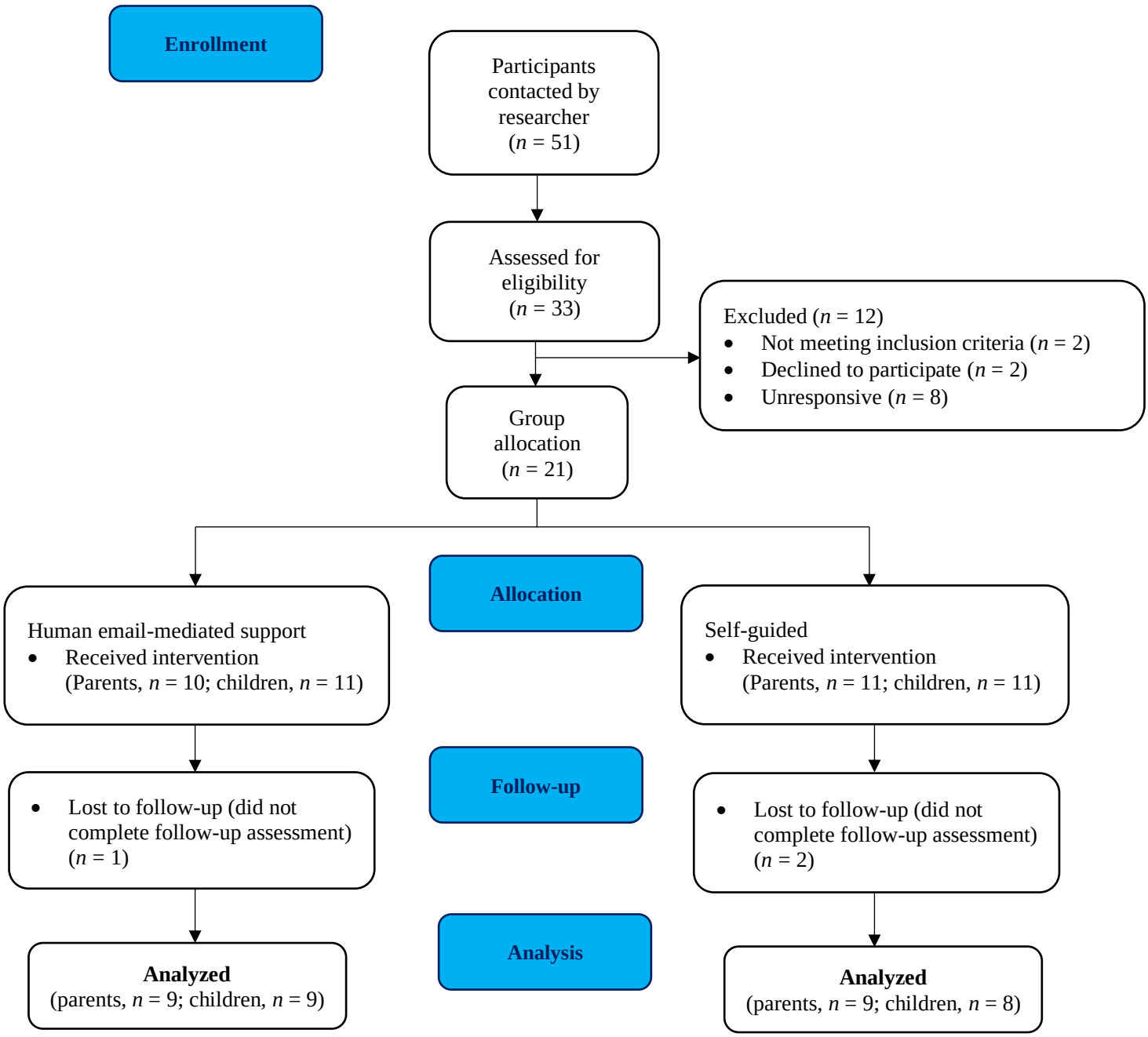

Figure 5. CONSORT Flow Diagram of Participant Flow and Analysis.

4.2.2. Attrition

One family in the human email-mediated support group dropped out at 8 weeks, resulting in an attrition rate of 10% (1/10). Two self-guided families both dropped out at 2 weeks and 3 weeks, respectively, yielding in an attrition rate of 18.2% (2/11). The attrition rate for both groups combined was 14% (3/21).

4.2.3. Website Engagement

Usage metrics are presented in Table 4. In comparison to the self-guided group, the human email-mediated support group showed a significantly higher login frequency than the self-guided group (4.7±2.1 and 2.3±1.4, respectively; $p = 0.02$), percentage of core pages accessed (35.8±19.6 and 13.1±18.2, respectively; $p = 0.02$), and total time spent in minutes (180.6±110.6 and 108.8±88.1, respectively; $p = 0.01$). The user engagement patterns (Figure 6) showed that the intervention engagement dropped over time. Based on the usage pattern, the human email-mediated support group showed a higher website usage than the self-guided group, especially in latter half the intervention (week 7 to week 10).

Table 4. Usage Data at 10-week Follow-up.

Variable	**Human Email-mediated Support (*n* = 9)**	**Self-guided (*n* = 9)**	***P*-value**	**Total (*n* = 18)**
Number of logins	4.7±2.1	2.3±1.4	0.02	3.5±2.1
Core pages accessed	41.9±22.9	17.7±26.7	0.06	29.8±27.2
% of content accessed	35.8±19.6	13.1±18.2	0.02	24.5±21.7
Time spent in minutes	180.6±110.6	108.8±88.1	0.01	144.7±103.8

Descriptive statistics are presented as mean±SD
P-values are presented as $p < 0.05$

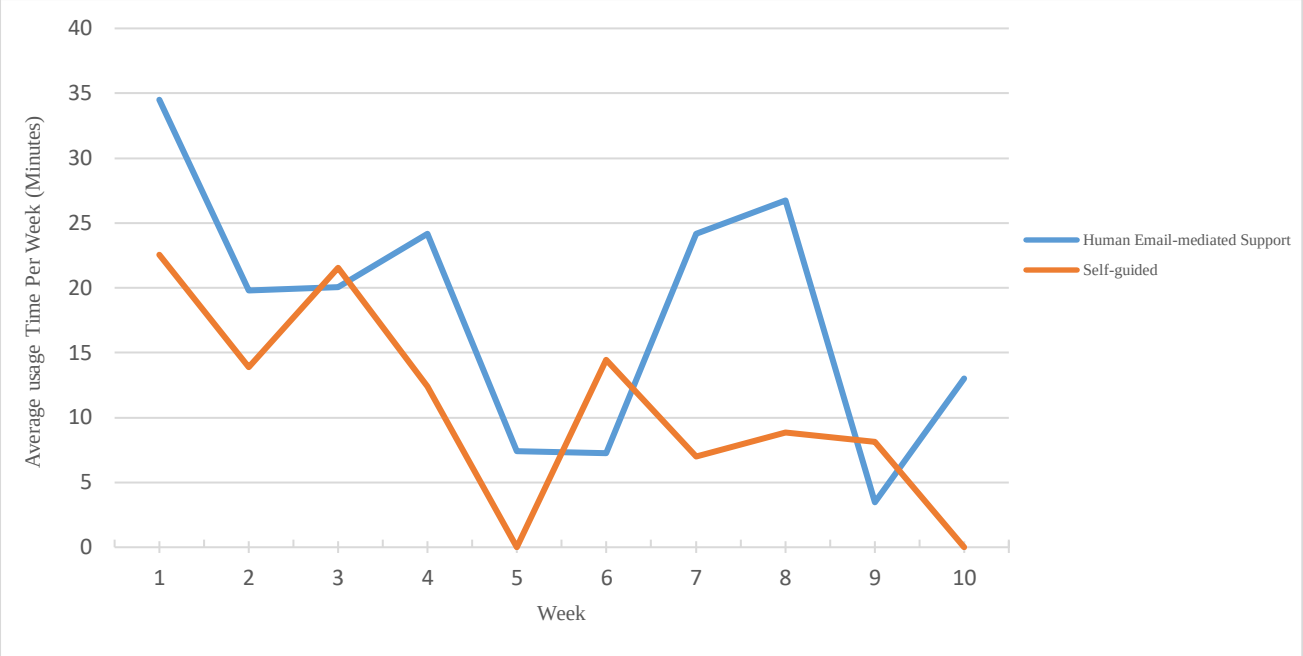

Figure 6. User Engagement Patterns Over 10-week Intervention Period.

4.2.4. Program Satisfaction

Program Satisfaction Survey

There were significant between-group differences observed for the website satisfaction. Parents in the human email-mediated group felt the website was easier to navigate ($p = 0.002$). The human email-mediated group parents also indicated that they gained more knowledge compared to the self-guided parents ($p = 0.02$). Parents in the human email-mediated group also felt that the content was significantly more applicable than those in the self-guided group ($p = 0.02$). Significant between-group differences were also observed for the content of the website ($p < 0.05$). The human email-mediated group parents significantly favoured the recipes section more in comparison to parents in the self-guided group ($p = 0.01$). Parents in the human email-mediated group also significantly considered family challenges focusing on physical ($p = 0.02$) and mental health ($p = 0.01$) as features that were more important for them than parents in the self-guided group.

Table 5. Post-intervention Satisfaction Levels.

Variable	**Human Email-mediated Support (*n* = 9)**	**Self-guided (*n* = 9)**	***P*-value**	**Total (*n* = 18)**
Website usability				
Website navigation	4.9±0.3	2.4±1.6	0.002	3.7±1.7
Content was easy to read	3.9±1.1	3.6±0.9	0.5	3.7±1.0
Gained valuable knowledge	4.2±0.8	2.8±1.4	0.02	3.5±1.3
Content application	4.2±0.8	2.8±1.4	0.02	3.5±1.3
Interactive features				
Quizzes	3.1±0.9	3.1±0.8	1.0	3.1±0.8
Our Places	3.6±1.1	3.3±1.1	0.7	3.4±1.1
Our Steps – helped child become more physically active	2.7±1.2	3.3±1.0	0.22	3.0±1.1
Our Steps – kept child active in a fun way	2.7±1.2	3.0±1.0	0.5	2.8±1.1
Forum	2.3±1.0	3.2±3.2	0.1	2.8±1.2
Content				
Recipes	4.2±0.7	2.7±1.3	0.01	3.4±1.3
Family challenges	4.2±0.7	3.0±1.2	0.02	3.6±1.1
Family challenges – mental health focused	4.6±1.0	2.9±1.3	0.01	3.7±1.4

Descriptive statistics are presented as mean±SD
P-values are presented as $p < 0.05$
Note: All questions ranked from 1 (*strongly disagree*) to 5 (*strongly agree*)

Post-program Satisfaction Interviews

A total of ten families completed the post-program interview, with eight coming from the human email-mediated group and two from the self-guided group. Interview comments were summarized into the following:

i. Positive comments

The sample quotations of positive comments are presented in Table 6. Weekly recipes feature was cited as one of the most appealing parts of the program (3/8 from human email-mediated group; 2/2 from self-guided group) with positive words to express participants' thoughts on this particular component. Family challenges feature was another component of the study that was cited often (4/8 from human email-mediated group; 2/2 from self-guided group) as the best part throughout the 10-week intervention period, with three families (2/8 from human email-mediated group; 1/2 from self-guided group) particularly showing appreciation towards mental health activity options. When asked about the impact the program on their lifestyle, six families (4/8 from human email-mediated group; 2/2 from self-guided group) said that they realized how easy it was to live a healthier lifestyle, citing simple physical activities and access to healthier food ingredients as two factors that could easily be applied to their routines. In addition, four families (3/8 from human email-mediated group; 1/2 from self-guided group) also mentioned that they were more aware of what they should buy in the supermarket.

The majority of participants (6/8 from human email-mediated group; 1/2 from self-guided group) mentioned that the online nature of the program gave them the freedom to access the portal whenever and wherever most convenient for them, making it easier for them to follow given their busy schedules. The majority of participants (6/8 from email-mediated group; 2/2 from self-guided group) mentioned that the colour combination made the portal easy to read, especially with the bright background and all the green tabs located on the left side of the screen. Appendix J provides examples of the layout of the portal.

Table 6. Sample Quotations of Positive Comments.

Human Email-mediated Support Sample Quotes	**Self-guided Sample Quotes**
"My child was always looking forward to the next recipes. I personally liked it because it made us think about what we should buy." *"I guess different physical activity ideas and also articles related to that particular topic was something that I appreciated the most as the program progressed. Challenges were uncomplicated as well, and most of them could be done together with my kid."* *"I had to drop my son off every morning and picked him up later, not to mention all the activities I had to do in between. When I had nothing to do, I would go back to the portal. It was that easy."* *"I'm just an overall forgetful person! Those emails helped a lot, I would've missed most of the lessons otherwise."*	*"Uncomplicated family challenges and recipes. I also liked the challenges that focused on emotional state, giving us directions to slow down with life and be more mindful with the present, something that most of us have forgotten I believe."* *"It was so easy to follow and I didn't really have to drive somewhere just to keep myself in the loop. The whole online thing definitely helped because I had the freedom to do it whenever."* *"I really liked how everything was sort of jammed on the left side of the screen. It simplified everything, really. Oh, I liked some of the photos on the website, too."* *"My daughter once saw me playing on the portal and she said the colour was cool. I didn't pay attention that much to it before she said that, and just randomly compared it to other pages I had opened. Didn't realize the bright background would make it look more appealing."*

ii. Recommendations for program improvements

The sample quotations of positive comments are presented in Table 7. Participants cited long and rather repetitive articles as their least favourite part (5/8 from human email-mediated group; 1/2 from self-guided group). Participants also wanted to see more videos and interactive games instead of text-heavy pages (4/8 from human email-mediated group; 2/2 from self-guided group). Participants also mentioned that the program could be improved by expanding the age limits, because, according to them, families with younger children (< 8 years old) would also benefit from such study (1/8 from human email-mediated group; 1/2 from self-guided group). As for the *Forum* provided on the human email-mediated portal, only one participant asking if this particular feature was active. The traffic was practically nonexistent, indicating that participants did not access it.

Table 7. Sample Quotations of Recommendations for Program Improvements.

