PARENTS, PRACTITIONERS, AND PUBLIC HEALTH FOR A HEALTHY FAMILY ENVIRONMENT: A PILOT EVALUATION TO PROMOTE HEALTHY WEIGHT IN CHILDREN

by

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Abstract

Given that childhood obesity has become a public health concern, the development and implementation of effective interventions addressing this issue are needed. Research suggests that the use of a parent-only approach is an effective way to improve the home and family environment to promote healthy weight in children. Moreover, by improving parents’ physical activity and eating behaviours children’s behaviours may also be improved. Primary care interventions have been shown to be effective for enhancing physical activity in adults, especially when using physical activity prescriptions and referrals to community programs. No studies have combined these two interventions to explore the possibility of an added-value effect relative to the promotion of a healthy family environment conducive to healthy weight in children. Therefore, the purpose of this study was to compare the effectiveness of a combined primary care-parent-only intervention with a primary care intervention alone for improving the home and family environment and mothers’ physical activity behaviours relevant to the promotion of healthy weight in children.

Female patients (N = 35) were randomly assigned to one of three conditions: Prescription Plus (PP), Prescription Only (PO) and Usual Care (UC). The PP group received a physical activity prescription plus a referral to a parent-only intervention, the PO group received just the prescription, and the UC group, regular health care. Outcome variables were physical activity, the obesogenic home environment, mother’s confidence for making obesity related changes, exercise/physical activity self-efficacy and outcome
expectations, and self-regulation and perceived competence for exercise. All the measures were self-reported and were assessed before and eight weeks after the intervention.

A 2 x 3 mixed analysis of variance showed no significant group differences at post-intervention. Only a significant time * intervention interaction was observed ($p = .03$), where the PP group achieved the largest effect (partial $\eta^2 = .200$) in the obesogenic home environment score after receiving the intervention. These findings suggest that the combined primary care-parent-only intervention was effective for improving the home environment and provide preliminary insight into the effectiveness of such an intervention for influencing healthy weight in children.
Co-Authorship

This thesis presents the original work of Karla Galavíz in collaboration with her advisor, Dr. Lucie Lévesque.
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Chapter 1

Introduction and Literature Review

1.1 Background and Rationale

1.1.1 Childhood Obesity

Childhood overweight and obesity are increasing in prevalence around the world (Lobstein, Bauer, & Uauy, 2004). In Canada, 26% of children and adolescents between the ages of 2-17 years are overweight or obese (Shields, 2004). The presence and severity of childhood obesity as a risk factor for developing cardiovascular and other chronic health problems is well established (YoonMyung & SoJung, 2009). Children and adolescents affected by obesity are at risk of developing cardio-metabolic problems such as adverse lipoprotein profiles, diabetes mellitus, atherosclerotic cerebrovascular disease, coronary heart disease, colorectal cancer, and death from all causes (Dietz, 1998; Lobstein et al., 2004). This is alarming and because childhood overweight and obesity represent a greater risk of obesity in adulthood (Power, Lake, & Cole, 1997), many efforts have been directed toward battling obesity in young populations.

According to Barlow and Dietz (1998), obesity in childhood and adolescence has become one of the most complicated diseases to treat (Barlow & Dietz, 1998). Even though there is a debate about whether or not obesity is a disease or a risk factor (Heshka & Allison, 2001), extensive evidence suggests that a number of physical ailments and psychosocial issues are associated with this condition (Ball & McCargar, 2003). The
main factors that have been identified as responsible for the growing prevalence of childhood obesity are increased energy content in the diet, decreased levels of physical activity, increased sedentary lifestyles, and several cultural and environmental factors (Summerbell et al., 2009).

Research has shown that children and adolescents whose consumption of fruits and vegetables is frequent (5 or more times a day) are less likely to develop weight problems than those whose consumption is less frequent (Shields, 2004). Moreover, time spent in sedentary activities such as television viewing and videogame use has been found to be strongly associated with increased adiposity in children (Robinson, 1999). In contrast, physical activity has been shown to protect children from being overweight or obese (Tremblay & Willms, 2003). Finally, environments that are obesogenic, that is, environments that promote unhealthy eating and physical inactivity that make it difficult for children to maintain a healthy weight, are also associated with childhood obesity (Golan & Weizman, 2001; Hill & Peters, 1998).

In the battle against childhood obesity, efforts have been directed toward the development and implementation of interventions that are aimed at targeting the aforementioned behaviours and obesogenic environments. Although many of these interventions have not been effective in preventing weight gain, they have succeeded in promoting healthy diets and physically active lifestyles among children (Summerbell et al., 2009). Furthermore, most of these interventions have achieved better outcomes when using behaviour change theories for improving children’s obesity-related behaviours.
(Epstein, 1996). With regards to obesogenic environments, some interventions have focused on improving the home environment and have been effective for decreasing the obesogenic factors present in that setting (Golan, Kaufman, & Shahar, 2006).

1.1.2 Family-based interventions

Although there is inconclusive evidence about the best strategy for preventing unhealthy weights in children, the use of family-based interventions is one strategy that has been shown to achieve positive results (Epstein, 1996). According to Kitzmann and Beech (2006), “a family-based intervention is one that includes at least one parent as an integral part of the intervention, where the parent is considered an active and essential component of the treatment” (p. 176). Furthermore, these interventions are usually directed at changing the behaviour of multiple family members, instead of targeting only the child (Kitzmann & Beech, 2006). It has been suggested that parental involvement leads to more favourable results in the prevention and treatment of childhood obesity, given that they shape the family physical activity and healthy eating environment (Story, 1999). Compared to programs that do not include parents, obesity prevention programs that incorporate parental involvement have shown enhanced intervention effects upon children and youth (Stice, Shaw, & Marti, 2006).

There are several reasons for including parents in interventions aimed at the promotion of healthy weight in children. First, the role of parents is critical to the development of a home environment that enhances opportunities for healthy eating and physically active lifestyles among children and adolescents (Lindsay, Sussner, Kim, &
Hence, parents are crucial in avoiding the development of an obesogenic home environment. Second, health-related behaviours such as physical activity and fruit and vegetable consumption can be modelled and supported by parents, which has been proven to influence those same behaviours in children (Pearson, Timperio, Salmon, Crawford, & Biddle, 2009). Finally, parents represent the primary mediator of change for children (St. Jeor, Perumean-Chaney, Sigman-Grant, Williams, & Foreyt, 2002); therefore, by targeting parents, chances for changing children’s behaviours improve.

Studies suggest that family-based interventions are a promising avenue for improving obesity related behaviours in children (Young, Northern, Lister, Drummond, & O’Brien, 2006). However, research on family involvement is sparse (McLean, Griffin, Toney, & Hardeman, 2003), and a debate exists on whether parents and children should be targeted together or separately. Previous research shows that interventions that target parents and children together are better in terms of weight loss and behavioural changes (Epstein, Valoski, Wing, & McCurley, 1994). On the other hand, some interventions have been shown to be effective in achieving weight loss and behavioural change by targeting only parents (Golan, Weizman, Apter, & Fainaru, 1998). Finally, interventions in which both parents and children are targeted, but in separate groups, have been shown to achieve positive outcomes as well (Beech et al., 2003; Nader et al., 1989). The latter strategy has been recommended when targeting both parents and children, given the cognitive development differences related to age (Berry et al., 2004).
In any case, it has been suggested that the role of parents in helping their children to attain and maintain healthy behaviours is crucial, and because of that, they should be part of interventions addressing obesity in children (Barlow & Dietz, 1998). The role of parents however, changes as children grow. For young children, parents should be the main recipients of the intervention given that they represent the primary influence shaping children’s behaviours (Lindsay et al., 2006). For older children and adolescents, it becomes important to intervene with parents and children separately given that additional psycho-social and environmental factors shape youth behaviours (Meriwether, Lobelo, & Pate, 2008).

Overall, reported positive outcomes achieved with family-based interventions are improvements in body mass index, on waist circumference, and on dietary habits and sedentary behaviours (Beech et al., 2003; Robinson et al., 2003; Story et al., 2003). Furthermore, improvements in fitness levels (Ransdell et al., 2003), self-perceptions toward physical activity competence, and physical condition (Ransdell, Drat, Kennedy, O'Neill, & DeVoe, 2001) have also been observed. Finally, increases in knowledge about physical activity and healthy eating, improvements in LDL cholesterol levels (Nader et al., 1989), and improvements in blood pressure and weight status (Brownell, Kelman, & Stunkard, 1983) have also been reported.
1.1.3 Interventions Targeting Parents Only

Existing research supports the use of interventions for the improvement of parental skills for preventing (Stolley & Fitzgibbon, 1997) and treating (Israel, Stolmaker, & Andrian, 1985) obesity in children. A strategy that has been studied is the parent-only approach in which parents are considered the principal agent for changing the factors that affect weight gain in children (Golan & Crow, 2004). In this familial approach, behavioural and environmental change is delivered through parents emphasizing the adoption of a healthy lifestyle rather than weight reduction (Golan & Weizman, 2001).

Golan and colleagues (2006) cite several reasons in support of the use of a parent-only approach. Given that children tend to resist change, it becomes important to target parents and deliver the change through them rather than through the child. Through parents, obesogenic factors in the home environment can be decreased, resulting in better chances for children to maintain a healthy weight. Obesogenic factors in the home environment include the family’s physical activity and sedentary behaviours, the stimulus exposure to unhealthy food, and the family’s eating practices. Given that all of these obesogenic factors are under the control and influence of parents, it makes sense to target parents as the main agents through which these obesogenic factors can be reduced to create a healthier home environment that promotes healthy behaviours among children. Another reason for using a parent-only approach is that it is better to have only one agent of change rather than multiple agents in order to avoid confusion about responsibility for
change among family members. For example, when both parent and child are intended for change, parents might impose an excessive amount of the responsibility for changing on the child, which can interfere with the behaviour change process. Finally, a parent-only intervention can be more cost-effective than other strategies for addressing obesity in children (Golan et al., 2006).

Studies implementing the parent-only approach have achieved positive outcomes and provided important evidence about the effectiveness of such an approach. Golan and colleagues (1998) implemented an intervention for treating obese children in which participants were randomly assigned to one of two conditions: the parents as agents of change group and the children as agents of change group. The parent group received 14 educational sessions on how to reduce the obesogenic home environment by altering the family sedentary lifestyle, providing a prudent diet, and decreasing the family's exposure to food stimuli. Moreover, parents in this group were taught how to apply behavioural modifications, parental modelling, cognitive restructuring, and coping with resistance. In the children group, each child was provided with a prescribed diet and attended 30 educational sessions on how to follow a prudent diet, restrict energy intake, increase exercise, control food stimuli, techniques in self-monitoring, practice problem solving and cognitive restructuring, and make use of social support. After one year of intervention, the parent group achieved significantly greater improvements in the obesogenic home environment and a greater child weight reduction than the children group (Golan, Fainaru, & Weizman, 1998).
In another study about the parent-only approach, Golan and colleagues (2006) randomly assigned participants to one of two groups: the parent-only group and the parent-child group. The intervention was the same for both groups, but in the first group, only parents were treated whereas in the second group parent and child dyads were treated together. The intervention included 16 educational sessions during six months and it was aimed at reducing the obesogenic home environment by emphasizing healthy eating patterns, encouraging daily physical activity, and decreasing sedentary behaviours. Parents in both groups were trained to use an authoritative feeding style in which parents are both firm and supportive and assume a leadership role in the environmental change in a way that respects the autonomy of the child. Results showed that the parent-only intervention achieved a significantly greater reduction in the obesogenic home environment and in the percentage of child overweight than the parent-child group at the end of the program and at one year follow-up (Golan et al., 2006).

Janicke and colleagues (2008) conducted a study investigating a behavioural family-based intervention with three groups: parent-child dyads, parent-only, and control. Parent-child dyads received the same intervention and participated in simultaneous, but separate groups. For both, parent-only and parent-child groups, ninety-minute weekly sessions were held during the first eight weeks, and then biweekly sessions were conducted for the next eight weeks. Changes in dietary habits were promoted by using a modified version of the stoplight diet where “red light” represented limiting the consumption of high-fat/high-sugar foods and “green light”, increasing fruit and
vegetable intake. Physical activity was encouraged through a pedometer-based step program. After 10 months, children in both treatment conditions demonstrated greater decreases in body mass index than those in the control condition. No significant difference was observed in weight status change between the parent-only and parent-child interventions at either assessment (Janicke et al., 2008). Given that the cost of an intervention increases as do the number of targets involved, these findings suggest that a parent-only intervention can be more cost-effective than a parent-child intervention for promoting healthy weight in children (Janicke et al., 2009).

Of the research that supports using parent-only interventions, the evidence suggests that mothers are the better target. First, maternal obesity is the most significant predictor of childhood obesity (Strauss & Knight, 1999). Second, mothers typically exert strong influence over their children’s weight (Johannsen, Johannsen, & Specker, 2006) and over their children’s health-related attitudes and behaviours (Mechanic, 1964). Finally, mothers make most of the food and activity decisions for their families, which influences their children’s and partners’ physical activity and eating behaviours (Trost et al., 2003). Hence, targeting mothers to promote healthy weight has the potential to achieve significant health benefits for themselves and their families (Lombard, Deeks, Ball, Jolley, & Teede, 2009).

1.1.4 Social Cognitive Theory

The use of behaviour change theories in interventions addressing childhood obesity is crucial for promoting the adoption and maintenance of behaviours such as
healthy eating and physical activity (Berry et al., 2004). The parent-only approach proposed by Golan and Weizman (2001) is guided by the Social Cognitive Theory (Bandura, 1986), which is based on the premise that people learn by observing others and by acquiring knowledge via cognitive processing of information. This theory posits that the learning process is influenced by the interaction among cognition (personal factors), behaviour, and environmental factors. Thus, Social Cognitive Theory (SCT) focuses on enhancing cognition and knowledge to establish control over one’s behaviour.

In the parent-only approach, SCT plays an important role given that it offers a framework for teaching parents how to be proper social models for enhancing imitation, which is crucial for the learning process of a new behaviour. Moreover, SCT posits that psychological constructs, such as self-efficacy and outcome expectations, are fundamental for acquiring healthy behaviours and for enhancing behaviour change (Bandura, 1986). Self-efficacy is the belief about one’s ability for performing a given behaviour, and has been found to be a consistent determinant of physical activity behaviour (Culos-Reed, Gyurcsik, & Brawley, 2000). Outcome expectations are beliefs about the anticipated consequences of performing a given behaviour, and existing research suggests that this construct is a good predictor of physical activity behaviour (Dawson, Gyurcsik, Culos-Reed, & Brawley, 2001). Therefore, these two constructs are often targeted in behavioural interventions framed on SCT such as the parent-only intervention.
The most relevant studies investigating the parent-only approach are those conducted by Golan and colleagues (2001) to assess the effectiveness of a model based on SCT in which the intervention is aimed at inducing parental cognitive-behavioural change, environmental change, and modelling (Figure 1). The strategies intended to induce parental cognitive-behaviour change are focused on increasing parental nutrition and physical activity skills and improvements in parenting skills. The strategies used at the environmental level are aimed at creating an environment in the home free of obesogenic factors for facilitating the adoption of a healthy lifestyle. Given that the family provides the major social learning environment for the child, parents serve as proper social models at the home in order to enhance learning and adoption of new healthy behaviours (Golan & Weizman, 2001). Hence, in the parent-only approach, parents are the main agents of change because they can induce change by modelling appropriate lifestyle behaviours, by inducing environmental change, and by promoting healthy habits among their children (Golan & Weizman, 2001).
It has been established that parents’ physical activity behaviours influence their children’s behaviours through different mechanisms such as modelling and parental support (Trost et al., 2003). Furthermore, studies have shown that parents’ physical activity levels are positively correlated with children’s physical activity levels (Moore et al., 1991). Based on this, it can be argued that children with active parents are more likely to be active than children with inactive parents. Given that more than half of the adult population in Canada has been identified as inactive (Liu, Wade, Faught, & Hay,
2008) and many of them are parents, it becomes important to investigate interventions to improve parents’ physical activity behaviours which in turn could benefit children’s behaviours.

1.1.5 Primary Care Interventions

Primary care interventions for promoting physical activity in adults have been investigated given the potential of this setting for improving patients’ health behaviours (Whitlock, Orleans, Pender, & Allan, 2002). Furthermore, health care professionals come into contact with a high proportion of the population (Tulloch, Fortier, & Hogg, 2006) and they are thought to be a very credible source of health advice (Dugdill, Graham, & McNair, 2005). Therefore, primary care interventions have become a promising avenue to promote physical activity. A primary care intervention is an intervention implemented in a primary care setting where a health care professional is the main vehicle through which the intervention is delivered. Among health care professionals, physicians have been preferred as the main contact for delivering interventions to address the problem of inactivity in the population (Tulloch et al., 2006) given that their role can be crucial in motivating and assisting patients in their efforts to improve health-related behaviours (Whitlock et al., 2002). The most common ways in which physicians can intervene are by offering physical activity counselling (Jimmy & Martin, 2004), by giving physical activity written prescriptions (Swinburn, Walter, Arroll, Tilyard, & Russell, 1998), and by offering referrals to physical activity programs (Leijon, Bendtsen, Nilsen, Festin, & Ståhle, 2008) or to physical activity counsellors (Fortier et al., 2007).
Given the success that primary care interventions have shown, these strategies have been implemented in many parts of the world. In the United Kingdom, a strategy called “exercise referral schemes” has been introduced. This strategy involves a referral by a physician to a tailored physical activity program that includes an initial assessment and subsequent monitoring (Morgan, 2005). In Sweden, a similar strategy, the “physical activity referral schemes” (PAR) has been implemented. These schemes involve a physician referral to physical activity programs, a physical activity prescription, local networks, and collaboration with physical activity organizations in the local community (Leijon, Bendtsen, Nilsen, Ekberg, & Ståhle, 2008).

In New Zealand, “the green prescription” strategy has been implemented, which entails the physician offering a physical activity prescription to patients during consultations (Swinburn et al., 1998). In Canada, the Physical Activity Counselling (PAC) project was introduced and evaluated in the primary care setting. In the PAC intervention, patients received brief physical activity counselling and a prescription from their physicians, and they were then referred to a physical activity counsellor for more specialized counselling (Fortier et al., 2007). A similar model was recently used in the PROACTIVE trial (Ross et al., 2009).

Finally, a strategy called the Physician-based Assessment and Counselling for Exercise (PACE), has been developed in the United States to overcome the barriers that prevent physicians from offering physical activity advice and counselling to sedentary adults (Patrick et al., 1994). In the PACE intervention, physicians are trained to offer
physical activity counselling to their patients by using the stages of change model (Prochaska & DiClemente, 1982). During the consultation, physicians offer brief physical activity counselling and complete a physical activity plan based on patients’ stage of change (Calfas et al., 1996). This strategy has also been implemented in Canada. In collaboration with the United States PACE team, the Canadian Fitness and Lifestyle Research Institute developed PACE Canada, an adapted version of the original project to the Canadian context.

It has yet to be determined which of these interventions is the most effective in increasing adult patients’ physical activity. However, each intervention has shown to achieve positive outcomes in different conditions and with diverse populations. Taylor and colleagues (1997) conducted a study to evaluate the effectiveness of an exercise referral scheme upon changes in adult physical activity, blood pressure, smoking habits, and body composition over a nine month period. Patients were given a signed prescription card with the reason for the referral and other information to take to a local leisure centre to arrange an appointment. An introductory session included a lifestyle assessment, a brief discussion about exercise perceptions, and some training in how to use the different exercise machines. Patients attended the local centre informally, but were encouraged to increase the intensity and duration of their exercise and were given extra advice when they requested it. Referral to the exercise program led to short-term increases in physical activity, reductions in the sum of skinfolds, and decreases in blood
pressure in 40-70 year old men and women identified as smokers, hypertensive, or overweight (Taylor, Doust, & Webborn, 1998).

In a study implementing a PAR, patients whose health status would benefit from increased physical activity were provided with a physical activity prescription and referred to a facility-based and a lifestyle-based physical activity program. Referred patients were contacted by telephone after five weeks to check their attendance and to motivate them to continue. After three months, the proportion of inactive patients declined and was maintained after 12 months. Moreover, patients reported increased levels of physical activity at 3 and 12 months after being referred (Leijon et al., 2008).

In a study by Elley (2009), general practitioners were prompted to give oral and written advice (the green prescription) on physical activity during usual consultations. Patients were contacted three times in three months by exercise specialists to receive support and advice about exercise. Patients were referred to community groups when appropriate. Results showed that the green prescription in primary care was effective for increasing participants’ physical activity and for improving their quality of life over 12 months (Elley, Kerse, Arroll, & Robinson, 2003).

Finally, in a study by Norris and colleagues (2000), physicians were trained to deliver the PACE intervention during an intake visit and to offer additional support by telephone to inactive patients 30 years and older. At the waiting room, patients were asked to complete a form to determine their PACE score and stage of change, and to fill out the Physical Activity Readiness Questionnaire. After this, patients were given a sheet
containing physical activity information relevant to their stage of change, the benefits of physical activity, and tips for dealing with barriers for being physically active. Physicians then counselled patients following the PACE protocol appropriate for the patient’s stage of change, reviewed their information sheet, and gave the patient a physical activity prescription. Patients received a telephone call from a research assistant four weeks after the intake visit to reinforce the initial counselling protocol. Although the intervention group showed higher PACE scores than the control group after six months, these groups did not differ significantly in physical activity levels (Norris, Grothaus, Buchner, & Pratt, 2000).