Human Email-mediated Support Sample Quotes	**Self-guided Sample Quotes**
"Some articles were long and pretty repetitive, making it boring sometimes." *"More animation, shorter lessons, more games for kids so parents and kids can play together using the portal."* *"I generally liked all the lessons I ready, but yeah I think adding more videos to them would make the lessons more appealing. Sometimes you're just too tired to read after such a long day. Videos would definitely help in my opinion."* *"I noticed the age limits when I signed up. I'm pretty sure parents with younger kids would appreciate this program as well if you could expand the age limits a bit more."*	*"I think some of the longer articles could be made shorter and more concise. Perhaps use more graphics or clips to help explain the goals and points."* *"I didn't really enjoy reading some of the lessons because they were a bit too long. Some of the topics were a bit tedious as well. My daughter and I enjoyed watching some of the videos though. I think people these days would prefer watching something because it's just more practical that way."* *"I know some families in my community with children who are too young for this program. I would've told them about the program if their children were one-two years older."*

4.3. Secondary Outcomes

4.3.1. Social Support

There were significant main effects of time for informational ($p = 0.001$; $\eta_{p2} = 0.9$) and appraisal-emotional support from experts ($p = 0.001$; $\eta_{p2} = 0.9$), suggesting that both groups improved their perceived support from experts at 10-week follow-up. No group-time interaction were observed for informational and appraisal-emotional support from experts (Table 8).

Table 8. Social Support Outcomes.

Variable	Human Email-mediated Support *n* = 8			Self-guided *n* = 3			ANOVA *P*-value time * group	ANOVA *P*-value time	η_{p2} time * group	η_{p2} time
	Baseline	Follow-up	Δ	Baseline	Follow-up	Δ				
Informational support (family)	1.6±1.03	1.5±1.35	-0.1±1.53	0.8±1.22	0.9±1.17	0.1±0.12	0.93	0.8	0.006	0.001
Informational support (friends)	1.8±1.1	1.4±1.31	-0.43±1.54	0.8±1.06	0.6±0.72	-0.2±0.35	0.81	0.5	0.01	0.05
Informational support (experts)	1.6±0.92	3.9±0.15	2.3±0.85	0.4±0.53	2.8±0.87	2.4±0.4	0.85	0.001	0.004	0.9
Appraisal-emotional support (family)	1.5±1.0	1.4±1.66	-0.1±1.42	0.7±1.2	0.6±0.92	-0.1±0.25	0.92	0.8	0.001	0.006
Appraisal-emotional support (friends)	1.79±1.11	1.04±1.38	-0.75±1.25	1.11±1.1	0.72±0.98	-0.39±0.51	0.65	0.17	0.02	0.2
Appraisal-emotional support (experts)	0.89±0.79	3.5±0.72	2.6±1.02	0.11±0.19	2.7±0.82	2.6±0.63	1.0	0.001	0.001	0.9

Note: Outcomes are presented as Mean±SD

4.3.2. Parent Outcomes

Parent physical activity support self-efficacy had a significant main effect for time (p = 0.03; η_{p2} = 0.27), which suggests that parents in both human email-mediated and self-guided groups increased their self-efficacy to support their children's physical activity levels and behavioural regulations. Both groups also showed a positive trend in improving perceived opportunity to support their children's physical activity and behavioural regulations at follow-up (p = 0.1; η_{p2} = 0.16) (Table 8).

Table 9. Parent Outcomes.

Variable	Human Email-mediated Support *n* = 9			Self-guided *n* = 9			ANOVA *P*-value time * group	ANOVA *P*-value time	η_{p2} time * group	η_{p2} time
	Baseline	**Follow-up**	**Δ**	**Baseline**	**Follow-up**	**Δ**				
Parent PA*support self-efficacy	3.5±0.93	3.8±0.94	0.3±0.72	2.7±0.91	3.4±0.78	0.7±1.05	0.41	0.03	0.04	0.27
Parent PA support perceived capability	23.3±2.7	23.5±2.58	0.2±2.16	20.1±4.1	21.3±4.29	1.2±2.99	0.45	0.27	0.04	0.08
Parent PA support perceived opportunity	11.4±1.1	12.2±0.97	0.8±0.93	9.9±2.6	10.7±2.08	0.8±2.55	1.0	0.1	0.01	0.16

Note: Physical activity; outcomes are presented as Mean±SD

4.3.3. Child Outcomes

There was a significant interaction effect between group and time for child physical activity intrinsic motivation ($p = 0.02$; $\eta_{p2} = 0.34$). Children in the human email-mediated group improved their intrinsic motivation from baseline to follow-up, whereas the self-guided children decreased at 10-week follow-up. Children in both groups improved their confidence to perform physical activity ($p = 0.04$; $\eta_{p2} = 0.26$). No group interaction was observed for child physical activity confidence ($p > 0.05$; $\eta_{p2} = 0.02$) (Table 10).

Table 10. Child Outcomes.

Variable	Human Email-mediated Support *n* = 8			Self-guided *n* = 9			ANOVA *P*-value time * group	ANOVA *P*-value time	η_{p2} time * group	η_{p2} time
	Baseline	**Follow-up**	**Δ**	**Baseline**	**Follow-up**	**Δ**				
Child PA* levels	18.2±2.03	20.1±2.46	1.9±2.99	17.6±6.1	16.7±5.09	-0.9±3.74	0.1	0.53	0.17	0.03
Child PA intrinsic motivation	9.5±1.59	10.6±1.10	1.1±1.72	10.1±1.89	8.5±3.13	-1.6±2.2	0.02	0.59	0.34	0.02
Child PA competence	8.8±1.87	9.9±1.43	1.1±1.14	7.9±1.96	7.7±2.63	-0.2±2.10	0.15	0.28	0.14	0.08
Child PA confidence	17.6±4.34	20.4±4.0	2.7±3.59	13.7±6.25	15.3±5.93	1.6±4.18	0.61	0.04	0.02	0.26
Child sedentary behaviour	5.9±1.82	5.2±1.22	-0.7±1.85	6.5±1.97	6.8±2.52	0.3±3.09	0.44	0.76	0.04	0.01

Note: Physical activity; outcomes are presented as Mean±SD

Chapter 5: Discussion

The purpose of this study was to evaluate the feasibility and the potential efficacy of a web-based family-centered physical activity intervention program. This chapter will discuss the findings of the present study and compare the results to the existing literature. I will also discuss the study implications, strengths, weaknesses, and future research.

5.1. Feasibility

Recruitment for this research project was challenging with only twenty-one out of fifty-one (41%) potential families recruited over a 16-month period. Since it was difficult to find identical 10-week web-based intervention feasibility studies addressing families with young children, the comparator feasibility studies were chosen based on the web-based intervention studies with adolescents or parents and children as the sample, regardless of the duration of the intervention. DeFrank et al. (2019) conducted a feasibility study of a 4.5-month web-based intervention program aiming at reducing obesity risk among minority youth and had a 51% (89/175) recruitment rate over a 4-month period. Another web-based intervention study focusing on the feasibility of a family-based physical activity promotion resulted in a 42% (12/28) recruitment rate (Guagliano et al., 2019) over 3 months. In comparison to these trials, the absolute numbers in the present study were low given a longer recruitment timeline of the present study (i.e. 16 months). Considering this extended timeline, recruitment can be considered below par and thus does not manage to provide compelling evidence of recruitment feasibility when compared to similar feasibility studies.

Previous literature has shown that recruitment for family-based interventions has been particularly challenging (Guagliano et al., 2019; O'Connor, Jago, & Baranowski, 2009). Van Doesum et al. (2016) elucidated that most parents with young children already lead a very busy life filled with different responsibilities and family commitments. Hence, it can be

difficult to convince them to invest in another responsibility that could possibly demand them to readjust their routines. Additionally, parents that were contacted to participate in the present study perhaps had a perception that participation in such program would be too taxing and time consuming, as supported by Guagliano et al. (2019). Therefore, it is important for future research to ensure necessary research team recruitment skills and adopt different recruitment methods targeting families with young children before implementing them (Gardner, Treweek, & Gillies, 2019). Previous literature has suggested that recognizing the school calendar has the potential to maximize recruitment for family- and school-based interventions (Bartlett et al., 2017). By acknowledging the school year, future research can create different cycles in which they can predict when the parents and children have more time (e.g. spring/summer) less school-related responsibilities, and thus increasing the chance to get involved in the study.

Further, as hypothesized, findings demonstrated that the human email-mediated group had lower attrition rate (10%, 1/10) compared to the self-guided group (18.2%, 2/11). In addition, with a 14% (3/21) attrition rate for both groups combined at follow-up, this study can be rated as good in comparison to other web-based physical activity intervention trials (26% to 39%) (Hayman et al., 2017; Mailey, Huberty, & Irwin, 2016). One possible explanation is that participants in the human email-mediated group in this study may have perceived email-mediated support as continual reminders and encouragement for them to stay in the program. However, a larger trial is required to confirm the findings as lower attrition of the human email-mediated support group in the present study could be due to chance given the small sample size.

Furthermore, the results suggested that intervention engagement was higher in the human email-mediated group than the self-guided. This finding supported the hypothesis that human support led to a higher website engagement overtime. Previous research has shown

that typical engagement decreases rapidly after three to five weeks (Nelson, Coston, Cherrington, & Osborn, 2016; Wolin et al., 2015). However, results from the present study have shown that the human email-mediated support may be able to sustain the website engagement beyond five weeks. My finding was supported by a recent study comparing website engagement between a group of participants that received weekly emails from an online coach and access to an intervention website and a group that was only given access to the website (Arnold et al., 2019). The authors revealed that participants who received more emails from the online coach used the website more frequently and were more engaged throughout the program in comparison to those that did not receive extra support. Based on Ritterband's Model for Internet Intervention (2009), support from the intervention provider directly influences participant's commitment to the website. The role of email-mediated human support in the present study has further established the important influence of social support underpinned by the M-PAC framework (Rhodes, 2017; Rhodes & Yao, 2015), which can lead to increased self-efficacy, positive self-talk, self-monitoring, and mental ownership. Thus, lower attrition rate and higher website engagement among intervention participants may have been the results of improvements in aforementioned psychosocial components.

Despite good attrition and engagement levels, it is likely important moving forward to consider strategies to minimize attrition and improve website engagement. Previous studies have suggested several possible causes for high attrition and low engagement in the web-based health intervention domain, such as lack of motivation, boredom, and decreased interest in the content and overall intervention procedures (Hageman et al., 2017; Moroshko, Brennan, & O'Brien, 2011). There are different ways to minimize attrition and improve website engagement. Incorporating a technique that applies interactive gaming components (i.e. gamification) may increase participant's motivation to engage in the program which may result in low attrition and high program engagement, as an addition to improved clinical

outcomes (Allam et al., 2015; Edney et al., 2019; Looyestyn et al., 2017). As well, mimicking physical social network through the provision of virtual environments that facilitate synchronous communication may help establish a closer connection between the provider and the participant (Balatsoukas, Kennedy, Buchan, Powell, & Ainsworth, 2015; Ramos et al., 2019). This closer connection can help participant maintain their commitment to the program.

With respect to program satisfaction of the present study, feedback provided by the parents in both groups emphasized the importance of good layout, ease of use, and relevant content, and how these components could help determine participant satisfaction and engagement level (Horvath, Ecklund, Hunt, Nelson, & Toomey, 2015; Lustria et al., 2009; Ritterband et al., 2009). The interviews also provided valuable feedback that future studies should consider, including making the articles less text-heavy and creating more interactive games on the portal.

5.2. Parent Outcomes

As seen from large effect sizes, parents in both groups reported higher perceived informational support and appraisal-emotional support coming from experts, as well as self-efficacy to support their children's physical activity at follow-up. It is encouraging that both interventions were able to improve these support-related outcomes. A possible explanation of why the self-guided group also improved could be due to the automated emails that might have been perceived as adequate support to improve their perceived support and self-efficacy to support their children's physical activity. However, this does not mean that human support did not add value to the intervention. The human email-mediated group might have perceived enhanced email support as a stream of reminders for them to access the portal more frequently, as seen from the usage metrics. This presumption is important as the relationship

among human support, website engagement, and parent psychosocial outcomes is also an important feasibility metric that further research can use as a reference.

In relation to the M-PAC constructs (Rhodes, 2017), the findings showed that the support coming from experts delivered through email may have contributed to the human email-mediated group's emotional experience and psychosocial factors that made them feel sufficiently supported throughout 10-week intervention period, which in turn possibly played an important role in improving their self-efficacy to support their children's physical activity. Additionally, existing literature suggests that physical activity self-efficacy is one of the components that rely on internal and social environmental factors in order to change (Bandura, 1991; Rhodes, McEwan, et al., 2019). Internal factors include one's own motivation and behaviour to perform physical activity. Social environmental factors such as family, significant others, the media, and cultural components also have the ability to shape one's self-efficacy. In the present study's context, environmental factors such as the appearance, content (e.g. physical activity-related articles and weekly challenges), email support, and practicality of the website were perhaps sufficient for parents in both groups to propel their self-efficacy to support their children's physical activity behaviours. The reason why the self-guided parents also improved their perceived support and self-efficacy to support their children's physical activity might have been caused by a few internal and environmental factors. Firstly, the self-guided parents may already have had the motivation and self-efficacy to practice healthier lifestyle. They may also have had the capability to process the information provided via email and on the portal. Secondly, one can also assume that the content of the intervention itself was written in a supportive manner and was perceived as supportive by the self-guided parents to perform the weekly tasks. Results from post-intervention interviews reinforce this assumption as self-guided parents mentioned that the program was easy to follow and components such as weekly challenges and recipes were

uncomplicated. This echoes existing literature that stresses the importance of providing carefully-crafted content to increase parents' self-efficacy and motivations in the domain of Internet-based health interventions (Horvath et al., 2015; Lustria et al., 2009). Thus, all of these components combined may have played a role in improving the self-guided parents' self-efficacy at follow-up.