Overall, each of these intervention strategies has achieved some improvements in participants’ physical activity behaviours and it is important to mention that these interventions share one common characteristic: a physical activity prescription. This is a popular strategy given that a prescription represents a well understood interaction between the patient and the physician (Becker, 1974). Furthermore, a prescription represents a tangible reminder of the physical activity goals set between the patient and the physician (Swinburn et al., 1998). Research has shown that physical activity prescriptions are well accepted by physicians and by their patients (Aittasalo, Miilunpalo, Kukkonen-Harjula, & Pasanen, 2006), and that prescriptions represent a feasible and effective strategy for increasing physical activity (Sorensen, Skovgaard, & Puggaard, 2006). Still, it appears that by using a physical activity prescription combined with a referral to a physical activity program or counsellor, improved outcomes can be achieved.
In addition, this strategy can help overcome physician barriers to offering physical activity counselling such as lack of time, lack of knowledge, and lack of institutional support (Tulloch et al., 2006).

1.1.6 The PAC Intervention and the 7-As Model

The Physical Activity Counselling (PAC) intervention was introduced to address physical inactivity among adults in a primary care setting. The PAC intervention model is founded on Self-determination Theory (Deci & Ryan, 1985) and its counselling protocol is based on the 7-As model (address, ask, advice, assess/agree, assess, assist, and arrange). This novel strategy combines brief counselling offered by a physician, a physical activity prescription, and a referral to a physical activity counsellor. The PAC intervention was designed to enhance patients’ autonomous regulation and perceived competence, both constructs from Self-determination Theory that have been shown to mediate physical activity behaviour change (Fortier et al., 2007).

The 7-As model for physical activity counselling (Figure 2) introduced by Fortier and colleagues (2007), is an extended version of the original 5-As model (assess, advise, agree, assist, and arrange) for lifestyle change counselling in primary care (Elford, Yeo, Jennett, & Sawa, 1994). The 7-As model is a patient-centred model, that is, a model focused on promoting the patient’s autonomy and on creating a collaborative environment where decisions are made by both the physician/counsellor and the patient. This model was developed to assist physicians in offering physical activity counselling and to provide a framework where physical activity counsellors can be integrated in the
The 7-As are shared by physicians and physical activity counsellors, which promotes a collaborative interdisciplinary shared care approach. The first 4-As of the model (address, ask, advice, and agree) are implemented by the physician in a brief intervention during a regular consultation where the physician refers the patient to a physical activity counsellor who implements the last 3-As (assess, assist, and arrange) of the model.

The PAC intervention has been found to be effective for improving patients’ physical activity behaviours. In a study investigating PAC, participants were randomly assigned to either a brief physical activity counselling (BPAC) group or an intensive physical activity counselling (IPAC) group. In the BPAC group, patients received a 5-minute physical activity counselling using the first 4-As (address, ask, advise and agree), and a tailored physical activity prescription from a physician. In the IPAC group, patients received the BPAC plus six additional counselling sessions with a trained physical activity counsellor during three months. During these sessions, the counsellor delivered the last 3-As of the model (assess, assist, and arrange) through three face-to-face encounters and via three telephone calls. Results showed higher levels of autonomy support and autonomous motivation at six weeks as well as higher levels of physical activity at 13 weeks in the IPAC group (Fortier, Sweet, O’Sullivan, & Williams, 2007).
Figure 2. The 7-As model for the interdisciplinary shared care approach for physical activity counselling in primary care (Fortier et al, 2007).

- Address
  - Position physical activity in the topics to be discussed
  - Agree on agenda

- Ask
  - Ask patient about their physical activity level
  - Verify PAR-Q to make sure it is safe for patient to exercise

- Advise
  - Advise patient to increase their physical activity
  - Relate it to their particular health problems

- Assess
  - Assess patients’ readiness to change
  - Reach agreement with the patient about an appropriate 1-month physical activity goal

- Agree
  - Write a physical activity prescription
  - Assess patient’s willingness to see a counsellor
  - Refer patient to a physical activity counsellor

- Assist
  - Explore/enhance readiness to change
  - Discuss/agree on a physical activity long term goal
  - Assist in developing a tailored action plan

- Arrange
  - Arrange a follow up appointment to assess progress and any issues that arise

PAC = Physical Activity Counsellor
1.1.7 Self-Determination Theory

The PAC intervention is framed on the Self-determination Theory (Deci & Ryan, 1985), which provides a theoretical framework for guiding interventions aimed at enhancing behaviour change. Self-determination Theory (SDT) is a theory of human motivation that is focused on explaining to what extent human behaviours are self-determined, that is, a result of one’s free will and full sense of choice, without any external influence. This theory states that regulation for human behaviour can be autonomous (intrinsic) or controlled (extrinsic), which determines the extent to which regulatory processes are self-determined. Autonomous regulation involves experiencing a full sense of choice where one’s behaviours are influenced by intrinsic desires. In contrast, controlled regulation involves experiencing pressure or coercion where one’s behaviours are influenced by extrinsic factors (Williams et al., 2002).

In the SDT, three psychological states are theorized to facilitate self-determined behaviour change: perceived competence, autonomous regulation, and relatedness (Deci & Ryan, 2000). Perceived competence, the perception of one’s ability to effectively perform a given behaviour, has been found to be an important predictor of health behaviour change (Williams, Freedman, & Deci, 1998). Autonomous regulation comes from within oneself without the influence of external sources. Evidence suggests that autonomous regulation is predictive of behaviour change in several health conditions and that it is modifiable from an intervention standpoint (Fortier et al., 2007). According to SDT, people who have high levels of autonomous regulation and who feel competent that
they can attain the desired outcome, are most successful at adopting a health behaviour such as physical activity (Fortier et al., 2007). Finally, relatedness is the need to interact and be connected with others who can offer social support for changing the desired behaviour. Relatedness has thus far not been included as a separate construct in interventions developed for the health care domain because the time that patients spend with their physicians is limited (Williams et al., 2002). Therefore, the association between relatedness and health-related behaviour change in a health care setting is yet to be determined.

Considerable effectiveness has been demonstrated by the SDT in explaining physical activity motivation and behaviour (Haggera & Chatzisarantis, 2008) and in predicting physical activity behaviour change (Fortier & Kowal, 2007). Thus, SDT offers a framework for improving physical activity behaviours and has been used for guiding interventions in primary care settings.

1.2 Summary

Given that childhood obesity has become a public health problem, the development and implementation of effective interventions addressing this issue are needed. Research suggests that the use of a parent-only approach is an effective way to improve the home and family environment to prevent and treat childhood obesity (Golan & Crow, 2004). Furthermore, through such an approach, parental physical activity and eating behaviours can be improved, which in turn, can influence these behaviours in children (Pearson et al., 2009). Primary care interventions have been shown to be an
effective way to improve physical activity behaviours among adults. Specifically, physical activity prescriptions and referrals to community programs have been shown to offer positive results (Leijon et al., 2008; Swinburn et al., 1998). Despite research suggesting that these two strategies are effective, no studies have combined them to explore the possibility of an added-value effect relative to the promotion of a healthy family environment conducive to healthy weight in children.

1.3 Study Purpose

The purpose of the present study was to compare the effectiveness of a combined primary care-parent-only intervention with a primary care intervention alone for improving the home and family environment and mothers’ physical activity behaviours relevant to the promotion of healthy weight in children.

1.4 Hypotheses

It was hypothesized that, compared to mothers receiving only a physician delivered physical activity prescription and mothers receiving usual care, mothers receiving a combined primary care-parent-only intervention would be more likely to decrease obesogenic features of their home environment, and to improve their confidence for making obesity related changes, self-efficacy, outcome expectations, perceived competence, autonomous regulation, and physical activity levels. Improvements on physical activity levels were expected to be better in mothers receiving only a physician delivered physical activity prescription when compared to mothers receiving usual care.
Chapter 2

Method

2.1 Study Context

The Motiv8 Community Series

In response to the 2004 report by the Chief Medical Officer of Health of Ontario, Healthy Weights, Health Lives, Kingston, Frontenac and Lennox & Addington (KFL&A) Public Health launched the Motiv8 Initiative, a community based comprehensive health promotion program. Motiv8 was developed to be a multi-level health promotion initiative targeting adults aged 18-64 years through several community settings, with the purpose of reducing the incidence of overweight and obesity, and chronic disease in KFL&A area. The initiative was labelled “Motiv8” because it represents the following 8 “evidence-based” healthy lifestyle behaviours: 1) eat a healthy breakfast every day, 2) re-think your snack, 3) be active every day, 4) choose water, 5) enjoy more fruit and vegetables, 6) make meals at home, 7) breastfeed your baby, and 8) watch less television.

The Motiv8 initiative was launched in January 2008 and was first implemented as the Motiv8 Workplace Series, a 6-week program aimed at getting employees interested in improving their health behaviours through educational sessions offered at their workplaces. In the winter of 2009, KFL&A Public Health also developed the Motiv8 Community Series, a similar 8-week program offered at the Public Health Unit facilities, aimed at helping participants to improve their physical activity and eating behaviours.
The program vision is that with a supportive environment, adults can increase awareness, enhance motivation, and build skills to improve their health and pass these healthy habits on to their children. In order to promote the Motiv8 community series, the Motiv8 team contacted a local family medicine clinic to recruit participants via a physical activity prescription.

**Kingston Gets Active**

Kingston Gets Active (KGA) is a community-wide strategy that aims to raise awareness of the benefits of physical activity and create and enhance opportunities that will enable Kingston residents to be physically active on a regular basis. KGA is a collaboration of education, health, recreation, municipal, military, and social sectors in the Kingston and area community who have been working together since 2005. In 2008, KGA received funding through the Heart and Stroke Foundation of Ontario Community Advocacy fund to implement a physical activity prescription campaign among health care providers who have child and youth patients. The aim of this project was to advocate for health care providers to “prescribe” physical activity using prescription pads.

**Merging Projects**

Given the compatible aims of the Motiv8 Community Series recruitment strategy and the KGA physical activity prescription project, and because the KFL&A Public Health team was a member of KGA, it was agreed that we would implement the two initiatives together. This “natural experiment” offered the opportunity to pilot test the feasibility and effectiveness of both the Motiv8 Community Series and the use of a
physician delivered physical activity prescription. A natural experiment is a public health intervention occurring in a real-life setting and not initiated for research purposes (Petticrew et al., 2005). Natural experiments can offer an opportunity to learn about the effectiveness of an intervention or change in the environment that has occurred without researcher input. Study designs used to assess the impact of natural experiments are typically quasi-experimental (e.g. time-series and pre-/post-evaluations) since treatment conditions are usually assigned to an entire population (Ramanathan, Allison, Faulkner, & Dwyer, 2008).

The current study is a hybrid of a natural experiment and a randomized control trial (RCT) design because randomization to three groups occurred within the context of the community-driven intervention. A partnership with the Queen’s Family Medicine clinic was critical in this regard since it provided the space, administrative support, and physicians who were willing to have their practices randomised to one of three conditions. Each partner provided important resources and knowledge to strengthen the intervention and the evaluation. First, the KFL&A Public Health team developed and implemented the Motiv8 program which was offered as a physical activity resource in the community for referred patients. Moreover, the Motiv8 team designed and printed the physical activity prescriptions for the primary care intervention. Second, the Queen’s Family Medicine team provided the population for the study (physicians and patients), the recruitment materials, and the facilities and resources needed for the primary care intervention. Finally, the School of Kinesiology and Health Studies’ team contributed
scientific evidence to enhance the intervention content, designed the research component, and conducted the data collection and data analysis.