Although findings need to be interpreted with caution given the small sample size and the nature of feasibility analysis, the present study has important implications for subsequent research. Larger pilot trials are warranted to assess the extent to which human email-mediated support plays a short-term role in amplifying parent's self-efficacy, perceived capability and opportunity to support their child's physical activity behaviour. Future research should also consider exploring participant user characteristics (e.g. knowledge, the ability to absorb and process information, perceived benefits to intervention, cultural factors, socioeconomic status (SES), and education) further and how they influence parent's self-efficacy and perceived control to support their child's physical activity in the context of human support email-mediated web-based family-centered interventions.

5.3. Child Outcomes

Children in both groups increased their confidence to perform physical activity. It is encouraging that both groups improved this measure. However, children in the human email-mediated group had greater improvements in intrinsic motivation to perform physical activity in comparison to the self-guided group. This study's findings suggest that parents' improved self-efficacy to support child physical activity may have contributed to children's enhanced physical activity confidence, as supported by previous studies (Garriguet et al., 2017; Rhodes et al., 2018). Moreover, the findings can be related to the role of parents as custodians that have the ability and authority to improve child's motivation through good experience during

physical activity, which in turn may have promoted their children's genuine interest and enhanced their confidence to perform physical activity (Beets et al., 2010; Bentley et al., 2012; Rhodes, Berry, et al., 2019).

Furthermore, there are possibilities that may help explain why improvements in physical activity intrinsic motivation were only observed in the human email-mediated support children. Firstly, parents in the human email-mediated group received more email support throughout the 10-week intervention. As a result, the human email-mediated parents may have been exposed to the program more often as opposed to the self-guided parents, which is consistent with the higher website engagement in the human email-mediated group explained previously. Thus, human email-mediated support probably played a role in reminding the intervention parents to apply the physical activity-related content and knowledge to improve their children's physical activity motivation due to more exposure to the program and higher website engagement. Secondly, parents in the self-guided group may have acquired similar knowledge and information on physical activity from the portal, but they probably did not necessarily practice the weekly tasks with their children due to less email support and lower engagement with the program. This assumption is consistent with a systematic review by Hamel, Robbins, & Wilbur (2011) that explained that decreases in child's physical activity level and behaviour could be attributed to parent's low website use. Findings pertaining to child's physical activity motivation also correspond to existing parental support research addressing the issues associated with the intention-behaviour gap (Rhodes, Berry, et al., 2019; Rhodes et al., 2016). These previous studies highlighted the importance of action control of parental support for child physical activity behaviour, as seen in the M-PAC framework (Rhodes, 2017). Parental support associated with child physical activity behaviour requires direct and active participation from parents (Beets et al., 2010; Jarvis, Harrington, & Manson, 2017; Rhodes, Berry, et al., 2019). This direct participation

can be achieved through several approaches, such as role modelling (i.e. being physically active themselves), the provision of instrumental support (i.e. logistic, financial) as well as appraisal-emotional support (i.e. affirmation, validation, praise, encouragement, advice, feedback) (Beets et al., 2010; Garriguet et al., 2017; Gustafson & Rhodes, 2006; Sanders, Parent, Forehand, & Breslend, 2016). Previous reports on parental support have suggested that providing support for child physical activity behaviour requires more effort and can be time-consuming for parents (Jarvis et al., 2017; Rhodes, Berry, et al., 2019), and hence it all depends on the parents as the catalysts to support the physical activity behaviour change of their children and to what degree they want to do so. In the context of the present study, as an addition to lower website engagement, one may assume that the self-guided parents could have had more barriers (e.g. busy, weather, location, financial) during the intervention period and perhaps made a decision to provide support for their children in a way that was not necessarily related to physical activity motivation. This presumption may have reduced the enjoyment and continuation to perform physical activity among self-guided children, which then possibly translated to their decreased physical activity motivation (Bentley et al., 2012; Eather et al., 2013; Petersen et al., 2020). Physical activity is also a non-volitional act (Rhodes et al., 2002), which means that children would still need support from their parents to improve their physical activity behaviours. Following the M-PAC construct (Rhodes, 2017), without adequate support from their parents, the chance for the self-guided children to increase their motivation to commit to the gradual processes of adopting a new physical activity behaviour may have been reduced. Such a paradox could help explain why the self-guided children decreased their physical activity motivation in spite of their parents' improved self-efficacy to support their physical activity behaviours.

5.4. Study Implications

There are several research implications as a result of this study. First, this study collected pilot data and has laid down the groundwork for future larger randomized controlled trials. Findings from this feasibility study support a larger scale study to further explore meaningful differences between human support and self-guided family-centred interventions delivered online but with enhanced recruitment efforts. Second, study recruitment may be a particular challenge for a full-scale study. Consequently, future studies may require a longer recruitment time frame in order to reach the desired sample size. The use of incentives should also be considered for study recruitment and retention. Third, this study demonstrated the potential benefits of incorporating human email-mediated support in future web-based interventions. These benefits include improved engagement and attrition. Finally, this study provided potential efficacy data of both human email-mediated and self-support web-based interventions for promoting physical activity for children. Specifically, both forms of intervention delivery showed positive trends in promoting physical activity. The effect sizes observed can be used to calculate sample size for future trials.

5.5. Strengths

A study strength is the use of validated measures questionnaires to measure parent perceived social support (Chogahara, 1999), self-efficacy, perceived capability, perceived opportunity (Davison et al., 2011) as well as child physical activity level (Kowalski et al., 2004; Longmuir et al., 2018) and their self-regulation skills (i.e. physical activity intrinsic motivation, competence, confidence, and sedentary behaviour) (Longmuir et al., 2018; Prochaska et al., 2000). Objective measure of program engagement was another study strength.

5.6. Limitations

There are several limitations of this study that need to be taken into account prior to drawing conclusions from the analysis. The present study used a quasi-experimental design. Research has suggested that quasi-experimental method limits the ability of the study to conclude a causal association between the intervention and the outcomes (Schweizer, Braun, & Milstone, 2016), which translates to a loss of internal validity of the present study. In addition, since proper randomization was not achieved, there was a likelihood of a health-seeking parent sample, which increased the possibility that the sample of the present study may not be representative of the population initially expected to be analyzed (Brown, Schiff, & Van Sluijs, 2015; Larzelere, Kuhn, & Johnson, 2004).

Moreover, low recruitment was also the main obstacle in this feasibility trial. This yielded a small sample size which can undermine the internal and external validity of a study (Faber & Fonseca, 2014). The self-guided group only had three participants responding to the parent perceived social support questionnaire because the decision to add social support variables into the study came before phase 3 commenced. Multiple efforts through phone calls and emails were conducted to get participants from first two phases to complete the social support questionnaire after the fact; these participants, however, were unresponsive. Furthermore, subjects self-reported the psychosocial components. Such reporting remains controversial due to issues of recall capability. These problems are more common among children, whose cognitive abilities and level of abstract thinking may not be sufficient for rather complex physical activity recall and behavioural questions, and may lead to children overestimating their physical activity attainment (Biddle, Gorely, Pearson, & Bull, 2011). The beginning of COVID-19 outbreak in late February-early March 2020 also limited the extent to which the researcher could recruit more participants. The protocols for all research

activities had to be adjusted and it was difficult to get more contacts due to the unpredictable outcomes of the pandemic.

Lastly, the relatively short study duration (10-weeks) may have been responsible for the higher program engagement and lower attrition rate of this study (Adu, Malabu, Malau-Aduli, Drovandi, & Malau-Aduli, 2020; Husband et al., 2019). It is unclear if results would be similar if the intervention time frame was longer. Thus, it may be important to increase the intervention length, especially considering that the duration of the majority of family-based physical activity interventions has been short (H. E. Brown et al., 2016; O'Connor et al., 2009; Rhodes, Blanchard, Quinlan, Naylor, & Warburton, 2019).

5.7. Conclusion

The present study suggests that recruitment would be an issue related to feasibility and a future efficacy trial given the extended recruitment timeline (i.e. 16 months), suggesting much needed improvements in terms of strategies to recruit more participants. The human email-mediated group had lower attrition rate in comparison to the self-guided group and results from the usage metrics have also indicated that human support may have contributed to a higher state of being exposed to the website, which in turn possibly led to higher website engagement among the human support parents. Similarly, human email-mediated support and higher website engagement may also explain why the human email-mediated support parents were more satisfied with the intervention than were the self-guided group based on the post-program satisfaction. Moreover, preliminary results showed that parents improved perceived social support coming from experts and self-efficacy to support children's physical activity may have contributed to children's enhanced physical activity confidence. However, the human email-mediated children had greater improvements in intrinsic motivation to perform physical activity compared self-guided children. These

findings suggest that human email-mediated support and higher website engagement could have played a role in encouraging parents in the human support group to practice physical activity-related knowledge gained from the portal to support their children's physical activity motivation. Findings from this feasibility study support a larger scale study to further explore meaningful differences between human support and self-guided family centered interventions delivered online but with enhanced recruitment efforts.

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Appendix

Appendix A. Screening Phone Call Script and Registration Form.

Generation Health Screening Phone Call Script

Site _____ **Date** _____ **RA** _____

Hi, my name is _____ and I'd like to thank you for your interest in Generation Health. I have some information to share about the program and an eligibility process to walk. Is this a good time to talk?

I'd like to start out by asking you what drew you to finding out more about the program _____

_____

_____

Great, thank you – and can I ask how you heard about the program?

Prompts – if needed:

	MD Referred
	Nurse/Nurse Practitioner
	School
	Posters - where?
	Flyers/Rack Cards - where?
	Newspaper, Radio, other local Media
	Social Media (Facebook, Instagram, other)
	Program Participants (current or past)
	Friends, Family, Community Member
	Other, please specify

Great, thank you. If it's okay with you I'd like to spend some time explaining the program and then we can talk more about your interest in taking the program.

1) First it is important for me to tell you that this is an online program for families with children between the ages of 8-12 who are **NOT** above a healthy weight, but would like to learn healthy lifestyle behaviours. If your child is above healthy weight – this means that their Body Mass Index for age is in the 85th percentile or above – I can refer you to the in-person version of this program (**NOTE**: ignore the last part if the family was referred by the coordinator).

2) May I ask are you concerned that your child is off the healthy weight path or above a healthy weight?

If Yes

- ➢ We will be offering an in-person program at the Juan de Fuca Rec centre this fall and winter. Our fall program will take place on Saturdays from 3-5pm starting September 28th and our winter program will take place on Thursdays from 6:30-8:30pm starting January 16th.
- ➢ **If interested in signing up, go to program information**

If No but I am having trouble with their lifestyle and am worried

- ➢ Our 10-week, online program for families that need help working on their lifestyle which includes access to a web-based family portal with resources and suggested activities.

If NOT SURE

- ➢ Why don't I describe the program and the process for figuring out whether your child is off the healthy weight path. If they are you have access to our Generation Health in-person Program and if they aren't you still get access to a 10-week online program through the Generation Health Family Portal.
- ➢ **go to Program Information**

PROGRAM INFORMATION

1) Let me tell you more about the program itself and then we will talk about how we determine eligibility.

- It's a FREE community, family based 10-week program
- Designed in BC by healthy lifestyle and behaviour change experts
- This is not a weight loss program, but rather a program to support you in making family changes to healthy behaviours such as healthy eating, physical activity, screen time, sleep and to promote positive mental health that support your child's own health behaviours
- The program is focused on practical, fun activities that build family connectedness while building both parents and the child's skills to make lasting changes. In addition, it incorporates some positive mental health activities that build resilience and self-confidence.
- A parent and/or caregiver is required to come to all sessions.

FOR THE ONLINE PROGRAM

- You will receive 10, weekly online e-sessions through a web-based family portal. These e-sessions will include a weekly lesson on various healthy lifestyle behaviour topics, as well as weekly family challenges & activities and recipes.
- As part of the evaluation, participants (both adults and children) will be asked to provide some lifestyle information about themselves at the first and last

session of the program. Participants will be provided with a consent form to review and sign.

FOR THE IN-PERSON PROGRAM

- Sessions are 2-hour long and will include a variety of family time (both you and your child will learn, do activities and be active together), parent only discussion time and child-only physical activity time
- The physical activity portion of the program encourages physical activity in a group setting while emphasizing FUN! And building the skills and confidence so children want to participate outside the program
- Sessions include:
    - Introduction to healthy eating and active living
    - Strategies that help you make changes, like goal setting, tracking, etc.
    - Healthy body image and self-esteem, managing stress and active living for everybody
    - Creating positive family mealtimes and physical activity experiences
    - Family, food, and getting active outdoors
    - Positive caregiving
    - Cooking and Playing together
- In addition to the weekly in-person sessions, there will also be weekly online e-sessions through a web-based family portal. These e-sessions will supplement the material covered in class and can be completed whenever is convenient for you during the week.
- Over the 10-week period there will also be 4 additional group activities that you will be expected to participate in. These extra group activities will be community-based activities that will be scheduled and led by the program facilitators and may take place on the weekend or on a week night.
- After the 10-week intensive phase there will be a maintenance phase where you will have continued access to the online family portal and will receive email reminders from the Generation Health team.

2) Based on what you have heard are you interested in moving forward with the questions regarding eligibility? We can go through this process now or we can arrange another time that is more convenient for you. You will need to know your child's height and weight. Do you have that information handy?

➢ **If time now and know their child's height and weight proceed to Screening Questions**

➢ **If not enough time now and/or don't know child's height and weight schedule a call back time.** When would be a good time to call you back? As mentioned part of the screening process requires providing your child's weight and height as part of a healthy growth check. Could you have those measurements with you when we talk next?

SCREENING QUESTIONS

1. What is your child's name? _____ (***ALWAYS*** use their name during the interview). Are they a girl or boy? _____

2. Our program is designed for children above a healthy weight. In order to determine if your child is eligible, may I have (**use child's name**) most recent height ___ and weight ___. What is **use child's name**'s date of birth? _____

Thank you. It will just take me a moment to calculate their BMI.

** use CDC BMI calculator https://nccd.cdc.gov/dnpabmi/calculator.aspx and enter data in EIP Participant Tracking Form

➢ BMI above the 85th percentile for age

Great thank you. Let's continue with the screening questions.

Note: Don't engage in a discussion about whether the child is overweight or obese. If they have questions related to child's height and weight, encourage them to follow up with their family physician.