The intervention was aimed at enhancing healthy lifestyles in the family and the home environment in order to promote healthy weight in children by drawing upon two promising strategies for physical activity promotion: primary care intervention and parent-only intervention. This is a novel strategy that to our knowledge, has not been previously evaluated or presented in the literature.

Primary Care Intervention

The primary care intervention was based on the PAC study (Fortier et al., 2007) and guided by SDT (Deci & Ryan, 1985). Moreover, this intervention was designed based on existing evidence supporting this strategy for the promotion of physical activity in primary care settings (Tulloch et al., 2006) and was framed on the adapted 4-As model for physical activity counselling (Figure 3).
Figure 3. The 4-As model for physical activity counselling (adapted from Fortier et al., 2007).

- **Address**: Physician positions PA in the topics to be discussed and agrees with patient on agenda.
- **Ask**: Physician asks patient about her PA level (Part 1 of the prescription).
- **Advise**: Physician determines if it is safe for the patient to engage in physical activities. If Yes, Physician advises the patient to increase her PA and relates it to her particular health problems or situation (Part 2 of the prescription).
- **Agree**: Physician reaches agreement with the patient about 1 short term PA goal based on the FITT principle (Part 3 of the prescription).

Physician signs the PA prescription and:
- Gives the PA prescription to the patient and refer her to the Motiv8 Community Series.
- Gives the PA prescription to the patient.

PA = Physical Activity
The primary care intervention consisted of a physical activity consultation based on the 4-As model offered by a trained physician, a physical activity prescription (for those in the prescription plus condition only), and a referral to the parent-only intervention, which was the Motiv8 Community Series. The 4-As for physical activity counselling were implemented by a physician during a five-minute consultation in the following order: The physician first Addressed the physical activity topic at the beginning of the consultation, then he/she Asked the patient about her current physical activity levels, after that, the physician Advised the patient to increase her physical activity levels and related that to her particular health situation, and finally the physician Agreed on a physical activity short term goal with the patient and gave her Canada’s physical activity guide (www.paguide.com). The physician filled out each section of the physical activity prescription while going through the 4-As and completed it based on the patient’s physical activity goal and on the FITT (frequency, intensity, type, and time) principle. Finally, the physician signed the prescription and referred the patient to the Motiv8 Community Series. The physical activity prescription (Appendix C) was tailored to each participant and it was based on Canada’s physical activity guidelines for adults (Health Canada and Canadian Society for Exercise Physiology, 1998).

Children between 5 and 12 years of age received a child-friendly physical activity prescription (Appendix C) from the physician only if they were accompanying their mother during the consultation. This prescription was the same as the one that mothers received, but tailored for this age group based on the recommendations from Canada’s
Parent Only Intervention

The parent-only intervention was implemented as the Motiv8 Community Series and was guided by the theoretical framework of SCT (Bandura, 1986). Furthermore, this intervention was based on empirical evidence supporting the use of such an approach for addressing childhood obesity (Golan et al., 1998), and guided by the conceptual model of the familial approach for the treatment of childhood obesity introduced by Golan and Weizman (2001).

The Motiv8 Community Series is a program offered by KFL&A Public Health designed to increase awareness, provide motivation, and give opportunities for participants to learn skills for making changes in eating and physical activity behaviours for themselves and their families. The Motiv8 Community Series consists of eight sessions (Table 1), delivered at the KFL&A Public Health facilities. These 90-minute sessions focus on enhancing physical activity and healthy eating by promoting behaviour change, improvements in the family and home environment, and in participants’ confidence in improving their children’s behaviours. The Motiv8 Community Series under study lasted eight weeks starting in February 2010 and ending in March 2010.
Table 1. Motiv8 Community Series session content.

<table>
<thead>
<tr>
<th>Session</th>
<th>Content*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory meeting</td>
<td>Overview of the Motiv8 Community Series; instruction on goal setting and using the log book; provision of the log book to the participant. Session facilitated by one of the Motiv8 Community Series facilitators and research student.</td>
</tr>
<tr>
<td>Session 1</td>
<td>Introductions; review of SMART goals and breaking down barriers; pedometer activity; using a log book effectively. Session facilitated by a Public Health Nurse.</td>
</tr>
<tr>
<td>Session 2</td>
<td>Review goal setting; managing eating behaviour; eating well with Canada’s Food Guide; regular eating patterns; snack demonstration. Session facilitated by a Public Health Dietitian and a Community Food Advisor.</td>
</tr>
<tr>
<td>Session 3</td>
<td>Review goal setting; endurance activities and intensity; flexibility activities; walking exercise; full body stretching routine. Session facilitated by a Public Health Physical Activity Specialist.</td>
</tr>
<tr>
<td>Session 4</td>
<td>Review goal setting; label reading, nutrition facts; packaging claims; virtual grocery tour. Session facilitated by a Public Health Dietitian.</td>
</tr>
<tr>
<td>Session 5</td>
<td>Review goal setting; strengthening activities; using a resistance band; safety considerations; strength training routine; review environmental supports to help make behaviour changes. Session facilitated by a Public Health Physical Activity Specialist.</td>
</tr>
<tr>
<td>Session 6</td>
<td>Review goal setting; benefits and challenges of making supper meals at home; planning family meals; kitchen inventory; shopping; cooking demonstration and taste testing. Session facilitated by a Public Health Dietitian and a Community Food Advisor.</td>
</tr>
<tr>
<td>Session 7</td>
<td>Review goal setting; planning family meals; food storage and safety; making a family menu using Canada’s Food Guide; cooking demonstration and taste testing. Session facilitated by a Public Health Dietitian and a Community Food Advisor.</td>
</tr>
<tr>
<td>Session 8</td>
<td>Review goal setting and breaking down barriers; group discussion on challenges from the program and successes; walking activity; strength training routine; full body stretching routine; celebration; completion of post intervention questionnaires; wrap up and evaluation. Session facilitated by a Public Health Physical Activity Specialist and research student.</td>
</tr>
</tbody>
</table>

*See appendix D for detailed session content.
2.2 Study Design and Methods

The present study was approved by the General Research Ethics Board from Queen’s University and it followed strict ethical standards, procedures, and expectations as per Tri Council Policy (Khaliq, 2002).

2.2.1 Design

A pretest-posttest experimental design with three groups was employed. Participants were randomly assigned to one of three conditions; the Prescription Only (PO) group, who received a physical activity prescription during a consultation with a physician who had received the 4-As training for physical activity counselling; the Prescription Plus (PP) group, who received a physical activity prescription during a consultation with a physician who had received the 4-As training for physical activity counselling plus a referral to the parent-only intervention (Motiv8 Community Series); and the Usual Care (UC) group, who received a consultation, which may or may not have included physical activity as a topic, offered by a physician who had not received the 4-As training for physical activity counselling.

2.2.2 Sampling Recruitment and Eligibility

A convenience sample method was used to recruit mothers who are patients at the Queen’s Family Medicine Clinic. A sample size of N = 150 was determined to be needed based on a power calculation using G*Power (version 3.1.2) with the following parameters: effect size = 0.25, α = .05, power = .90. A small-to-medium effect size was
used in the calculation because it is consistent with effect sizes reported in similar studies (Fortier et al., 2007; Golan et al., 2006).

*Recruitment and Randomization of Physicians*

Physicians were recruited on Sept 28th 2009 during the Grand Rounds meeting, which is held once a week for the Queen’s Family Medicine team to discuss topics relevant to the clinic. At this meeting, this study research was presented to 35 primary care providers (14 nurse practitioners and 21 family physicians) of which 11 physicians responded to our invitation to enrol in this study. Physicians who agreed to participate were asked to sign an informed consent and were required to complete a 30-minute face-to-face training on the 4-As model for physical activity counselling.

The 11 consenting physicians were randomized to one of the three study conditions; PP (n = 4), PO (n = 4), and UC (n = 3). One physician in the UC group dropped the study due medical problems. Physicians in the PP and PO groups received a 30-minute face-to-face training session on how to implement the 5-minute physical activity consultation using the 4-As model, and on how to use the physical activity written prescription. Physicians in the UC group did not receive any training.

*Patient Eligibility Criteria*

The eligibility criteria required that participants be women between the ages of 25-45 years, with a body mass index ≤35, with at least one child between the ages of 5-12 years, reporting less than 150 minutes of mild to moderate physical activity per week, as per physical activity recommendations that would classify this level of activity as
inadequate (Warburton, Katzmarzyk, Rhodes, & Shephard, 2007). Participants also needed to be viewed by their family physician as belonging to a family that could benefit from receiving support for a healthy family lifestyle. Moreover, participants were required to be cleared by their family physician to engage in physical activities, not be pregnant or breastfeeding, not have an uncontrolled medical condition or injury that would prevent them from participating in the study, and not to have participated in a lifestyle study in the past 12 months.

Recruitment and Randomization of Patients

Patients were automatically assigned to the same condition to which their family physician was assigned. Physicians provided patient lists generated according to the eligibility criteria in order to identify potential participants. By looking at the medical information (e.g. body mass index and age) available in the lists, potential participants were identified and screened by a research assistant. Based on these lists, invitation letters tailored for each study condition were sent to eligible female patients from the Queen’s Family Medicine clinic. One week later, a research assistant called every potential participant to ask if she was interested in participating in the study and to conduct a second screening process. During this phone call, patients who agreed to participate were given an appointment with their physician and their email addresses were obtained.
Participation Rate

From the PP patient lists, 146 patients were eligible and were mailed an invitation letter, but only 15 agreed to participate and 12 completed the study. From the PO patient list, 128 were eligible and received an invitation letter, but only 16 agreed to participate and 12 completed the study. Finally, from the UC patient lists, 104 patients were eligible and invited to participate but only 11 agreed to participate and 11 completed the study. Therefore, the participation rate in the present study was about 9%, which is consistent with that reported in similar studies (see Figure 4). In a clinical trial investigating a physical activity intervention in a primary care setting, only about 7% of the patients sampled were successfully recruited (Fortier et al., 2007). Similarly, the Ontario Institute for Cancer Research (2010) reported that in clinical trials investigating cancer treatments, the participation rate was about 8% in Ontario and less than 5% in Kingston in 2009 (Ontario Institute for Cancer Research, 2010). Interestingly, the participation rate in intervention studies has been shown to be influenced by the characteristics of the intervention and by the participants’ perceived costs and benefits related to their participation. For instance, population-based participation rates differ by the type of intervention (e.g., preventive) and target population (Heinrichs, Bertram, Kuschel, & Hahlweg, 2005). Furthermore, when participants are offered incentives, especially monetary, they are more likely to participate (Guyll, Spoth, & Redmond, 2003). Our total sample of 35 women (\( M \) age = 36.18 years ± 4.90) for the three groups was well below the sample ideal of 150 and resulted in a reduced power of .70.
Figure 4. Recruitment and participation rate flow chart.