➢ BMI below 85th percentile for age

Great thank you. Your child's BMI is within the healthy weight range. So this means although you aren't eligible for the 10 week program you can register for the online program which will also give you access to the family portal. Would you like to register?

➢ If yes use the registration form to register them for the Workshop

Screening Questions Continued:

Note: If you sense, hear hesitation or things that may limit the family from attending, do not proceed to the next question. Discuss the question in more detail. It's OK if you help the parent determine that their family is not ready for the program. Always validate, affirm and

3. The following set of questions are asking about your **concerns and readiness** for participating in the program:

   a) Why are you interested in this program? _____
   _____
   _____

   b) What if any health concerns do you have for your child? _____
   _____
   _____

c) What if any are your concerns for your child around healthy eating, physical activity, screen time, sleep and/or positive mental health? _____

d) Do you worry your child has lost control over how much they eat? _____

e) Do you worry your child makes themselves sick because they feel uncomfortably full? _____

f) How would you like things to be different for your family? _____

g) What if any changes would you like to make? _____

h) Why might you consider making this change? _____

i) How have you tried to engage in similar lifestyle changes? _____

j) What would be most helpful for you? _____

k) What might be some barriers to change? _____

l) If you were encouraged to come to the program by your physician or another professional, are you registering because you want to? _____

m) Is your child interested in attending the program? _____

When to refer to family physician:

1. Major health concerns raised (questions b & c)
2. Signs of an eating disorder (questions d & e)

When to refer to Shapedown BC program or HEAPK

1. Between 85th percentile and known health issues such as cardiovascular disease, mental health issues, eating disorder

** For Vancouver & Surrey families with children above the 97th percentile with no known co-morbidities – inform parents of more intensive Shapedown BC program and parents can decide which program they want to pursue

4. **(FOR IN-PERSON PROGRAM)** (NOTE: if family was referred by the program coordinator, skip this section)

   The following questions address your family's ability to **commit** to the program. The program requires that a parent/caregiver attends and actively participates in the program with their child. This means attending the 10, weekly 2-hour sessions and participating in the 4 additional group sessions.

   a. What is your ability to commit to the 10 week program? Does your child have any other activities happening on **[week night of program]**?_____
   _____
   _____

   b. Do you have other children? Where will they be during the sessions? _____
   _____
   _____

   c. What might limit you from being able to attend sessions each week and doing family activities in addition to weekly sessions? _____
   _____
   _____

   d. Do you have any holidays planned between October and December? _____
   _____
   _____

   e. If there are occasions that you cannot attend with your child, who will come in place of you? _____
   _____
   _____

   f. Is there anything that would prevent your child from participating in the physical activity portion? Have they participated in similar activities? _____
   _____
   _____

   g. The program requires that you commit to participating in the evaluation of the program by providing health information for yourself and your child at the beginning

and end of the 10-week program. This includes an online questionnaire for the parents/caregivers and in-person questionnaires for the Children during the first and last session of the program. The measurements will be treated confidentially.

h. Do you have any questions or concerns do you have about the evaluation? _____

_____

_____

i. Can you commit to taking part in the evaluation? _____

_____

_____

After everything that you have heard and we have discussed are you ready to register for the program?

- **If yes** – **fill out the registration form**
- **If no** – **ask if you can follow up with another phone call after they have had time to think about the program**

Generation Health
Registration Form:

Date: _____ Completed by: _____

Program location:			
Participant Information			
Child's First Name		Child's Last Name	
Date of Birth		Gender (M/F)	
Caregiver's First Name		Caregiver's Last Name	
Home Phone		Cell Phone	
Email Address			
Address – Line 1		Address – Line 2	
City		Postal Code	
Province		Country	
Relationship to Child			
Height (state units)		Weight (state units)	
Calculated BMI			

Medical Information

It is important for the program facilitators to know any essential health information about your child.

Can you think of any reason (medical/physical/psychological/other) why your child may have difficulty participating in the program? Such conditions could include: asthma, diabetes, attention deficit hyperactive disorder, down syndrome, behavioural disorders, autism, dyspraxia, dyslexia, any heart or lung conditions etc. History of relevant injuries.

It doesn't mean your child will not be included in the program but it will let us know how to help you and ensure your child has the best experience possible.

Additional Notes
Please give any other information that you think is relevant, for example any health complications your child may have due to their weight etc.

Appendix B. Email Recruitment Script.

Hi (*first name*),

Thank you for your interest in Generation Health program.

My name is Dimas and I am a graduate student working under the supervision of Dr. Sam Liu in Digital Health Lab in the School of Exercise Science, Physical & Health Education at the University of Victoria.

The **Generation Health** program is a **FREE** lifestyle management program for families with children between the ages of 8-12 who want to learn healthy lifestyle behaviours. It is a program designed in B.C. by healthy lifestyle and behaviour change experts to support you in making family changes to healthy behaviours such as healthy eating, physical activity, screen time, sleep and to promote positive mental health that support your child's health behaviours. The program is focused on practical, fun activities that build family connectedness while building both parents and the child's skills to make lasting changes.

As part of regular program activities, families (parents and children) are asked to complete a consent form and four questionnaires prior to starting the program. For this particular study, as a researcher, I am requesting access to the information provided on the questionnaires. You will also receive $50 once you have finished the program. Your participation is completely voluntary.

I would also like to assure you that this project has been reviewed and received ethics clearance through the University of Victoria Human Research Ethics Board (HREB).

Please let me know if you need additional information and I would be more than happy to do so via phone or email.

Best regards,

Dimas Adiputranto
MSc Kinesiology Candidate
Digital Health Lab
McKinnon Building – Room 0026
School of Exercise Science, Physical and Health Education (EPHE)
University of Victoria
E: digitalhealth@uvic.ca | dimas.adiputranto@uvic.ca

Appendix C. Participant Consent Form.

Generation Health Evaluation Study

You are invited to participate in the Generation Health Evaluation Study because you have expressed interest in participating in the Generation Health program and the evaluation is a core component of the program. If you join the program you are agreeing to participate in the evaluation component of the Generation Health study, because the purpose of the pilot is to evaluate whether Generation Health is effective and feasible for families. The Generation Health Program is being conducted by the Childhood Obesity Foundation through funding from the BC Ministry of Health. The evaluation component is being carried out by Dr. PJ Naylor, in collaboration with Dr. Sam Liu, of the University of Victoria. You may contact them by phone or e-mail (Dr. Naylor: 250-721-7844, pjnaylor@uvic.ca; Dr. Liu: 250-721-8392, samliu@uvic.ca) if you have further questions.

Purpose and Objectives
The purpose of the study is to evaluate how feasible and effective the Generation Health program is for families, as well as gain an understanding of the issues involved in the implementation of this intervention across the province.

Importance of this Study
Evaluation studies of this type are important because they help us understand how to help families adopt a healthy lifestyle that keeps them on a healthy lifestyle and healthy weight path.

What is involved?
Together, children and their parent(s)/caregiver(s) are asked to complete a 10-week online program. Participants will be randomly assigned into one of two online programs and will not know which program they have been assigned into. Both programs will consist of 10 online weekly self-guided sessions. Sessions will cover topics such as: healthy eating, physical activity, behaviour change skills, mental health, parenting practices, and sleep hygiene. Caregivers and children are asked to complete questionnaires and have physical measures (height, weight) taken on two separate occasions: before the program starts and after the program ends. The research team will contact you to confirm the location and date of the measurement collection.

If you consent to voluntarily participate in the Generation Health program, the research team will collect the information at the beginning and end of the program and again after the maintenance sessions. Your information will be combined with others for evaluation purposes. There will be no information in the research results that will be personally identifiable. These measures are all planned to be a normal part of the Generation Health program activities. In addition to these, you may be asked to participate in a post-program telephone interview to get your opinion on the program.

Inconvenience
Data collection will be completed in person at the University of Victoria immediately following program registration. Compensation for childcare and parking will hopefully mitigate any inconvenience this may cause. To thank participants for their time, a $50 honoraria will be provided to families in both programs after they have completed their second measurement. Participation in this research may cause some additional inconvenience to you as we are collecting the caregiver data using a pre-program online questionnaire and we may ask you

to take additional time to participate in a 30-minute post-program interview. All of the rest of the data collection will occur during program delivery hours.

Risks
None.

Benefits
The potential benefits of your participation in Generation Health include increased self-esteem and increased health and wellness for you and your child. By participating in the research study you are contributing to the evidence of Generation Health's ability to help children and families adopt a healthy lifestyle and stay on a healthy weight path.

Voluntary Participation
Your participation in this program and evaluation study is completely voluntary. If you do decide to participate, you may withdraw at any time without any consequences or any explanation. If you do withdraw from the study you can choose to allow us to use your/your child's data collected to date or to not use it. If at any time you choose to withdraw consent, your preference for the use of your data will be documented and your request honoured.

Since participation in this study requires a child and caregiver to participate together, if you or your child/children decide to withdraw from the study, you will both have to withdraw; children cannot participate without a caregiver and caregivers cannot participate without a child.

On-going Consent
To make sure that you continue to consent to participate in the evaluation component, we will re-confirm your consent when we complete measures at the last session of the program and when we contact you for the focus group.

Anonymity
In terms of protecting your anonymity there will be no identifying names on any of your/your child's records. Your name/your child's name will be replaced by unique identification numbers. You will not be completely anonymous as the research team knows who is participating.

Confidentiality
Your confidentiality and the confidentiality of the data will be protected by having no participant names on any of the data. As well, hard copies of the data will be stored in a locked filing cabinet in a locked room at the University of Victoria. Electronic files will be stored using your unique identification numbers on a secure network drive at the University of Victoria which is accessible only to the principal investigator and research staff. Only the researchers will have access to the videos. During the telephone interview notes will be taken and the interview may be audio-taped and will be transcribed for further analysis. Only the researchers will have access to the tapes and transcripts.

Dissemination of Results
It is anticipated that the results of this evaluation study will be shared with others through presentations at conferences, a report to public health and community stakeholders and through academic publications.

Disposal of Data
This data (e.g. questionnaire, interview transcriptions) will be disposed of five years following publication. If the results are not published within 5 years of completing the study, the data will be destroyed. Hard copies will be shredded and any computer files with participant information will be deleted.

Individuals that may be contacted regarding this study include:

Dr. PJ Naylor	Dr. Sam Liu	Dr. Karen Strange
Principal investigator	Co-investigator	EIP Project Director
250-721-7844	250-721-8392	250-216-7893
pjnaylor@uvic.ca	samliu@uvic.ca	karen@childhoodobesityfoundation.ca

In addition, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or ethics@uvic.ca) or the Research Subject Information Line in the University of British Columbia Office of Research Services by email at RSIL@ors.ubc.caor by phone at 604-822-8598 (Toll Free Number 1-877-822-8598).

Your signature below indicates that you understand the above conditions of participation in this study, that you have had the opportunity to have your questions answered by the researchers and that you consent to participate in this study.

_____	_____	_____
Name of Participant	Signature	Date

Children's Statement

I have talked with my parents/guardians about the Healthy Living pilot program and evaluation study and I understand that all activities are a normal part of the Healthy Living Program. I understand that if I want to I can stop being in the pilot program evaluation study at any time. I have had the chance to ask questions and have received satisfactory answers to all of my questions.

_____	_____
Signature of Child One	Date

_____
Printed Name of Child

_____	_____
Signature of Child Two	Date

_____
Printed Name of Child

A copy of this consent will be left with you, and a copy will be taken by the researcher.

Appendix D. Parent Questionnaire.

University of Victoria | School of Exercise Science, Physical & Health Education

1. Please indicate your full name and the date in the text boxes below.

   Name

   Date

2. Please provide your **participant ID number** in the textbox below.

This form should be completed by the participating child's parent or primary caregiver. The Healthy Living Program is committed to reaching all groups, irrespective of gender, location, economic means or ethnicity. The information you provide will help to ensure we are reaching all sections of the community and providing services to meet all the community's needs.

We therefore request that you answer all the following questions.

Remember this information is strictly confidential.

3. What is your relationship to the child?

4. Do you consider yourself a single parent?
   - ☐ Yes
   - ☐ No
   - ☐ Prefer not to answer

5. People living in Canada came from many different cultural and racial backgrounds. Is your child (please choose all the apply):
   - ☐ An aboriginal person (e.g. First Nations, Metis, or Inuit)
   - ☐ White
   - ☐ Chinese
   - ☐ South Asian (e.g. East Indian, Pakistani, Sri Lankan)
   - ☐ Black
   - ☐ Filipino
   - ☐ Latin American
   - ☐ Southeast Asian (e.g. Cambodian, Indonesian, Laotian, Vietnamese)
   - ☐ Arab
   - ☐ West Asian (e.g. Afghan, Iranian)
   - ☐ Japanese
   - ☐ Korean
   - ☐ Other (please specify)

6. What language(s) do you speak most often at home?
   - ☐ English
   - ☐ French
   - ☐ Chinese language (Cantonese, Mandarin, Hakka, Fukien, Taiwanese)
   - ☐ German
   - ☐ Punjabi
   - ☐ Tagalog (Filipino/Pilipino)
   - ☐ Spanish
   - ☐ Hindi
   - ☐ African languages
   - ☐ Somali
   - ☐ Arabic
   - ☐ Vietnamese
   - ☐ Korean
   - ☐ Urdu
   - ☐ Aboriginal languages (Cree, Blackfoot, Ojibway)
   - ☐ Other (please specify)

7. The following questions use the term "household". For this questionnaire, "household" refers to the people living at the same place who are supported by the same source(s) of income. Is the primary earner of the household:
   - ☐ Employed
   - ☐ Unemployed – currently looking for work
   - ☐ Unemployed – currently not looking for work
   - ☐ Prefer not to answer

8. What is your best estimate of the total income received by all household members, from all sources, before taxes and deductions, in the past 12 months? Income can come from various sources such as from work, investments, pensions or government. Examples include Employment Insurance, Social Assistance, Child Tax Benefit and other income such as child support, alimony and rental income. Is your household income in the past year:
   - ☐ Less than $28,000
   - ☐ $28,000 to less than $34,000
   - ☐ $34,000 to less than $41,000
   - ☐ $41,000 to less than $47,000
   - ☐ $47,000 to less than $53,000
   - ☐ $53,000 to less than $59,000
   - ☐ $59,000 or more
   - ☐ Prefer not to answer

9. What is the highest level of education achieved by the primary caregiver of your child?
   - ☐ Finished grade 8
   - ☐ Finished grade 10
   - ☐ High school certificate
   - ☐ Trade certificate or diploma from a vocational school or apprenticeship training
   - ☐ Non-university certificate or diploma from a community college
   - ☐ University certificate below bachelor's level
   - ☐ Bachelor's degree
   - ☐ University degree or certificate above bachelor's degree
   - ☐ Prefer not to answer

10. How many adults and children live in your household? Please count yourself as an adult. If you are pregnant, please indicate the baby you are carrying as a child:

Adult(s)	
Child(ren)	

Parent Self-Efficacy to Support Child's Physical Activity

1. I set short-term (daily or weekly) goals for how I could support my child's leisure-time physical activity **last month**.
   - ☐ Strongly disagree
   - ☐ Disagree
   - ☐ Neutral
   - ☐ Agree
   - ☐ Strongly agree

2. I made regular plans concerning "when", "where", "how" and "what" kind of support I could provide for my child's physical activity **last month**.
   - ☐ Strongly disagree
   - ☐ Disagree
   - ☐ Neutral
   - ☐ Agree
   - ☐ Strongly agree

3. I made plans regarding what to do if something made it difficult to support my child's physical activity **last month**.
   - ☐ Strongly disagree
   - ☐ Disagree
   - ☐ Neutral
   - ☐ Agree
   - ☐ Strongly agree

4. If I did not reach one of my goals for supporting my child's physical activity **last month**, I analyzed what went wrong.
   - ☐ Strongly disagree
   - ☐ Disagree
   - ☐ Neutral
   - ☐ Agree
   - ☐ Strongly agree

5. For me, regularly supporting my child's moderate-to-vigorous physical activity (e.g. driving to practice, scheduling activities) over the next **two weeks** would be.
   - ☐ Extremely unenjoyable
   - ☐ Quite unenjoyable
   - ☐ Slightly unenjoyable
   - ☐ Neutral
   - ☐ Slightly enjoyable
   - ☐ Quite enjoyable
   - ☐ Extremely enjoyable

6. For me, regularly supporting my child's moderate-to-vigorous physical activity (e.g. driving to practice, scheduling activities) over the next **two weeks** would be.
    - Extremely harmful
    - Quite harmful
    - Slightly harmful
    - Neutral
    - Slightly beneficial
    - Quite beneficial
    - Extremely beneficial

7. For me, regularly supporting my child's moderate-to-vigorous physical activity (e.g. driving to practice, scheduling activities) over the next **two weeks** would be.
    - Extremely useless
    - Quite useless
    - Slightly useless
    - Neutral
    - Slightly useful
    - Quite useful
    - Extremely useful

8. For me, regularly supporting my child's moderate-to-vigorous physical activity (e.g. driving to practice, scheduling activities) over the next **two weeks** would be.
    - Extremely unpleasant
    - Quite unpleasant
    - Slightly unpleasant
    - Neutral
    - Slightly pleasant
    - Quite pleasant
    - Extremely pleasant

Parent Perceived Capability to Support Child's Physical Activity

Regular support of my child's physical activity is something:

1. I do automatically
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree
2. I do without thinking
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

Over the last **two weeks**, how often did you:

3. Encourage your child to participate in moderate-to-vigorous physical activity or sport?
    - Never/rarely
    - 1-2 times/week
    - 3-4 times/week
    - Most days

- Daily

4. Play outside with your child or do moderate-to-vigorous physical activity with your child?
   - Never/rarely
   - 1-2 times/week
   - 3-4 times/week
   - Most days
   - Daily

5. Arrange transportation so your child could do moderate-to-vigorous physical activity or play sports?
   - Never/rarely
   - 1-2 times/week
   - 3-4 times/week
   - Most days
   - Daily

Please select how much you agree or disagree with each statement:

6. I enroll my child in sports teams and clubs such as soccer, basketball, and dance.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

7. I take my child to places where he/she can be active.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

8. I watch my child play sports or participate in other activities such as martial arts or dance.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

9. I encourage my child to be physically active by leading by example (by role modeling).
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

10. I exercise or am physically active on a regular basis.
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

11. I enjoy exercise and physical activity.
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

12. I encourage my child to use resources in our neighbourhood to be active (such as the park and the school).
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

13. I enroll my child in community-based programs (such as Girls and Boys Club, YMCA) where he/she can be active.
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

14. I find ways for my child to be active when school is out by, for example, enrolling him/her in summer camp and after school programs.
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

15. I limit how long my child plays video games (including PlayStation, Xbox, and Game Boy).
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

Parent Perceived Opportunity to Support Child's Physical Activity

Assuming that I am fully motivated:

1. I have the ability to support my child's moderate-to-vigorous physical activity over the next **two weeks**.
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

2. I am capable of supporting my child's moderate-to-vigorous physical activity over the next **two weeks**.
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

3. I will have an opportunity to support my child's moderate-to-vigorous physical activity over the next **two weeks**.
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

4. I make regular plans concerning "when", "where", "how", and "what" kind of support I will provide for my child's moderate-to-vigorous physical activity.
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

5. I make plans regarding what to do if something interfered with my support of my child's moderate-to-vigorous physical activity.
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

6. I consider myself a supportive parent for my child's moderate-to-vigorous physical activity.
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

7. I often talk with others about supporting my child's moderate-to-vigorous physical activity.
    - Strongly disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly agree

Appendix E. Parent Perceived Social Support Questionnaire.

University of Victoria | School of Exercise Science, Physical & Health Education

In this section, we would like to ask you about how much you and your child(ren) feel supported to do regular physical activity. For each question, please make three marks (**x**) for each one (**FAMILY**, **FRIENDS**, and **EXPERTS**). These questions refer to the **past month** only.

- **Physical activity**: any bodily movement during your leisure time (e.g. swimming, dancing, golf, walking, running, bicycling, hiking, or any other sport and exercise activities)
- **Family**: wife/husband, sister/brother, child/grandchild, other relative
- **Friends**: close friends, neighbours, co-workers, club members etc.
- **Experts**: physician, nurse, trainer, social worker, or other health/exercise professionals, staff, or volunteers in public or private agencies

Informational Support

	Never 0	1	2	3	Very often 4
1. informed you and your child(ren) about the expected positive effects of physical activity on your health					
FAMILY	( )	( )	( )	( )	( )
FRIENDS	( )	( )	( )	( )	( )
EXPERTS	( )	( )	( )	( )	( )
2. explained to you and your child(ren) why physical activity is important to improve your health					
FAMILY	( )	( )	( )	( )	( )
FRIENDS	( )	( )	( )	( )	( )
EXPERTS	( )	( )	( )	( )	( )
3. clarified how you and your child(ren) may achieve your health goals through physical activity					
FAMILY	( )	( )	( )	( )	( )
FRIENDS	( )	( )	( )	( )	( )
EXPERTS	( )	( )	( )	( )	( )
4. suggested a physical activity program or facility that might assist you and your child(ren)'s health					
FAMILY	( )	( )	( )	( )	( )
FRIENDS	( )	( )	( )	( )	( )
EXPERTS	( )	( )	( )	( )	( )
5. explained about the amount or intensity of physical activity required to improve you and your child(ren)'s health					
FAMILY	( )	( )	( )	( )	( )
FRIENDS	( )	( )	( )	( )	( )
EXPERTS	( )	( )	( )	( )	( )

Appraisal and Emotional Support

6. complimented you and your child(ren) on the mastery of a physical activity skill

FAMILY	( )	( )	( )	( )	( )
FRIENDS	( )	( )	( )	( )	( )
EXPERTS	( )	( )	( )	( )	( )

7. praised you and your child(ren) for your physical activity level

FAMILY	( )	( )	( )	( )	( )
FRIENDS	( )	( )	( )	( )	( )
EXPERTS	( )	( )	( )	( )	( )

8. affirmed that you and your child(ren) have done well in your physical activity

FAMILY	( )	( )	( )	( )	( )
FRIENDS	( )	( )	( )	( )	( )
EXPERTS	( )	( )	( )	( )	( )

9. shown their respect for you and your child(ren) versatility in physical activity

FAMILY	( )	( )	( )	( )	( )
FRIENDS	( )	( )	( )	( )	( )
EXPERTS	( )	( )	( )	( )	( )

10. told you that you should be proud of you and your child(ren)'s physical activity skills

FAMILY	( )	( )	( )	( )	( )
FRIENDS	( )	( )	( )	( )	( )
EXPERTS	( )	( )	( )	( )	( )

11. To what extent do you feel that you and your child(ren) have been encouraged or supported in doing physical activity?

FAMILY	( )	( )	( )	( )	( )
FRIENDS	( )	( )	( )	( )	( )
EXPERTS	( )	( )	( )	( )	( )

Appendix F. Child Questionnaire.

University of Victoria | School of Exercise Science, Physical & Health Education

Child Physical Activity Level

In the last week:

1. **During your physical education classes**, how often were you active (playing hard, running, jumping, throwing)?
   - ☐ I don't do PE
   - ☐ Hardly ever
   - ☐ Sometimes
   - ☐ Quite often
   - ☐ Always

2. What did you do most the time **at recess**?
   - ☐ Sat down (talking, reading, doing schoolwork)
   - ☐ Stood around or walked around
   - ☐ Ran or played a little bit
   - ☐ Ran around and played quite a bit
   - ☐ Ran around and played hard most of the time

3. What did you do most of the time **at lunch** (besides eating lunch)?
   - ☐ Sat down (talking, reading, doing schoolwork)
   - ☐ Stood around or walked around
   - ☐ Ran or played a little bit
   - ☐ Ran around and played quite a bit
   - ☐ Ran around and played hard most of the time

4. On how many days **right after school**, did you do sports, dance, or play active games in which you were very active?
   - ☐ None
   - ☐ 1 time last week
   - ☐ 2 or 3 times last week
   - ☐ 4 times last week
   - ☐ 5 times last week

5. On how **evenings**, did you do sports, dance, or play active games in which you were very active?
   - ☐ None
   - ☐ 1 time last week
   - ☐ 2 or 3 times last week
   - ☐ 4 times last week
   - ☐ 5 times last week

6. **On the last weekend**, how many times did you do sports, dance, or play games in which you were very active?
   - ☐ None
   - ☐ 1 time last week
   - ☐ 2 or 3 times last week

- 4 times last week
- 5 times last week

7. Which **one** of the following describes you best **over the last week**?
   - All of my free time was spent doing things that involve little physical effort
   - I sometimes (1-2 times last week) did physical things in my free time (e.g. played sports, swimming, bike riding)
   - I often (3-4 times last week) did physical things in my free time
   - I quite often (5-6 times last week) did physical things in my free time
   - I very often (7 or more times last week) did physical things in my free time

8. During the **past week (7 days)**, on how many days were you physically active for a total of at least 60 minutes per day? Count all of the time you spent doing activities that increase your heart rate or made you breathe hard.
   - 0
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6
   - 7

Child Physical Activity Intrinsic Motivation

Why are you active? I am active because:

1. Being active is fun
   - Not true for me
   - Not really true for me
   - Sometimes true for me
   - Often true for me
   - Very true for me

2. I enjoy being active
   - Not true for me
   - Not really true for me
   - Sometimes true for me
   - Often true for me
   - Very true for me

3. I like being active
   A. Not true for me
   B. Not really true for me
   C. Sometimes true for me
   D. Often true for me
   E. Very true for me

Child Physical Activity Competence

How do you feel about being active:

1. When it comes to playing active games, I think I am pretty good.
    - ☐ Not like me at all
    - ☐ Not really like me
    - ☐ Sometimes like me
    - ☐ Quite a lot like me
    - ☐ Really like me

2. I think I do well at activities compared to other children.
    - ☐ Not like me at all
    - ☐ Not really like me
    - ☐ Sometimes like me
    - ☐ Quite a lot like me
    - ☐ Really like me

3. When it comes to being active, I have good skills.
    - ☐ Not like me at all
    - ☐ Not really like me
    - ☐ Sometimes like me
    - ☐ Quite a lot like me
    - ☐ Really like me

Child Physical Activity Confidence

How sure are you that you can:

1. Do physical activity when you feel sad or stressed?
    - ☐ I'm sure I can't
    - ☐ I probably can't
    - ☐ Neutral
    - ☐ I probably can
    - ☐ I'm sure I can

2. Set aside time for physical activity on most days of the week?
    - ☐ I'm sure I can't
    - ☐ I probably can't
    - ☐ Neutral
    - ☐ I probably can
    - ☐ I'm sure I can

3. Do physical activity even when your family or friends want you to do something else?
    - ☐ I'm sure I can't
    - ☐ I probably can't
    - ☐ Neutral
    - ☐ I probably can
    - ☐ I'm sure I can

4. Get up early, even on weekends, to do physical activity?
    - I'm sure I can't
    - I probably can't
    - Neutral
    - I probably can
    - I'm sure I can

5. Do physical activity even when you have a lot of schoolwork?
    - I'm sure I can't
    - I probably can't
    - Neutral
    - I probably can
    - I'm sure I can

6. Do physical activity even when it is raining or really hot outside?
    - I'm sure I can't
    - I probably can't
    - Neutral
    - I probably can
    - I'm sure I can

Child Physical Activity Sedentary Behaviour

1. **<u>On a school day</u>**, how many hours do you do sedentary habits (like being a couch potato)?
    - 1
    - 2
    - 3
    - 4
    - 5
    - 6 or more

2. **<u>On a day you are not in school</u>**, how many hours do you do sedentary habits (like being a couch potato)?
    - 1
    - 2
    - 3
    - 4
    - 5
    - 6 or more

Appendix G. Program Satisfaction Questionnaire.