Physicians N=10

Randomization

Prescription Plus
r=4

Prescription Only
n=4

Usual Care
n=2

Eligible patients per physician N = 370

-Physician 1 n=25
-Physician 2 n=50
-Physician 3 n=34
-Physician 4 n=37
Total n = 146

-Physician 1 n=40
-Physician 2 n=45
-Physician 3 n=24
-Physician 4 n=19
Total n = 128

-Physician 1 n=30
-Physician 2 n=74
Total n = 104

Patients successfully recruited

-Physician 1 n=2
-Physician 2 n=6
-Physician 3 n=4
-Physician 4 n=3
Total 15

-Physician 1 n=0
-Physician 2 n=7
-Physician 3 n=5
-Physician 4 n=3
Total 16

-Physician 1 n=4
-Physician 2 n=7
Total 11

12 completed the study

12 completed the study

11 completed the study

N = 35
Participation rate 9%
2.2.3 Measures

Demographics

Demographic information such as age, ethnicity, employment status, income, and level of education was collected. This information was used to describe the characteristics of the sample under study and to look at any relationships between these variables and the dependent measures (Appendix B section 1).

Obesogenic Home Environment

An obesogenic home environment is one in which environmental factors and family behaviours, such as physical activity and eating habits, influence weight gain and loss in children. An obesogenic home environment contributes to obesity in children through different stimuli such as the availability of unhealthy food at home, the number of televisions in the house, and/or the family’s physical activity patterns. The obesogenic home environment was measured using an adapted version of the Family Eating and Activity Habits Questionnaire. This questionnaire has a reported reliability of $r 0.85$ and internal consistency of $\alpha 0.83$ (Golan & Weizman, 1998). In this study, a reliability of $r 0.82$ and internal consistency of $\alpha 0.78$ was observed. This questionnaire measures four factors in the home and family environment that have been shown to affect weight in children: activity level (4 items), stimulus exposure in the home environment (8 items), the extent to which eating is related to hunger (4 items), and eating style (13 items). Scores for each of these four factors were then summed to obtain a total score for each family member (e.g. activity level mother + stimulus exposure mother + eating related to
hunger mother + eating style mother = mother total). This total score was calculated for each family member: one for the mother, one for the partner, and one for the child. Mothers were asked to answer the questionnaire with their oldest child in mind every time if they had more than one child between 5 and 12 years old. The three composite scores (mother total, partner total, and child total) were then averaged to obtain the overall family score of the questionnaire (Appendix B section 2). High family scores indicated higher levels of obesogenic environment.

**Mother’s Confidence**

Mothers’ confidence in being able to make obesity-related changes to the home environment for their child and family was measured by using an adapted version of an instrument developed by Taveras and colleagues (2009). A previous study reported an internal consistency of $\alpha 0.72$ for this instrument (Taveras, Mitchell, & Gortmaker, 2009). In this study, an internal consistency of $\alpha 0.70$ was observed. This instrument contains six statements about making changes related to physical activity and eating behaviours such as removing the television from the child’s bedroom, or reducing the child’s fast food intake. Mothers’ rated their confidence for making these changes on a 4-point Likert scale ranging from “1 = not confident” to “4 = extremely confident.” A total score of the questionnaire ranging from 0 to 24, was calculated by summing the scores on each item, with high scores indicating a higher level of confidence (Appendix B section 3).
Exercise Self-efficacy and Outcome Expectations

Self-efficacy is the belief that one is capable to perform certain behaviour. In this study, self-efficacy for exercising under adverse circumstances was measured using an instrument developed by Rossi and colleagues (2007) which is based on previously validated questionnaires (Marcus, Selby, Niaura, & Rossi, 1992; Sallis, Pinski, Grossman, Patterson, & Nader, 1988). A internal consistency of α 0.82 for this instrument has been reported (Rossi, Benisovich, Norman, & Nigg, 2007). In this study, the internal consistency observed was of α 0.94. The questionnaire describes affects, barriers, and situations in which individuals may find it difficult to exercise in order to measure their confidence for exercising (Appendix B section 4). This questionnaire contains seven statements about circumstances that may prevent individuals from exercising such as bad weather, tiredness, or lack of time. Responses are anchored in a 5-point Likert scale ranging from “1 = not at all confident” to “5 = completely confident.” A total score for this questionnaire was calculated by summing the scores of each item and dividing the total by the number of items. Higher scores indicated higher levels of self-efficacy for exercising.

Outcome expectations, also known as the decisional balance, involve weighting the perceived pros (advantages) and cons (disadvantages) of continuing a current behaviour or adopting a new behaviour. Outcome expectations for physical activity were measured using a questionnaire proposed by Plotnikoff and colleagues (2001) where participants rate to what extent physical activity pros and cons would influence their
decision to be active (Appendix B section 5). An internal consistency of $\alpha = 0.83$ for the pros items and of $\alpha = 0.72$ for the cons items has been reported (Plotnikoff, Blanchard, Hotz, & Rhodes, 2001). In this study, the observed internal consistency for the pros items was $\alpha = 0.93$ and $\alpha = 0.87$ for the cons items. This questionnaire contains five pro items and five con items about physical activity where participants rated their expectations using a 5-point Likert scale ranging from “1 = not at all” to “5 = very much.” Both negative and positive assessments were obtained and calculated separately as outcome expectation pros (e.g. physical activity would help me reduce tension or manage stress), and outcome expectation cons (e.g. physical activity would take too much of my time). A final outcome expectations score was calculated by subtracting the cons total score from the pros total score. Higher scores indicated higher outcome expectations for being physically active.

**Self-Regulation and Perceived Competence for Exercise**

Self-regulation and perceived competence, constructs from SDT, were measured using validated questionnaires. Relatedness, the third construct from SDT, was not measured in this study because its association with health-related behaviour change in a health care setting has not been determined, and because to date, there is no questionnaire validated to measure this construct. Self-regulation is the ability to regulate one’s behaviours without external control or monitoring. This construct was measured using the Treatment Self-Regulation Questionnaire (TSRQ) developed by Ryan and Connell (1989), which has an internal consistency of $\alpha = 0.82$ (Ryan & Connell, 1989). In the
present study, an internal consistency of \( \alpha 0.81 \) was observed. The purpose of this questionnaire is to assess the degree to which a person’s motivation for a particular behaviour is relatively autonomous or self-determined, that is, intrinsically motivated. This questionnaire measures autonomous regulatory style (intrinsically motivated) and controlled regulatory style (extrinsically motivated) using 15 statements about the reasons why a person would exercise regularly (Appendix B section 6). Participants rated how true each statement was for them on a 7-point Likert scale ranging from “1 = not at all true” to “7 = very true.” A score for the autonomous regulatory style was obtained by calculating the average of the autonomous items. Similarly, a score for the controlled regulatory style was obtained by calculating the average of the controlled items. A total score for this questionnaire, the autonomous motivation index, was then calculated by subtracting the score of the controlled style items from the score of the autonomous style items. Higher scores indicated higher levels of autonomous self-regulation.

Perceived competence represents the degree of confidence that a person has in being able to make (or maintain) a change toward a healthy behaviour. Perceived competence for exercising regularly was measured using the questionnaire developed by Williams and colleagues (1998) which has an internal consistency of \( \alpha 0.94 \) (Williams et al., 1998). The observed internal consistency in this study was of \( \alpha 0.95 \). This questionnaire contains four items for measuring participants’ confidence in their ability to exercise regularly (Appendix B section 7). Responses were anchored on a 7-point Likert scale ranging from “1 = not at all true” to “7 = very true.” The final score for this
questionnaire was obtained by calculating the average from the four exercise items where higher scores indicated higher perceived competence for exercising regularly.

Physical Activity

Godin’s Leisure-Time Exercise Questionnaire (GLTEQ), a self-report instrument, was used to measure participants’ physical activity (Appendix B section 8). An reliability of 0.83 has been reported for this questionnaire (Godin & Shephard, 1985). This questionnaire assesses frequency and intensity of leisure-time physical activity lasting at least ten minutes per session. Frequency of vigorous, moderate, and light physical activity over an average week was measured separately to obtain total leisure-time physical activity. This total was calculated by multiplying the weekly frequencies of vigorous, moderate, and light physical activities by their metabolic equivalent (MET) values of nine, five, and three METs respectively. The following formula was used: \((9 \times \text{weekly number of vigorous activity sessions}) + (5 \times \text{weekly number of moderate activity sessions}) + (3 \times \text{weekly number of light activity sessions}) = \text{Total leisure-time physical activity.}\) Higher scores indicated higher levels of physical activity.

Although the primary care-parent-only intervention also targeted healthy eating via the Motiv8 Community Series, the focus of this study was on assessing changes on the obesogenic home environment and on physical activity with its associated psychological constructs. A measure of healthy eating was not included because the obesogenic home environment measure assessed the food environment and eating behaviours in the family, which covered some aspects related to healthy eating.
Furthermore, the study questionnaire was considerably long and including another measure would have increased participant burden.

2.2.4 Procedures

An online questionnaire that included the previously described measures was designed and managed by StudentVoice, a specialized company that combines elements for collecting, organizing, and integrating online data. An email containing the link to access the baseline questionnaire and the letter of information was sent to consenting participants prior to their consultation with their physician. Participants were required to complete the baseline questionnaire before they came to the clinic. Consent for participating in this study was obtained by asking participants to check the “agree to participate” box on the online questionnaire. All participants received a token of appreciation (groceries bag) for their participation before entering in to the consultation room.

During January 2010, patients in the PP group received the physical activity consultation, the physical activity prescription, and were referred to the Motiv8 Community Series. Referred participants contacted the KFL&A Public Health team to arrange an individual introductory meeting where some program materials and information were provided. After the introductory meeting, participants attended the Motiv8 Community Series as a group, which was held once a week during eight weeks from February to March 2010. The post-intervention questionnaire was emailed to participants after the Motiv8 Community Series ended in April 2010.
For the PO group, the same process described above was followed to obtain informed consent and to complete the baseline questionnaire. Participants in the PO group received their physical activity consultation and prescription in March 2010. The post-intervention questionnaire was emailed to participants in this group in May 2010.

For participants in the UC group, the informed consent and the baseline data were obtained through the same process as for the other two groups. The UC medical consultations were held in April 2010 or whenever the patient had her usual consultation booked. The post-intervention questionnaire for the UC group was emailed in June 2010.

A map outlining this process is presented in Figure 4.