Program Satisfaction Survey

1. What do you think about the program?
2. What impact (positive/negative) has the program had on your family?
3. Were there any impacts you didn't expect? Either positive or negative? Include spin off benefits.
4. What was the best thing about the program?
5. What was the worst thing about the program?
6. What improvements could be made to the program to make it more appealing to families in your community?
7. Why do you think that families don't attend? Drop out?
8. What are the major lessons you learned through participating in the program?
9. To what extent was the program meaningful to you?
10. Was the family web portal useful for you? What did you like? What didn't you like? Is there anything else you would like to see on the portal?
11. What did you think about the extra family activities that were offered?
12. How satisfied were you with the program?
13. What impact (positive/negative), if any, do you think measuring your child's weight and BMI had on your child's positive mental health? (socially/emotionally)
14. Is there anything else that you feel is important to say?

Portal Satisfaction Survey

1. I found the portal easy to navigate
   - ☐ Strongly disagree
   - ☐ Disagree
   - ☐ Neither agree nor disagree
   - ☐ Agree
   - ☐ Strongly agree

2. I enjoyed reading the contents in the e-Lessons.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

3. I gained valuable knowledge from the e-Lessons.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

4. The quizzes were a good reminder of what I learned in the previous week.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

5. Overall, I found the contents in the e-Lessons applicable to me and my family.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

6. The recipes were varied and my family liked them.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

7. The Family Challenges ideas kept me and my family active each week.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

8. Aside from physical activity for family, the Family Challenges ideas offered features that focused on mental health and I liked them.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

9. The Our Places feature gave more ideas about places to visit with my family.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

10. The Our Steps feature helped my child become more physically active.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

11. The Our Steps feature kept my child active in a fun way.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

12. I liked the Forum because I could share my thoughts and ideas with other members.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

Appendix H. Email Scripts for the Human Email-mediated Support Group

WEEK 1

Email 1
Hello,

Congratulations on making a decision to join this program! I am so glad that you are here with us.

I would like to use this email to introduce myself and elaborate on what is going to happen in the next 10 weeks so you know what you can expect from me and from the program. In order to do so, this email will be a bit lengthy – but worry not, it's only once!

I am a graduate student in kinesiology at the University of Victoria who is also a certified personal trainer. Prior to coming to the University of Victoria, I obtained a degree in physical education and sociology of sport and have since gone on to do work in dynamic environments at various schools, professional sport clubs, and rec centres in the UK, New Zealand, Taiwan, Bali, and Canada. I am committed to helping you and your child/children lead a healthier lifestyle!

The online Family Portal is part of the 10-week Generation Health Program that is designed to help you and your family lead a healthier lifestyle. Over the next 10 weeks, I will send you two emails each week with a subject line that starts with "**Generation Health Program**". This way you will know that the email is from me.

I've set these emails to be delivered every Monday at 5 P.M. and Thursday at 5 P.M. as the program progresses. However, I know that life can get in a way at times, which is why I'm giving you the freedom to determine what days and times you want to receive these two weekly emails from me if Monday and Thursday late afternoons don't work with you. All you have to do is send me an email and let me know the best times for you and I'd be more than happy to flow with your schedule.

In order to get the best results, I would like for us to work together in a collaborative manner in this program. Having said that, if there are any topics not included in the lessons that you would like to discuss, please let me know and we can discuss this through our email exchanges as you move forward with the program. The quality of the counselling you will receive will be dependent on the information I receive from you. The more information I receive from you through emails and/or **Forum** (if you prefer this platform), the better I will be able to provide you with quality feedback.

It will be important for you to check your email regularly during the program, since it acts as a reminder for you to stay on track and gives you links to useful information from the lessons.

The online portal is a platform where you will receive your weekly online lessons. This will help reinforce your knowledge on healthy lifestyle and expand your ideas on fun activities and practical, feel-good recipes. These lessons have been studied extensively and have been found to be effective in helping people improve their lifestyle.

Our team has set up an account for you. Please click **HERE** and use username and password provided:

Username:
Password:

You will be given access to new topics every week. Don't worry if you can't finish your weekly session on one occasion, you can always come back at your convenience!

You now have access to your week 1. The goals of your first week are:

1. Learn how to navigate yourself on the portal. Worry not, we have provided an instruction that is easy to follow **HERE**.

2. Complete these online lessons to learn about:
- **Live 5-2-1-0+**
- **Parenting practices that promote health**
- **Division of Responsibility in Feeding**
- **Promoting healthy attitudes about body size and weight**.

3. Try out the **Family Challenges** – try to complete at least one activity provided on the portal this week.

4. Try the **Recipes** of the week
- **Crock pot lasagna**
- **Friendship salad with lemon yogurt sauce**

Additionally, you also have access to the **Forum** where you can ask questions and/or share your thoughts and cool ideas with other members - we're here to support each other!

If you have any questions, please contact me at **digitalhealth@uvic.ca**.

Kind regards,

Dimas
The Generation Health Team

Email 2
Good afternoon (*first name*),

How is your week going? Did you manage to finish all the tasks given in your first week's e-Session?

We would like to take this opportunity to remind you that this week's online lessons focus on **Live 5-2-1-0+**, **Parenting Practices That Promote Health**, and **Promoting Healthy Attitudes About Body Size and Weight**, which you can find in the portal.

Click **HERE** to access your Generation Health account.

If possible, try to do **one activity** this week. You can always check **these resources** out for some ideas.

We also encourage you to use the **Forum** if you have any questions or if you feel like sharing your thoughts and ideas.

Feel free to drop me a line if there are any specific topics that you think would be helpful if you get a more thorough understanding and/or explanation.

Dimas
The Generation Health Team

Email 3

Good afternoon (*first name*),

Congratulations on meeting your goals in week 1! How did you manage to do so? You should be proud of yourself!

Just a reminder, you can always take a look at this week's e-Session again before moving on to week 2 next week:

- **Live 5-2-1-0+**
- **Parenting practices that promote health**
- **Promoting healthy attitudes about body size and weight**

If you've got brilliant ideas and/or thoughts on anything related to this week's e-Session, feel free to share them with others in the **Forum**. You may inspire others with your own approaches and methods – who knows?!

I can't be more thrilled to work with you in the next few weeks as we move forward with the program. You are a valued participant, and I truly appreciate your effort.

See you next week and stay active!

Dimas
The Generation Health Team

Email 4

Good afternoon (*first name*),

I'm sorry to hear that you haven't managed to meet this week's goals yet. I understand that life sometimes can get in a way. Remember that we still have got plenty of time – it's only week 1, so please don't stress yourself.

If you're still confused as to how to navigate yourself on the online portal, click **HERE** to get a better understanding of it.

You can also reach out to fellow participants and share your concerns with them if you feel the need to do so in the **Forum**.

Why don't you just take a deep breath and consider doing so by applying one of these activities that are good for your soul, such as **walk and talk**.

Remember that first week might feel challenging because you are on a journey that may be entirely new for you, and it takes some time to adjust yourself to something new – time, commitment, diet, everything.

Was this of any assistance? Please don't hesitate to reach out to me if you need more advice and guidance.

Believe in yourself. You got this!

Dimas
The Generation Health Team

WEEK 2

Email 5

Your week 2 e-Session is now available on the Family Portal!

Hello,

Congratulations on finishing your week 1! I hope you enjoyed it as much as everyone else in the program did.

Week 2 is here for you now! Click **HERE** to access your account.

The goals of this week's e-Session are:

1. Complete the following lessons:
   - **Top Tips to Become a Physically Active Family**
   - **23 and ½ Hours: What Is the Single Best Thing We Can Do for Our Health?**
   - **S.M.A.R.T. Goal Setting**
   - **The Benefits of Active Living and Physical Activity**

2. Try out these **Family Challenges** and aim for **one physical activity** challenge this week.

3. Try this week's healthy **Recipes**:
   - **Yogurt parfait**
   - **Pita pizza**

Don't forget that you also have access to the **Forum**. You can use it to shoot questions and ideas, or even read what others have posted.

Keep up the good work!

Dimas
The Generation Health Team

Email 6
Good afternoon (*first name*),

How have you been? Did you manage to meet all the goals in this week's e-Session?

Click **HERE** to access your account.

I just wanted to remind you about a few strategies you can use to **become a physically active family.**

Don't forget to outline a plan that works for you and your family and make sure everyone can stick to it. My suggestion is to have a printed version of this plan so it's visible for everyone.

Keep up the good work and enjoy the rest of your week!

Dimas
The Generation Health Team

Email 7
Good afternoon (*first name*),

You have done it again! You're developing a reputation as someone who's capable and competent. That's great!

Since you've met all the goals for this week, you may want to slow down a little bit by doing some joyful physical activity. Click **HERE** to get inspired!

Great work. Keep it up and see you next week!

Dimas
The Generation Health Team

Email 8
Good afternoon (*first name*),

I'm sorry to hear that you haven't managed to meet your goals this week. I understand that it can be frustrating to maintain balance between your own commitments and meeting the goals of each week's e-Session. Here are three approaches you can do to yourself:

- Keep giving your best effort every time you have a chance to meet one of the goals this week.
- Enjoy the journey! Don't focus on the results and/or goals. Embrace every new experience you can perform.
- Celebrate each positive change you've managed to achieve.

You can use this **tracker** below to better plan your day. This way, hopefully you'll manage to find slots where you can meet your e-Session goals.

You can also reach out to fellow participants and share your concerns with them if you feel the need to do so in the **Forum**.

Was this of any assistance? Please don't hesitate to drop me a line if you need help.

I believe in you – you got this!

Best,

Dimas
The Generation Health Team

WEEK 3

Email 9

Your week 3 e-Session is now available on the Family Portal!

Hello,

Hope you had a great weekend!

It seems like you have managed to stay on track. You should be proud of yourself!

Now it's time to kickstart your week with a new e-Session. Click **HERE** to access your account.

The topics this week consists of 3 important topics:

- **Canada's Food Guide**
- **Healthy Food Choices**
- **Healthy Eating on a Budget**
- **Be a Good Role Model**

As for **Family Challenges** this week, try to aim for one **healthy eating activity** or **one physical activity** challenge.

Don't forget to indulge yourself in healthy **Recipes** this week:

- You can create your own **stir-fry**
- **Grab & go fruit**

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section **HERE**.

Have fun with your e-Session this week and please let me know if you have any questions.

Dimas
The Generation Health Team

Email 10
Good afternoon,

How have you been? Did you manage to meet the goals this week?

Click **HERE** to access your account.

Don't forget that you have a few different **ideas** you can apply to you and your loved ones to eat more mindfully.

Feel free to use the **Forum** to ask questions and/or share your thoughts, cool ideas, and inspirations:

Also, just a friendly reminder that you can always email me at digitalhealth@uvic.ca if you have any questions regarding this week's e-Lessons.

Keep up the good work!

Dimas
The Generation Health Team

Email 11
Good afternoon,

I wanted to take the time to thank you for putting the effort into this week's e-Session. The excellent work you have demonstrated so far is so inspiring!

Don't lose sight of what you need to do, and, once again, well done! See you next week!

Dimas
The Generation Health Team

Email 12
Hi (*first name*),

Sorry to hear that you haven't managed to meet this week's goals yet. I know it's hard to focus on the session when you have to juggle different things at the same time.

You may want to consider going for a walk with your loved ones. Click **HERE** to get inspired.

I suggest you work towards a particular goal with your family and do not feel pressured to do all the tasks this week.

Was this of any assistance? Please don't hesitate to email me if you still have anything else on your mind that you haven't shared yet. You'll get there eventually!

Best,

Dimas
The Generation Health Team

WEEK 4

Email 13
Your week 4 e-Session is now available on the Family Portal!

Hello,

Hope you could recharge yourself last weekend!

I'd like to start this week with words of appreciation because you have managed to stay this far. Your efforts are appreciated and valued. Thank you for staying on track!

Click **HERE** to access your account.
Here are 3 topics you'll find interesting this week:

- **Be Aware of Food Marketing**
- **Busting Food Labels**
- **Sugary Drink Sense**

We have created something fun you can do with your family this week – **at the supermarket**! Click **HERE** to dig deeper into it:

Remember to try to do at least **one challenge** this week. Better yet, you can even create your own physical activity/healthy eating challenge this week!

Some healthy and yummy **Recipes** to try this week:
- **Black bean, corn & tomato soup**
- **Color your plate with BC veggies**

Sharing is caring, so feel free to share your thoughts or ask questions in the **Forum**.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section here:

I'm ready to answer any questions you have as well if you prefer to do so. You can reach me at **digitalhealth@uvic.ca**.

Have fun doing all healthy things this week!

Dimas
The Generation Health Team

Email 14
Hello,

How are you doing? Did you meet all the goals provided in this week's e-Session?

Click **HERE** to access your account.

Whenever you're at a supermarket and are thinking about buying some food, don't forget to **read the labels.**

The best thing you get to do this week is to have FUN with your family at the supermarket. You can print three different worksheets and start playing with them next time you're doing grocery shopping. Click **HERE** to get some ideas!

Feel free to use the **Forum** to ask questions and/or share your thoughts, cool ideas, and inspirations:

Also, just a friendly reminder that you can always email me at digitalhealth@uvic.ca if you have any questions regarding this week's e-Lessons.

Stay active!

Dimas
The Generation Health Team

Email 15
Hi (*first name*),

Looks like you worked great against pressure. Good job at keeping your motivation alive!

Let's review some of the topics you've learned this week:

- **Be Aware of Food Marketing**
- **Busting Food Labels**
- **Sugary Drink Sense**

Feel free to send me any other information and/or questions that you think would be helpful for you as you move forward with the program. Also, let me know if you have any specific topics you would like to discuss.

You've been very efficient so far, but I still encourage you to keep giving your best effort each week to make sure you and your family are on the right track.

Enjoy the rest of your week and keep up the good work! See you next week!

Dimas
The Generation Health Team

Email 16
Hi (*first name*),

I'm sorry to hear that you haven't managed to focus on reaching your goals this week. I can imagine how you may feel. What do you think stops you from being able to move forward this week?

You can be creative with **this frozen smoothie** and do it without having to consider putting too much time into them if you think you're short of time this week.

Let me know if you find this helpful and please reach out to me if you still have any questions and/or concerns. I'm here for you.

Best,

Dimas
The Generation Health Team

WEEK 5

Email 17
Your week 5 e-Session is now available on the Family Portal!

Hello,

How was your weekend? I hope you managed to spend some quality time with your loved ones and are now ready to start a fresh week!

Before we move on, I would like to personally congratulate you on reaching a milestone this week. Yes, it's week 5, meaning you're almost halfway there! I know it's not always easy to stick to the program., but you are capable and competent and I am proud of you!

Click **HERE** to access your account.

We have provided interesting lessons for you this week:

- **Understanding body image and self-confidence**
- **Developing a positive body image**
- **Building Your Exercise Identity**
- **Body Self-Compassion and Appreciation**

We have provided some family challenges you can do together this week! This week, try to do **at least one mental health challenge**, **one physical activity challenge** or **create your own challenge.**

My team and I tried these **Recipes** last week and we all loved them! You can give them a try as well:
- **Raspberry yogurt flan**
- **Cheese pleaser**

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the Diary section **HERE**.

Once again, congratulations on reaching week 5! Have fun with your e-Session this week and please let me know if you have any questions.

Dimas
The Generation Health Team

Email 18
Good afternoon (*first name*),

How's your week going? Did you manage to meet all the goals of this week's e-Session?

Click **HERE** to access your account.

I just wanted to remind you that we've got a few interesting articles this week that can inspire you and may even give you a new perspective on this week's topic, which is body image and self-confidence. Here they are:

- **Understanding body image and self-confidence**
- **Developing a positive body image**

Don't forget that you have a **Forum** that you can use to ask questions or share some ideas with other members:

Email me at digitalhealth@uvic.ca if you have any questions regarding this week's e-Session. Enjoy the remainder of your week!

Dimas
The Generation Health Team

Email 19
Hi (*first name*),

It's been great working with you because you tend to stay one step ahead! Just a reminder that you've reached week 5 – halfway there!

As you already know, this week is all about positive body image. I think it's important for you to recap these articles you've read:

- **Understanding body image and self-confidence**
- **Body Self-Compassion and Appreciation**

Since you've managed to stay on the right track so far, I encourage you to share your experience and/or suggestion with other participants in the **Forum**.

Looks like you've outlined a S.M.A.R.T. plan for yourself in the last 5 weeks, but let me know if there's anything I can do to help you in sticking to the rest of the program.

Enjoy your week and keep up the good work!

See you next week.

Dimas
The Generation Health Team

Email 20
Hello,

Sorry to hear that you've found it tricky this week to meet the goals. What makes you feel that way?

Did you know that this week's core message is about appreciating your own body? You may find some of the content soothing for your soul, such as **these mental health break activities**.

Was this of any assistance? I'm always around whenever you feel like asking more questions or sharing your thoughts. You can also do so in the **Forum** if you feel comfortable:

It will be all right. You can do this!

Best,

Dimas
The Generation Health Team

WEEK 6

Email 21
Your week 6 e-Session is now available on the Family Portal!

Good afternoon (*first name*),

You are now in the second half of your program! It is not always easy to stick to it because I know sometimes life gets in a way, but you are doing well. Good job!

Click **HERE** to access your account.

We have provided some inspiring lesson topics for you this week. Here they are

- **Creating a positive family mealtime**
- **Qs and As about eating together**
- **Get pre-teens and teens to the table**
- **Practice mindful eating**

This week, try to do at least one **healthy eating challenge**, one **physical activity challenge** or **create your own challenge.**

Also, this week's **Recipes**, oh just heavenly! Give them a try:
- **Salmon cakes**
- **Quinoa salad with pears, feta & herbs**

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section.

Have fun with your e-Session this week and please reach out to me at digitalhealth@uvic.ca if you have any questions.

Regards,

Dimas
The Generation Health Team

Email 22
Hi (*first name*),

How have you been? Did you manage to meet all the goals this week?

Click **HERE** to access your account.

You can refresh your week a little bit with **this little quiz** about eating together.

Feel free to use the **Forum** to ask questions and/or share your thoughts, cool ideas, and inspirations.

Also, just a friendly reminder that you can always email me at digitalhealth@uvic.ca if you have any questions regarding this week's e-Lessons.
Keep up the good work!

Dimas
The Generation Health Team

Email 23
Hi (*first name*),

Congratulations on meeting all the goals this week! You've demonstrated an ability to motivate yourself and your loved ones. I know it can be tricky sometimes, but you've done so well.

Let's review what you've learned this week once more:

- **Creating a positive family mealtime**
- **Questions and answers about eating together**
- **Get pre-teens and teens to the table**
- **Hunger scale and mindful eating strategies**

Also, what are your thoughts on week 6's **Recipes**? Do you think **salmon cakes** and **quinoa salad** are a good combination for a healthy meal?

How did you manage to meet all the goals? It would be great if you can share your thoughts and ideas with others in the **Forum**. They may help others meet their weekly goals as well.

Once again, well done and keep up the great work! See you next week!

Dimas
The Generation Health Team

Email 24
Hi (*first name*),

I'm so sorry to hear that this week's goals haven't been achieved yet. What do you think stops you this week?

Take a deep breath, slow down, and do stuff that you think matters the most to you.

- **How about going outside and try orienteering with your loved ones?**

Just a reminder, if you ever feel like sharing with other members, we've got a **Forum** that you can use anytime you want.

I hope this helps. Feel free to reach out to me if you still have any concerns and/or questions.

Best,

Dimas
The Generation Health Team

WEEK 7

Email 25
Your week 7 e-Session is now available on the Family Portal!

Hello,

Thanks for completing last week's e-Session. Great effort!

Click **HERE** to access your account.

There are several interesting areas to focus on this week. Here they are:

- **Rate your family's eating style**
- **Family meals, culture, and food traditions**
- **Physical activity barriers**
- **Taking it outdoors**

Try to do **one healthy eating** or **one physical activity challenge.** You can also **create your own challenge** if there is something your family would like to work on.

Have you heard of **ants on a log** and **crock pot lasagna**? Find them in **Recipes** of the week:

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section.

Enjoy your e-Session this week and let me know if you have any questions.

Regards,

Dimas
The Generation Health Team

Email 26
Hi (*first name*),

How's your week going? Did you manage to meet your goals in week 7? Are you happy overall with your efforts and your progress so far?

Click **HERE** to access your account.

If you ever find it tricky to stay active physically, you can refer to these guidelines that outline some **common barriers to physical activity**.

Don't forget to try to make **family meals** happen this week. Here's a **resource** you can use to find out your family's meal culture.

Feel free to use the **Forum** to ask questions and/or share your thoughts, cool ideas, and inspirations:

You can always email me at digitalhealth@uvic.ca if you have any questions regarding this week's e-Lessons.

Enjoy the remainder of your week!

Dimas
The Generation Health Team

Email 27
Hi (*first name*),

Congratulations on yet another successful week! I'm so impressed. How did you do it?

I'd like to take this opportunity to review all the e-Lessons you received earlier this week:

- **Rate your family's eating style**
- **Making family meals happen**
- **Physical activity barriers**
- **Taking it outdoors**

It seems like you've managed to keep going strong despite all the distractions. Do you think you can share your strategies with others in the **Forum** so they can be as solid as you?

Don't forget that you can always email me at digitalhealth@uvic.ca if you have any questions regarding week 8.

Enjoy the rest of your week and do not lose sight of what you need to do.

See you next week!

Dimas
The Generation Health Team

Email 28
Hi (*first name*),

I'm so sorry to hear that this week's goals haven't been achieved. What do you think stops you this week?

Have you ever considered reminiscing your childhood by playing the games with your child? It may be a good idea to make you feel more energized so you'll be motivated to meet this week's goals. Try this **playground games revival**.

You may want to **go for a walk after dinner**. It's pretty unusual perhaps, but it can boost your mood and even improve your digestion, especially if you have access to do it in a green space.

Hope you'll feel better soon. I believe you can handle this well.

Don't hesitate to drop me a line if you feel like sharing your thoughts or asking questions.

Best,

Dimas
The Generation Health Team

WEEK 8

Email 29
Your week 8 e-Session is now available on the Family Portal!

Hello,

How was your weekend? I hope you managed to be active with your loved ones.

Click **HERE** to access your account.

Let's keep moving this week! This week's focus is on positive parenting, sleep hygiene, and brainiacs. Here are useful articles you:

- **Sleep hygiene**
- **How can live 5-2-1-0+ support better sleep?**
- **Brain gain**

Family Challenges this week has 4 options you can choose from. Remember to try to aim for one **one physical activity** or **one positive mental health** activity.

Some healthy and yummy **Recipes** to try this week:
- **Chicken sandwich**
- **Yummy hummus**

The **Forum** is always available if you feel like sharing some ideas, thoughts or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section.

I'm ready to answer any questions you have as well if you prefer to do so. You can reach me at **digitalhealth@uvic.ca**.

Have fun doing all healthy things this week!

Dimas
The Generation Health Team

Email 30
Good afternoon (*first name*),

How are things with you this week? Did you manage to meet week 8's goals?

Click **HERE** to access your account.

Remember the **5-2-1-0+** you learned in week 1? Did you know that it can support better sleep as well? Check out this article to find out more about it **HERE**.
Did you know that a little movement each day can do wonders to your brain and body? Check it out **HERE**.

Feel free to use the **Forum** to ask questions and/or share your thoughts, cool ideas, and inspirations.

Also, just a friendly reminder that you can always email me at digitalhealth@uvic.ca if you have any questions regarding this week's e-Lessons.

Stay active!

Dimas
The Generation Health Team

Email 31
Hi (*first name*),

Thanks for staying on track! Can you believe that it's only a couple of weeks left before it's done? You're so close to the finish line.

Let's review week 8's articles:

- **Sleep hygiene**
- **How can live 5-2-1-0+ support better sleep?**
- **Brain gain**

I'd also like to remind you that you can share whatever you want and keep it for yourself in the **Diary** section provided on the online portal. Better yet, you can even have a physical journal and keep a record of your journey in this program – it can be a good reminder of what you're capable of, and it's very encouraging given what you've achieved in the last 8 weeks!

Of course, if you want to share your thoughts, ideas or ask questions in the **Forum**, you're more than welcome to do so.

Keep up the good work and see you next week!

Dimas
The Generation Health Team

Email 32
Hi (*first name*),

I'm so sorry to hear that this week's goals haven't been achieved. What do you think stops you this week?

Do you have thoughts on this week's e-Session in general? If you haven't had a chance to have a thorough look at it, I can share a few articles that focus on different topics and may help you stay on track:

- **Do yoga in the comfort of your home**
- **Step away from the screen**

Let me know if these articles are helpful. Also, just a friendly reminder that you can always share your concerns and/or thoughts with others in the **Forum**.

You're only a couple of weeks away from the finish line – you can do this!
Best,

Dimas
The Generation Health Team

WEEK 9

Email 33
Your week 9 e-Session is now available on the Family Portal!

Hello,

I hope your weekend was fantastic!

Did you realize that you have reached week 9? It's not always easy to stay on track, so I'd like to take this opportunity to congratulate you!

Click **HERE** to access your account.

You're going to enjoy this week as we're learning about cooking and playing together. What does it look like? Let's move on!

- **Habits**
- **Getting kids in the kitchen**
- **Cooking with kids**
- **From beef to beans**

As for **Family Challenges**, you've got 4 options to choose from this week. You know how it works: try to do **at least one healthy eating** or **one physical activity challenge**. You can **also create your own challenge** if there is something specific your family would like to work on.

Don't forget to indulge yourself in healthy **Recipes** this week:

- **Salmon dip**
- **Friendship fruit salad with lemon yogurt sauce**
- **Oatmeal pancakes**
- **Yogurt pops or fruit kabobs**

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section.

Have fun with your session this week and please let me know if you have any questions.

Dimas
The Generation Health Team

Email 34
Good afternoon (*first name*),

How's it going? How do you find this week's e-Session, is it easy or pretty challenging for you? Did you manage to meet all the goals this week?

Click **HERE** to access your account.

Don't forget that you have a few different ideas you can apply to get your kids in the kitchen. Check out **this article** to find out more. Here are some **more ideas** you can try with your kids regardless of their age.

Interested in trying vegetarian diet but don't know how to start? Check out **this article** that will give you an overview of healthy plant based protein sources.

Feel free to use the **Forum** to ask questions and/or share your thoughts, cool ideas, and inspirations:

Also, just a friendly reminder that you can always email me at digitalhealth@uvic.ca if you have any questions regarding this week's e-Lessons.

Keep up the good work!

Dimas
The Generation Health Team

Email 35

Good afternoon,

Congratulations and thanks for meeting all the goals this week. Good job at keeping yourself on the right track!

I'd like to review a couple of articles about **habits** and **plant-based food**, as well as some tips for family get togethers. Check them out:

- **Habits**
- **From beef to beans**
- **Any weather fun**
- **Appetite for Appreciation**

Just a reminder: can you believe that next week is your last week in this program? You should be proud of yourself for handling everything so well – give a pat on your back!

Drop me a line if you need anything and see you next week!

Dimas
The Generation Health Team

Email 36
Hi (*first name*),

Sorry to hear that you've been struggling to meet your goals this week. I understand that you've been busy, but take a look at the brighter side: you're in WEEK 9, meaning you're so close to the finish line. It's not as smooth compared to what you did in the previous weeks, but you've managed to reach this point – you'll get through this!

Week 9 actually has a few useful resources and ideas you can access to help you with your last stretch of the program. Let me share some of them with you here:

- **Gratitude journal**
- This week's **Recipes** are pretty easy to follow

I'd like to remind you that you're more than welcome to ask questions and/or share your thoughts, cool ideas, and inspirations in the **Forum**:

I hope you find these suggestions helpful and that you'll be able to stay motivated until the end of the program – which is next week!

Drop me a line if you need anything and see you next week!

Dimas
The Generation Health Team

FINAL WEEK

Email 37
Your FINAL WEEK e-Session is now available on the Family Portal!

Hello,

Congratulations on reaching the **FINAL WEEK** of the program! It's been a journey! I hope you and your family have enjoyed this experience and found the lessons informative and valuable. Great work!

Click **HERE** to access your account.