*Figure 5. Intervention map.*
2.2.5 Data Analysis

All data analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 18 for Windows. To examine group differences on the dependent variables at both time points, a 2 (baseline vs. post intervention) x 3 (PP, PO, and UC) mixed analysis of variance (ANOVA) was conducted. This design was chosen because it provides a model for testing a within subject factor and a between subject factor. The within subjects factor was obtained by comparing baseline data against post-intervention data across groups. The between subjects factor was obtained by comparing differences between groups on the dependent variables. Groups were coded 2 (PP), 1 (PO), and 0 (UC) for high, medium, and no intervention dose respectively. With this analysis, we were able to examine the main effect of time (baseline vs. post intervention), the main effect of intervention (PP vs. PO vs. UC), and the interaction between time and intervention. A significant interaction between time and intervention would mean that there was a significant difference in change over time associated with group assignment. Separate analyses were run for each dependent variable. The post hoc Bonferroni correction method was used to adjust the significance level for multiple comparisons. The overall statistical significance was set at .05, which is common in the psycho-social sciences research (Howell, 2009).

The assumptions of the mixed ANOVA, random selection and assignment, interval data, independent observations, homogeneity of variances, and normality were assessed before conducting the analyses. Participants were not sampled randomly, which compromises the generalizability of findings to the entire population (external validity).
Despite this, participants were randomly assigned to groups in order to help assure that
the three groups were similar to each other prior to the treatment (internal validity). All of
the dependent variables were of interval data. Although participants were sampled from
the same primary care clinic, the assumption of independence of observations was met.
Participants were sampled from different physician practices; thus, the sampling of one
participant did not affect the selection of any other participant. The homogeneity of
variances assumption was assessed using Leven’s Test. This test allowed us to examine
whether or not the variances between groups were homogeneous and given that the level
of significance was higher than .05 on every dependent variable, it was concluded that
this assumption was met. Finally, to assess normality on each dependent variable,
skewness and kurtosis values were examined. All of the dependent variables presented an
acceptable skewness value of around ±1 and a kurtosis value of around ±1 as well.

Although running multiple ANOVAs may increase the chance of type I error, there
were several reasons this analysis was preferred over a multivariate analysis of variance
(MANOVA). First, for the research question addressed in this study, an ANOVA was a
more appropriate analysis (Huberty & Morris, 1989) and given that this was a pilot study,
it was important to see any potential effects of the intervention on each outcome variable
separately. Second, neither random sampling was used nor a large enough sample size
was achieved in this study, both required for conducting a MANOVA (Field, 2005).
Finally, in previous studies investigating the primary care and the parent-only
interventions separately, univariate analyses have been preferred (Fortier et al., 2007; Golan et al., 2006).
Chapter 3

Results

3.1 Data Screening

Given that data were collected through an online questionnaire and automatically entered into an SPSS database, issues related to data entry were avoided. Prior to conducting the main analysis, data were screened by analyzing frequencies and descriptive statistics such as means, standard deviations, and ranges. Neither outliers (scores falling more than three standard deviations away from the mean) nor out of scale points (e.g., below one or above five) were found. Missing values analysis was conducted and given that for some variables more than 5% of the data were missing at random, missing data were estimated with expectation maximization methods. Given the small sample size achieved in this study, data estimation was a critical procedure for preserving as many cases as possible to run the statistical analysis. Normality and homogeneity of variances were assessed prior to conducting the analysis. Data were normally distributed and the variance was satisfactorily similar across the dependent variables.

3.2 Baseline Group Differences

As a preliminary step, independent samples t-tests were conducted to examine significant differences between demographic variables (income, education, and employment) and the dependent variables across groups. Two groups were formed for
each demographic variable: below average income group and above average income group; less than college and completed college or bachelor degree; and employed and not employed. Then, significant differences between these groups were assessed for each dependent variable. No significant differences were found on the dependent variables associated with demographic groups. Demographic information divided by group is presented in Table 2.

Table 2. Demographic information at baseline.

<table>
<thead>
<tr>
<th></th>
<th>Prescription Plus (n = 12)</th>
<th>Prescription Only (n = 12)</th>
<th>Usual Care (n = 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean ± SD)</td>
<td>36.42 ± 4.65</td>
<td>36.15 ± 5.06</td>
<td>36.18 ± 4.96</td>
</tr>
<tr>
<td>Annual Family Income (%(n))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $50,000</td>
<td>33.3 (4)</td>
<td>0*</td>
<td>45.5 (5)</td>
</tr>
<tr>
<td>More than $50,000</td>
<td>66.7 (8)</td>
<td>66.7 (8)</td>
<td>54.5 (6)</td>
</tr>
<tr>
<td>Level of Education (%(n))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed high school and some post secondary</td>
<td>16.7 (2)</td>
<td>41.7 (5)</td>
<td>0</td>
</tr>
<tr>
<td>Completed college or bachelor degree</td>
<td>83.3 (10)</td>
<td>58.3 (7)</td>
<td>100 (11)</td>
</tr>
<tr>
<td>Employment Status (%(n))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>83.3 (10)</td>
<td>66.7 (8)</td>
<td>81.8 (9)</td>
</tr>
<tr>
<td>Not employed</td>
<td>16.7 (2)</td>
<td>33.3 (4)</td>
<td>18.2 (2)</td>
</tr>
<tr>
<td>Family type (%(n))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single mothers</td>
<td>66.7 (8)</td>
<td>0</td>
<td>81.8 (9)</td>
</tr>
<tr>
<td>Have a partner or spouse</td>
<td>33.3 (4)</td>
<td>100 (12)</td>
<td>18.2 (2)</td>
</tr>
<tr>
<td>Number of children (%(n))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One child</td>
<td>41.7 (5)</td>
<td>33.3 (4)</td>
<td>63.6 (7)</td>
</tr>
<tr>
<td>Two or more children</td>
<td>58.3 (7)</td>
<td>66.7 (8)</td>
<td>36.4 (4)</td>
</tr>
</tbody>
</table>

*33.3% (n = 4) of the participants in this group preferred not to provide this information.
Age, income, and number of children were somewhat similar across groups. In contrast, higher levels of education were observed in the PP and UC groups, a higher proportion of unemployed participants was observed in the PO group, and a higher proportion of single mothers was observed in the PP group.

A one-way ANOVA with group as the independent variable was conducted to examine possible differences between groups on the dependent variables at baseline. A significant difference was found on the obesogenic home environment $F(2, 34) = 4.58, p = .02$, whereby the PP group had the highest mean and the UC group the lowest. Post hoc Bonferroni multiple comparisons showed that these significant differences were found on the PP vs. PO comparison and on the PP vs. UC comparison. These baseline differences were accounted for in the following analyses.

### 3.3 Comparison of Intervention Effects

To examine significant differences across time (baseline vs. post-intervention) between groups (PP, PO, and UC), a 2 x 3 mixed ANOVA was conducted for each dependent variable. Post hoc Bonferroni adjustments for multiple comparisons were used. The 2 x 3 ANOVA allowed us to examine possible within subjects differences across time and to explore whether these differences were related to the intervention received. In general, no significant main effects of group were observed, which indicates that there were no significant group differences. However, most of the group means changed in the hypothesised direction suggesting a trend toward significance. All the group means and standard deviations at baseline and post intervention are presented in Table 3.
Table 3. Means and standard deviations of dependent variables at baseline and post-intervention.

| Obesogenic Home Environment | PP     | Pre  | 34.1 (15.1) | 26.8 (15.5) | 22.5 (10.6) | 19.3 (13.2) | 20.5 (8.8) | 21.9 (10.7) |
|                            | PO     | Post | 18.3 (3.1)  | 18.1 (4.3)  | 19.2 (3.7)  | 19.7 (3.1)  | 19.5 (2.8) |
|                            | UC     | Post | 2.5 (1.2)   | 2.8 (1.2)   | 3.1 (96)    | 3.2 (1.4)   | 2.8 (1.2)  | 3.0 (1.1)   |
| Outcome Expectations       | PP     | Pre  | 6.5 (7.5)   | 9.2 (5.5)   | 10.2 (6.3)  | 12.6 (6.0)  | 9.5 (6.9)  | 10.3 (7.0)  |
|                            | PO     | Post | 2.4 (1.5)   | 2.1 (2.3)   | 3.3 (1.2)   | 3.4 (1.6)   | 3.5 (1.3)  | 3.6 (1.7)   |
|                            | UC     | Post | 4.0 (1.6)   | 4.6 (1.9)   | 5.3 (1.6)   | 5.0 (1.7)   | 4.8 (1.4)  | 4.6 (2.0)   |
| Physical Activity          | PP     | Pre  | 42.0 (23.9) | 59.7 (27.5) | 42.2 (20.6) | 53.2 (32.4) | 52.5 (34.0) | 51.9 (39.3) |
|                            | PO     | Post | 52.5 (20.6) | 53.2 (32.4) | 52.5 (34.0) | 51.9 (39.3) |
|                            | UC     | Post | 52.5 (20.6) | 53.2 (32.4) | 52.5 (34.0) | 51.9 (39.3) |

Mean (standard deviation).
No significant group differences were observed.
*Arbitrary score based on Godin’s calculation.

Obesogenic Home Environment

A significant time * intervention interaction was observed $F(2, 32) = 4.00, \ p = .03$, partial $\eta^2 = .200$, where only the PP group achieved significant decreases on the obesogenic home environment after receiving the intervention (Figure 5). This significant time * intervention interaction suggests that the PP intervention was associated with significant decreases in the obesogenic home environment score from baseline to post-intervention. In addition, the observed effect size (partial $\eta^2 = .200$) indicates that 20% of the variance in the obesogenic home environment score is associated with the PP intervention. Although no significant group differences were observed, the group means decreased from baseline to post-intervention for the PP and PO group as hypothesised,
whereas the UC group mean increased. Furthermore, the significant group differences observed at baseline disappeared due to the post-intervention decrease in the obesogenic home environment reported by the PP group, which served to reduce the differences between groups.

*Figure 6.* Two-way interaction between time and intervention on obesogenic home environment.

![Graph showing two-way interaction between time and intervention on obesogenic home environment.]

Although the four obesogenic factors in the home environment (activity level, stimulus exposure, eating related to hunger, and eating style) were not analysed as separate variables, it is interesting to observe changes from baseline to post-intervention in each of these factors for each family member. From Table 4, it can be observed that physical activity changed positively for mother and child, that the stimulus exposure to
unhealthy food in the home decreased, and that the eating style for the mother and child improved. In contrast, eating related to hunger and partner measures showed unfavourable changes from baseline to post-intervention. The scores from these four factors were summed for each family member and then averaged to get the obesogenic home environment total score, which is the one reported above. Significant changes in any of these four factors are accounted by the significant time * intervention interaction observed for the obesogenic home environment.

Table 4. PP group means of the four obesogenic home environment factors measured at baseline and post-intervention.