To celebrate your awesomeness, I'd like to dedicate this week to encourage you to continue your positive change. Check out these articles I've provided for you:

- **Identity**
- **Exercise identity**
- **Set guidelines for active living and sleep**
- **Set guidelines for healthy eating**

As for **Family Challenges**, you've got 4 options to choose from this week. You know how it works: try to aim for one **healthy eating activity**, **one physical activity,** and **one mental health activity**. You can also **create your own challenge** if there is something your family would like to work on in your final week.

Don't forget to indulge yourself in healthy **Recipes** this week:
- **Yogurt pops or fruit kabobs**
- **Skillet chilli**

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions, but if you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section.

Have fun with your session this week and please let me know if you have any questions.

Dimas

The Generation Health Team
Email 38
Good afternoon (*first name*),

I would like to remind you that this week is the **FINAL WEEK** of the Generation Health program. How are you feeling now that you're almost done with the program? Did you manage to meet all the goals in this final week?

Click **HERE** to access your account.

Check out **these articles** on identity and how it relates to an active lifestyle.

Additionally, you can use **these resources** as guidelines for active living, sleep, and healthy eating.

Feel free to use the **Forum** to ask questions and/or share your thoughts, cool ideas, and inspirations.

Thank you for showing excellent dedication and impeccable hard work – these have certainly taken you to where you are right now. You should be proud of yourself!

You can still reach me at digitalhealth@uvic.ca if you have any questions, suggestions, or want to discuss anything related to the program.

Keep up the good work!

Dimas
The Generation Health Team

Email 39
Hi (*first name*),

You've managed to perform the last stretch of the program. Huge congratulations, I'm so proud of you! How are you feeling now?

Let's recap what you've learned this week to preserve your positive changes:

- **Identity**
- **Exercise identity**
- **Set guidelines for active living and sleep**
- **Set guidelines for healthy eating**

Since you've managed to finish strong, I encourage you to share your experience with others in the **Forum**. They might find your journey inspiring!

Last but not least, I'd like to express how grateful I am to have been given a chance to work with you in the past 10 weeks. I really hope you and your family found this program useful and that you can stay active and healthy as a family.

You can still reach me at digitalhealth@uvic.ca if you have any questions, suggestions, or want to discuss anything related to the program.

Once again, well done and thank YOU!

Dimas
The Generation Health Team

Email 40

Hi (*first name*),

Sorry to hear that you haven't managed to spare your time to do the final week's goals. But hey, you've come a long way and this is your last week. That's some real achievement there, you should be proud of yourself for being able to push yourself this far!

You can also consider doing something light with your family at home so you don't really have to think about sparring too much time on the road. Have you heard of Family History Charades or Activities Charades before? If you haven't, click **HERE** to get some inspiration.

Do you think this is helpful? Again, don't stress yourself too much – it's the last week of the program and you've given your best effort to be at this point. Great work!

Don't hesitate to reach out to me again if you still need more advice and or suggestions, I'd be more than happy to help!

Best,

Dimas
The Generation Health Team

Additional Email If Participant Still Finds It Difficult to Meet the Goals

Hi (*first name*),

Sorry to hear that you really find it challenging to meet your goals this week. It is okay and I am sure you will be able to get back on track again soon!

I have a few resources that you can use to help you meet your goals this week. Here they are:

(*insert relevant articles*)

I hope these resources are helpful. Do not hesitate to email me if you still need more advice and or suggestions.

Best,

Dimas
The Generation Health Team

Appendix I. Email Scripts for the Self-guided Group.

WEEK 1

Email 1
Hello,

Congratulations on making a decision to join this program! I am so glad that you are here with us.

I would like to use this email to introduce myself and elaborate on what is going to happen in the next 10 weeks so you know what you can expect from the program. In order to do so, this email will be a bit lengthy – but worry not, it's only once!

I am a graduate student in kinesiology at the University of Victoria who is also a certified fitness trainer. Prior to coming to the University of Victoria, I obtained a degree in physical education and sociology of sport and have since gone on to do work in dynamic environments at various schools, professional sport clubs, and rec centres in the UK, New Zealand, Taiwan, Bali, and Canada. I am committed to helping you and your child/children lead a healthier lifestyle!

The online Family Portal is part of the 10-week Generation Health program that is designed to help you and your family lead a healthier lifestyle. Over the next 10 weeks, you will receive one email each week with a subject line that starts with "**Generation Health Program".** This way you will know that the email is from me. I've set these emails to be delivered every Monday at 5 P.M. as the program progresses.

In order to get the best results, you are going to be the one who determines what weekly goals you should set and what topics you should focus on each week. It will be important for you to check your email regularly during the program, since it acts as a reminder for you to stay on track and gives you links to useful information from the lessons.

The online portal is a platform where you will receive your weekly online lessons. This will help reinforce your knowledge on healthy lifestyle and expand your ideas on fun activities and practical, feel-good recipes. These lessons have been studied extensively and have been found to be effective in helping people improve their lifestyle.

Our team has set up an account for you. Please click **HERE** and use username and password provided:

Username:
Password:

You will be given access to new topics every week. Don't worry if you can't finish your weekly session on one occasion, you can always come back at your convenience!

You now have access to your week 1 and the goals of your first week are:

1. Learn how to navigate yourself on the portal. Worry not, we have provided an instruction that is easy to follow **HERE**.

2. Complete these online lessons to learn about:
- **Live 5-2-1-0+**
- **Parenting practices that promote health**
- **Division of Responsibility in Feeding**
- **Promoting healthy attitudes about body size and weight**.

3. Try out the **Family Challenges** – try to complete at least one activity provided on the portal this week.

4. Try the **Recipes** of the week
   - **Crock pot lasagna**
   - **Friendship salad with lemon yogurt sauce**

Additionally, you also have access to the **Forum** where you can ask questions and/or share your thoughts and cool ideas with other members - we're here to support each other!

If you have any questions, please contact me at **digitalhealth@uvic.ca**.

Kind regards,

Dimas
The Generation Health Team

WEEK 2

Email 2
Your week 2 e-Session is now available on the Family Portal!

Hello,

Congratulations on finishing your week 1! I hope you enjoyed it as much as everyone else in the program did.

Week 2 is here for you now! Click **HERE** to access your account.

The goals of this week's e-Session are:

1. Complete the following lessons:
   - **Top Tips to Become a Physically Active Family**
   - **23 and ½ Hours: What Is the Single Best Thing We Can Do for Our Health?**
   - **S.M.A.R.T. Goal Setting**
   - **The Benefits of Active Living and Physical Activity**

2. Try out these **Family Challenges** and aim for **one physical activity** challenge this week.

3. Try this week's healthy **Recipes**:
   - **Yogurt parfait**
   - **Pita pizza**

Don't forget that you also have access to the **Forum**. You can use it to shoot questions and ideas, or even read what others have posted.

Keep up the good work!

Dimas
The Generation Health Team

WEEK 3
Your week 3 e-Session is now available on the Family Portal!

Hello,

Hope you had a great weekend!

It seems like you have managed to stay on track. You should be proud of yourself!

Now it's time to kickstart your week with a new e-Session. Here's a link to your account: https://digitalhealth.uvic.ca/eip2/login

The topics this week consists of 3 important topics:

- **Canada's Food Guide**
- **Healthy Food Choices**
- **Healthy Eating on a Budget**
- **Be a Good Role Model**

As for **Family Challenges** this week, try to aim for one **healthy eating activity** or **one physical activity** challenge.

Don't forget to indulge yourself in healthy **Recipes** this week:
- You can create your own **stir-fry**
- **Grab & go fruit**

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section **HERE**.

Have fun with your e-Session this week and please let me know if you have any questions.

Dimas
The Generation Health Team

WEEK 4
Your week 4 e-Session is now available on the Family Portal!

Hello,

Hope you could recharge yourself last weekend!

I'd like to start this week with words of appreciation because you have managed to stay this far. Your efforts are appreciated and valued. Thank you for staying on track!

Click **HERE** to access your account.
Here are 3 topics you'll find interesting this week:

- **Be Aware of Food Marketing**
- **Busting Food Labels**
- **Sugary Drink Sense**

We have created something fun you can do with your family this week – **at the supermarket**! Click **HERE** to dig deeper into it:

Remember to try to do at least **one challenge** this week. Better yet, you can even create your own physical activity/healthy eating challenge this week!

Some healthy and yummy **Recipes** to try this week:

- **Black bean, corn & tomato soup**
- **Color your plate with BC veggies**

Sharing is caring, so feel free to share your thoughts or ask questions in the **Forum**.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section here:

I'm ready to answer any questions you have as well if you prefer to do so. You can reach me at **digitalhealth@uvic.ca**.

Have fun doing all healthy things this week!

Dimas
The Generation Health Team

WEEK 5

Email 5
Your week 5 e-Session is now available on the Family Portal!

Hello,

How was your weekend? I hope you managed to spend some quality time with your loved ones and are now ready to start a fresh week!

Before we move on, I would like to personally congratulate you on reaching a milestone this week. Yes, it's week 5, meaning you're almost halfway there! I know it's not always easy to stick to the program., but you are capable and competent and I am proud of you!

Click **HERE** to access your account.

We have provided interesting lessons for you this week:

- **Understanding body image and self-confidence**
- **Developing a positive body image**
- **Building Your Exercise Identity**
- **Body Self-Compassion and Appreciation**

We have provided some family challenges you can do together this week! This week, try to do **at least one mental health challenge**, **one physical activity challenge** or **create your own challenge.**

My team and I tried these **Recipes** last week and we all loved them! You can give them a try as well:

- **Raspberry yogurt flan**
- **Cheese pleaser**

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the Diary section **HERE**.

Once again, congratulations on reaching week 5! Have fun with your e-Session this week and please let me know if you have any questions.

Dimas
The Generation Health Team

WEEK 6

Email 6
Your week 6 e-Session is now available on the Family Portal!

Hello,

You are now in the second half of your program! It is not always easy to stick to it because I know sometimes life gets in a way, but you are doing well. Good job!

Click **HERE** to access your account.

We have provided some inspiring lesson topics for you this week. Here they are

- **Creating a positive family mealtime**
- **Qs and As about eating together**
- **Get pre-teens and teens to the table**
- **Practice mindful eating**

This week, try to do at least one **healthy eating challenge**, one **physical activity challenge** or **create your own challenge.**

Also, this week's **Recipes**, oh just heavenly! Give them a try:
- **Salmon cakes**
- **Quinoa salad with pears, feta & herbs**

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section.

Have fun with your e-Session this week and please reach out to me at digitalhealth@uvic.ca if you have any questions.

Regards,

Dimas
The Generation Health Team

WEEK 7

Email 7
Your week 7 e-Session is now available on the Family Portal!

Hello,

Thanks for completing last week's e-Session. Great effort!

Click **HERE** to access your account.

There are several interesting areas to focus on this week. Here they are:

- **Rate your family's eating style**
- **Family meals, culture, and food traditions**
- **Physical activity barriers**
- **Taking it outdoors**

Try to do **one healthy eating** or **one physical activity challenge.** You can also **create your own challenge** if there is something your family would like to work on.

Have you heard of **ants on a log** and **crock pot lasagna**? Find them in **Recipes** of the week:

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section.

Enjoy your e-Session this week and let me know if you have any questions.

Regards,

Dimas
The Generation Health Team

WEEK 8

Email 8
Your week 8 e-Session is now available on the Family Portal!

Hello,

How was your weekend? I hope you managed to be active with your loved ones.

Click **HERE** to access your account.

Let's keep moving this week! This week's focus is on positive parenting, sleep hygiene, and brainiacs. Here are useful articles you:

- **Sleep hygiene**
- **How can live 5-2-1-0+ support better sleep?**
- **Brain gain**

Family Challenges this week has 4 options you can choose from. Remember to try to aim for one **one physical activity** or **one positive mental health** activity.

Some healthy and yummy **Recipes** to try this week:

- **Chicken sandwich**
- **Yummy hummus**

The **Forum** is always available if you feel like sharing some ideas, thoughts or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section.

I'm ready to answer any questions you have as well if you prefer to do so. You can reach me at **digitalhealth@uvic.ca**.

Have fun doing all healthy things this week!

Dimas
The Generation Health Team

WEEK 9

Email 9
Your week 9 e-Session is now available on the Family Portal!

Hello,

I hope your weekend was fantastic!

Did you realize that you have reached week 9? It's not always easy to stay on track, so I'd like to take this opportunity to congratulate you!

Click **HERE** to access your account.

You're going to enjoy this week as we're learning about cooking and playing together. What does it look like? Let's move on!

- **Habits**
- **Getting kids in the kitchen**
- **Cooking with kids**
- **From beef to beans**

As for **Family Challenges**, you've got 4 options to choose from this week. You know how it works: try to do **at least one healthy eating** or **one physical activity challenge**. You can **also create your own challenge** if there is something specific your family would like to work on.

Don't forget to indulge yourself in healthy **Recipes** this week:

- **Salmon dip**
- **Friendship fruit salad with lemon yogurt sauce**
- **Oatmeal pancakes**
- **Yogurt pops or fruit kabobs**

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions.

If you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section.

Have fun with your session this week and please let me know if you have any questions.

Dimas
The Generation Health Team

FINAL WEEK

Email 10
Your FINAL WEEK e-Session is now available on the Family Portal!

Hello,

Congratulations on reaching the **FINAL WEEK** of the program! It's been a journey! I hope you and your family have enjoyed this experience and found the lessons informative and valuable. Great work!

Click **HERE** to access your account.

To celebrate your awesomeness, I'd like to dedicate this week to encourage you to continue your positive change. Check out these articles I've provided for you:

- **Identity**
- **Exercise identity**
- **Set guidelines for active living and sleep**
- **Set guidelines for healthy eating**

As for **Family Challenges**, you've got 4 options to choose from this week. You know how it works: try to aim for one **healthy eating activity**, **one physical activity,** and **one mental health activity**. You can also **create your own challenge** if there is something your family would like to work on in your final week.

Don't forget to indulge yourself in healthy **Recipes** this week:

- **Yogurt pops or fruit kabobs**
- **Skillet chilli**

The **Forum** is always there if you feel like sharing your thoughts, experience or asking questions, but if you want to keep them for yourself, we have provided a platform for that purpose as well in the **Diary** section.

Have fun with your session this week and please let me know if you have any questions.

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Appendix J. Examples of weekly e-Session on the Portal.