<table>
<thead>
<tr>
<th></th>
<th>Mother</th>
<th>Partner</th>
<th>Child</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
</tr>
<tr>
<td>Activity level*</td>
<td>-3.3</td>
<td>2.8</td>
<td>14.3</td>
</tr>
<tr>
<td>Stimulus exposure**</td>
<td>10.0</td>
<td>.92</td>
<td>1.0</td>
</tr>
<tr>
<td>Eating related to hunger***</td>
<td>.92</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Eating style***</td>
<td>19.2</td>
<td>18.3</td>
<td>18.0</td>
</tr>
<tr>
<td>Individual totals (sum of the four scales)</td>
<td>33.0</td>
<td>24.2</td>
<td>33.4</td>
</tr>
<tr>
<td>Obesogenic home environment total (average of the three individual totals)</td>
<td>34.1</td>
<td>26.8</td>
<td>-</td>
</tr>
</tbody>
</table>

*In this questionnaire, low or negative scores indicate high levels of physical activity.
**Only measured for the mother given that the family members are assumed to share the same home environment.
***Higher scores indicate unhealthy eating practices.
Mother’s Confidence

No significant main effect of time on mothers’ confidence in being able to make obesity-related changes was observed $F(1, 32) = 1.110, p = .30$, partial $\eta^2 = .034$. Similarly, the main effect of intervention was not significant $F(2, 32) = 1.142, p = .33$, partial $\eta^2 = .067$. Although changes were not significant, the group means changed in the hypothesized direction where mothers in the PP and PO groups increased their confidence mean from baseline to post-intervention.

Social Cognitive Theory Constructs

Exercise Self-efficacy. No significant main effects of time $F(1, 32) = .694, p = .41$, partial $\eta^2 = .021$ or intervention $F(2, 32) = .742, p = .48$, partial $\eta^2 = .044$ were observed on mothers’ self-efficacy for exercising under adverse circumstances. Despite these findings, the observed means were higher at post-intervention for the three groups, with the PP group mean achieving the largest increases.

Physical Activity Outcome Expectations. A significant main effect of time was observed on mothers’ outcome expectations for physical activity $F(1, 32) = 4.178, p = .049$, partial $\eta^2 .115$. Although an increase in the outcome expectations mean was observed across time, the main effect of intervention was not significant $F(2, 32) = 1.061, p = .35$, partial $\eta^2 = .062$. This indicates that significant differences from baseline to post-intervention were not associated with the intervention received. The three groups demonstrated increases in the outcome expectations mean after receiving the intervention, with the PP group achieving the greatest increases.
Self-determination Theory Constructs

Self-regulation for Exercise. Neither the main effect of time $F(1, 32) = .004, p = .95$, partial $\eta^2 = .001$, nor the main effect of intervention $F(2, 32) = 2.632, p = .09$, partial $\eta^2 = .141$ were significant for mothers’ self-regulation for exercising. The self-regulation means from the PO and UC groups increased from baseline to post-intervention, whereas contrary to what was hypothesized, a decrease for the PP group mean was observed.

Perceived Competence for Exercise. No significant main effects of time $F(1, 32) = .014, p = .90$, partial $\eta^2 = .001$ or intervention $F(2, 32) = .957, p = .39$, partial $\eta^2 = .056$ were observed on mothers’ perceived competence for exercising. Although no significant effects were observed, the PP group mean increased as hypothesised, achieving the greatest improvements from baseline to post-intervention.

Physical Activity

A significant main effect of time on physical activity was observed $F(1, 32) = 4.402, p = .04$, partial $\eta^2 = .121$. This indicates that the total self-reported physical activity was significantly different from baseline to post-intervention across groups. However, the main effect of intervention $F(2, 32) = .095, p = .91$, partial $\eta^2 = .006$ and the time * intervention interaction $F(2, 32) = 1.374, p = .27$, partial $\eta^2 = .078$ were not significant. This suggests that even though there were significant differences in mothers’ total physical activity from baseline to post-intervention, those differences were not associated with the intervention received. Although these differences were not significant, the means changed in the hypothesized direction for the PO and PP groups with the latter achieving
the highest increases in the total physical activity mean from baseline to post-intervention.
Chapter 4

Discussion

4.1 Summary of Findings

This study examined the effectiveness of a combined primary care-parent-only intervention for promoting a healthy home environment and improved physical activity among mothers to promote healthy weight in children. The hypotheses that mothers receiving the combined primary care-parent-only intervention (PP) would achieve better outcomes than mothers receiving only the primary care intervention (PO) or no intervention (UC) and that mothers in the PO group would do better than mothers in the UC group were not supported. There are two possible explanations for this. The first one is related to evaluation failure, where the reduced statistical power, due to an insufficient sample size, could have resulted in an inability to detect intervention effects. The second one is related to intervention failure, where the primary care-parent-only intervention may have not adequately targeted the constructs from the behavioural theories employed (Rychetnik, Frommer, Hawe, & Shiell, 2002).

In general, the intervention did not result in significant group differences in the obesogenic home environment, mothers’ confidence, self-efficacy, outcome expectations, self-regulation, perceived competence or physical activity. This is contrary to past research on interventions implementing either parent-only or primary care interventions, which have resulted in significant improvements in the aforementioned outcome.
variables. For instance in the PAC study, higher levels of autonomy support, autonomous motivation, and self-reported physical activity at six and 13 weeks after the intervention were observed in the intervention group as compared with those achieved by the control group (Fortier et al., 2007). Similarly, the parent-only intervention has been shown to be effective for decreasing the obesogenic home environment, specifically for decreasing food stimuli and for improving eating habits in the home and family (Golan et al., 1998). In the present study, a significant interaction between time and intervention was observed for the obesogenic home environment where the PP group achieved the greatest decreases. This suggests that the PP intervention is associated with decreases in the obesogenic home environment, which is consistent with findings from a previous study implementing a parent-only intervention (Golan et al., 2006).

It is important to highlight that the PP group had a significantly higher obesogenic home environment at baseline than did the other groups, whereas at post-intervention this difference became insignificant. These findings suggest that significant improvements in the home environment can be achieved through a primary care-parent-only intervention especially when the environment is highly obesogenic. In the case of the PP group, a highly obesogenic home environment was observed at baseline, which means that there was a lot of room for improvement and thus greater possibilities of achieving a change. When looking at the four obesogenic factors in the home environment separately, it can be observed that physical activity and eating style of the mother and child improved and that the stimulus exposure in the home to unhealthy eating decreased, which is consistent
with previous research (Golan et al., 2006). No improvements on the partner’s behaviours were observed, which suggests that parent-only interventions may be less effective in other adults not directly targeted by the intervention. However, the fact that more than half of participants receiving the primary care-parent-only intervention did not have a partner may be a factor influencing these findings. Yet, these findings suggest that a parent-only intervention targeting mothers seems to be an effective way to promote a healthier home environment for their child/children (Lombard et al., 2009), which could potentially lead to the promotion of healthy weight in children.

Even though no significant group differences in the obesogenic environment were observed post-intervention, the outcome variables in the PP and PO group changed in the hypothesized direction, improving from baseline to post-intervention. It is thus possible that a lack of statistical power could have resulted in an inability to detect significant intervention effects. The reported statistical power in previous studies implementing a parent-only intervention and a primary care intervention has been .90 for a small to medium effect (Golan et al., 2006; Taylor et al., 1998) whereas power in the present study was only .70. It is thus possible that a type II error occurred (Lieberman & Cunningham, 2009).

With respect to the psychological constructs measured in this study, no significant group differences or significant improvements over time were observed. This is contrary to findings from previous studies where through a behavioural intervention, improvements on mothers’ confidence (Taveras et al., 2009), self-efficacy and outcome
expectations (Prodaniuk, Plotnikoff, Spence, & Wilson, 2004), perceived competence and self regulation (Williams, Gagne, Ryan, & Deci, 2002) have been achieved. In addition to a reduced statistical power, another explanation for the lack of an effect is the possibility of inadequate intervention implementation whereby psychological constructs may not have been adequately targeted (Rychetnik et al., 2002). However, given that no process evaluation was conducted, this is not possible to ascertain.

The primary care intervention was aimed at improving participants’ autonomous motivation and perceived competence, which have been shown to mediate physical activity behaviours (Hagger & Chatzisarantis, 2008). Previous studies have shown that a primary care intervention using the “As” model was effective for improving these constructs (Williams et al., 2002), whereas in the present study, no such effect was observed. This could be the result of an inadequate implementation of theoretical constructs within the intervention. Given the limited time that physicians could devote to this study, the physical activity counselling training session they received was only 30 minutes in length, whereas most of previous primary care interventions have offered two or more hours of training (Eakin, Glasgow, & Riley, 2000; Elley et al., 2003). The physician training in the present study may have been insufficient to adequately prepare the physicians for delivering the intervention in a way that would improve patients’ autonomous motivation and perceived competence for physical activity.

The Motiv8 Community Series was aimed at improving physical activity self-efficacy and outcome expectations, which have been found to be good predictors of
physical activity behaviour (Culos-Reed et al., 2000; Dawson et al., 2001). However, these constructs were not significantly different after the intervention, which is similar to findings from a previous evaluation of the Motiv8 Series (Smith, 2009). The present and previous evaluations suggest that the Motiv8 Series may not target self-efficacy and outcome expectations for physical activity effectively. Although these constructs have been shown to mediate physical activity (Prodaniuk et al., 2004), mediation effects were not assessed in the present study because no significant changes on physical activity were observed and because in the previous Motiv8 evaluation no significant mediation effects were found (Smith, 2009).

Because this is the first study implementing a combined primary care-parent-only intervention, it is hard to compare its results with previous studies. Even though most of the current findings are not consistent with those from previous studies investigating these strategies separately (Fortier et al., 2007; Golan & Crow, 2004), they represent an important contribution to the body of knowledge about interventions for promoting healthy weight in children. Based on the present findings, it can be concluded that the combined primary care-parent-only intervention was effective only for improving the home environment for the promotion of healthy weight in children. Although no significant group differences were observed on any other parameters measured, the PP group showed trends toward achieving greater improvements than the PO or UC groups from baseline to post-intervention. This is an important finding because this is the first study investigating the effectiveness of a combined primary care-parent-only intervention
and it seems that by using such an approach, better outcomes could be achieved. More research with larger, representative samples is needed.

4.2 The Value of the Primary Care Intervention

The effectiveness and feasibility of interventions in primary care has been widely investigated and evidence suggests that these interventions can be a successful strategy for promoting physical activity among the population (Jimmy & Martin, 2005). Given this, a primary care intervention was included in this study as part of a strategy for promoting healthy weight in children. The Queen’s Family Medicine team agreed to implement the aforementioned primary care intervention because it represented a good opportunity to introduce a feasible strategy to promote physical activity at the clinic level. Even though the primary care intervention alone did not seem to have significant effects on participants’ physical activity, this strategy was of significant importance for the promotion of physical activity in this setting. First, this intervention was a good opportunity to promote physical activity counselling among physicians and to increase awareness about the importance of talking to their patients about it. This is important because the prevalence of physical activity counselling in primary care practices is less than 22% (Podl, Goodwin, Kikano, & Stange, 1999), indicating that this type of counselling is not very common among physicians. Second, this intervention was a good opportunity to inform physicians about a brief, feasible, and promising intervention for promoting physical activity among inactive patients. Given that one of the reasons physicians do not offer physical activity counselling is the lack of knowledge and training
in this area (Nupponen, 1998), this was a good opportunity to provide physicians with basic training and tools needed for offering this type of counselling. Finally, this intervention represented an effective strategy for referring patients to community physical activity resources. In this study, out of 16 patients referred to the Motiv8 Community Series, 12 of them (75%) attended and completed the program, which suggests that physician referrals can be effective for recruiting patients into programs and for connecting them with community resources. Furthermore, lack of time is the main reason physicians do not offer physical activity counselling (Yarnell, Pollak, Ostbye, Krause, & Michener, 2003), and a referral to specialized programs or counsellors can help overcome this limitation. In sum, the primary care intervention implemented in the present study represented a great opportunity for promoting physical activity among physicians, for increasing awareness about its importance, and for providing physicians with basic knowledge and tools that can help them overcome the barriers that prevent them from counselling patients on physical activity.

4.3 The Value of the Motiv8 Community Series

The Motiv8 Community Series was directed toward promoting healthy lifestyles and healthy home environments among mothers as part of an intervention to promote healthy weight in children. For mothers attending the series, significant improvements in their home environment were reported after program completion. A previous evaluation of the Motiv8 Workplace Series found that the series was effective for improving healthy eating among participants (Smith, 2009). Despite that a carryover effects or social
desirability effect may be confounding these findings, they suggest that the Motiv8 Community Series was successful at achieving some of its goals and that it can be advocated as a promising strategy for promoting healthier lifestyles among participants.

These findings are consistent with those reported in studies investigating the parent-only intervention model (Golan & Crow, 2004) and can contribute to the body of evidence supporting the use of such an approach for promoting healthy weight in children. From the present study, it can be argued that the Motiv8 Community Series, delivered to mothers with the intent that they improve healthy opportunities for their family at home, is a feasible strategy to achieve positive outcomes in the home environment. This is important given that KFL&A Public Health launched the Motiv8 initiative as a health promotion strategy for adults aged 18-64 years to increase awareness, enhance motivation, and build skills to improve health behaviours and pass these behaviours on to children. Our findings suggest that delivering the Motiv8 Community series as a parent-only intervention could be a cost-effective way to achieve program objectives (Janicke et al., 2009).

These findings can also help the Motiv8 intervention team adapt the content, objectives, and methods of the series as did a previous evaluation. For instance, findings from the Motiv8 Workplace Series, showed that healthy eating improvements were the only positive effect and 88% of the participants recruited were women even though both men and women had been invited to participate (Smith, 2009). Based on this, the Motiv8 team decided to focus the community series on women and to add two extra sessions.
about physical activity. The intervention team’s willingness to use the evaluation findings to make program adjustments and their interest in continued evaluation is encouraging from a public health standpoint.

4.4 Study Strengths and Limitations

The main strength of the present study was the randomization component. Because participants were randomly assigned to the different study conditions, problems related to internal validity were reduced. The randomization component helped assure that groups were similar before receiving the intervention in order to ensure that conclusions about the effects of the intervention would be more accurate (Howell, 2009). A further strength of this study was that it provided important estimates (i.e. means and standard deviations) of the primary outcomes of interest which can be used to guide the design and implementation of future studies investigating the effectiveness of the Motiv8 Series.

From a public health perspective, there are also important contributions that can be attributed to the present study. To our knowledge, this is the first study combining a primary care and a parent-only intervention for improving mothers’ behaviours and the home environment for the promotion of healthy weight in children. Hence, important information about the effectiveness and feasibility of collaboration across diverse health care settings (i.e., primary care and public health) for the promotion of healthy lifestyles was obtained.
The main limitations of the present study that need to be considered were related to sampling, to self-reported measures, and to type I error probability. Limitations related to sampling were that the sample was selected by convenience and that the sample size achieved was smaller than expected. The convenience sampling interfered with the generalizability of findings compromising the external validity of the present study, whereas the small sample size interfered with the statistical power, resulting in a reduced ability to detect intervention effects (Howell, 2009). Statistical power is a function of three main factors: type I error probability (alpha level), the sample size, and the statistical test to be employed. In this study, the alpha level (.05) was established based on conventions used in the psycho-social sciences research (Howell, 2009) and the statistical test based on the research question to be addressed (Huberty & Morris, 1989). Therefore, the sample size was the main factor driving the inferior statistical power in this study. The sample size was calculated based on parameters reported in previous studies implementing parent-only and primary care interventions (Fortier et al., 2007; Golan et al., 2006). However, the low participation rate was not adequately anticipated at the beginning of the recruitment process. The response rate to invitations to participate in clinical trials in Ontario is only 8%, while in Kingston lower still, at 5% (Ontario Institute for Cancer Research, 2010). Given that for the present study we had access to only one clinic, there was a limited pool of participants from which to draw the sample. Similar to the numbers previously mentioned, our participation rate was 8%, resulting in an inadequate sample size which could explain the failure to detect intervention effects.
Another limitation was the use of self-reported measures, which are prone to social desirability and may have caused bias in the present findings (Singleton & Straits, 2005). Self-reported physical activity in particular, is known to be only moderately associated with objective measures of physical activity (Washburn, Heath, & Jackson, 2000). Moreover, given the nature of repeated measures designs, carry-over effects such as practice effects and recall bias could be further confounding the present results (Field, 2005). Finally, given that multiple testing was employed for the statistical analyses, the type I error probability may have increased, which could have resulted in falsely declaring statistical significance (Howell, 2009).

4.5 Lessons Learned so Far

Experimental research in the health and social sciences is concerned with exploring treatment effects that are not confounded by factors external to the experimental manipulation, and in ensuring that those effects can be generalized to the population from which the sample was selected. In settings where the experimental manipulation and variables are highly controlled, such as laboratories, the effects of a treatment can be assessed more accurately and represent the efficacy of the treatment. In contrast, in settings where the experimental manipulation and variables are not highly controlled, the effects of a treatment may be confounded by other factors that may obscure the conclusions about the treatment per se, but yield information about its implementation in real world conditions, thereby representing the effectiveness of the treatment (Flay, 1986).
In the public health field, interventions for improving the population’s health implemented under highly controlled experimental conditions (i.e. RCTs) are rarely conducted (Ramanathan et al., 2008). Quasi-experimental designs or natural experiments are more common in the public health field because of their feasibility, acceptability, and appropriateness to evaluate health interventions, although they are subject to bias (Rychetnik et al., 2002). Given the nature and characteristics of these types of designs, pure intervention effects are difficult to assess. Hence, in this type of real world experiments we are not only concerned about treatment effects, but also about the feasibility of implementing such intervention, about the importance of the evaluation, and about the application of empirical data and theory to develop health promotion programs (Schaalma, Ruiter, & Van Empelen, 2004). In the present study, an RCT within the context of an unfunded natural experiment was implemented, which helped preserve the internal validity of the study. Despite findings from the present study do not completely support the effectiveness of a combined primary care-parent-only intervention for promoting a healthy home environment and improved physical activity behaviours among mothers to promote healthy weight in children, important lessons were learned that can contribute to practice and theory for future research.

First of all, it is important to highlight the challenges confronted when conducting the present study and how those challenges were dealt with in order to ensure scientific rigour and to preserve the fidelity of the intervention. Working with Queen’s Family Medicine and KFL&A Public Health, two institutions aimed at improving the
population’s health was a challenge in itself. Given that their institutional objectives and resources are different, it was challenging to adapt the intervention to make it feasible and worthwhile for both institutions, which interfered with the study design and implementation of the intervention.

Many of the challenges confronted during this study were related to the nature of primary care settings, where lack of time and logistics were the main factors that affected the intervention plan. The intervention started four months later than originally planned because of varying schedules of participating physicians, which delayed the training and access to patients lists needed for recruitment. Furthermore, the physical activity measure, randomization, physician training, and the data collection procedure were also modified to meet clinic policies and procedures. Originally, physical activity was going to be measured using pedometry; however, this strategy was not feasible given that patients would have had to come one week prior to their consultation and be taught how to use the pedometer and record their steps, which would have represented a burden for both the clinic staff and the patients. Thus, physical activity was measured using self-reported measures which, though less accurate than pedometry, are more practical and cost-effective (Dishman, Washburn, & Schoeller, 2001).

With regards to randomization, plans changed as well in response to recommendations by clinic staff. Patients were going to be randomized to the different groups; however, this was a challenge given that all physicians would have had to receive training, which could have caused confusion about which patient should receive which
intervention. This could also have biased the control condition and caused an ethical dilemma for trained physicians who would have been required to withhold prescribing physical activity according to the 4-As model to some of their patients in order to adhere to the research protocol. Moreover, patients from the same physician randomized to different conditions could have “contaminated” each other by discussing the intervention or research. Therefore, in order to preserve the integrity of the research design, physicians were randomized instead. Physician training was initially planned to be delivered in one group session for all the physicians; however, this was not possible given physician schedules and other commitments. For that reason, training was delivered through individual face-to-face sessions. Finally, data were going to be collected at the clinic prior to patients’ consultations, but given that a computer, internet access, and extra patient time would be needed, this was not feasible and so the baseline questionnaire was emailed to patients instead.

Challenges related to the Motiv8 Community Series were also experienced. The effectiveness evaluation of the Motiv8 Community Series as a parent-only intervention was considered a natural experiment. Natural experiments are challenging because they happen “naturally” with little to no input from researchers in the “experimental” design, making it hard to ensure scientific rigour (Ramanathan et al., 2008). For instance, the Motiv8 Community Series was already designed as an intervention for adults, but not as a parent-only intervention. This led to some adaptations to part of the intervention content, sampling, and measures in order to ensure that both intervention and research objectives
could be met. Therefore, the evaluation of the Motiv8 Community Series required a consideration of the balance between what was naturally happening and what was needed to preserve the integrity of the research (Petticrew et al., 2005).

All the challenges and barriers confronted during this study represented not only a research burden, but an opportunity to learn important things about research in real world settings. First of all, we learned that bringing two institutions to work together toward the same goal, although challenging, is a strategy that can make a difference in whether or not the goal in question is met. For instance, because of the joint efforts of Queen’s Family Medicine and KFL&A Public Health, the present intervention was possible and strengthened with the available resources that could be leveraged from each institution. For example, for KFL&A Public Health, this partnership offered a way to recruit the most relevant clientele by encouraging physicians to identify patients who would most likely benefit from the Motiv8 Community Series. For physicians, the Motiv8 Community Series offered a trusted and tangible community resource to which their patients could be referred with confidence. Finally, for patients, the credibility of the Queen’s Family Medicine team and the established relationship between patients and physicians likely allowed patients to have confidence in the value of the Motiv8 Community Series for addressing their needs.

We also learned that given the unpredictable nature of research in real world settings, and specifically, in a clinical setting, there should be some degree of flexibility in the research plan. There should always be a plan “B” in order to be able to overcome
the challenges that can compromise the objectives and integrity of the research. For instance, having extra time in case the intervention is delayed or having more than one data collection option available could be helpful. It is also important to mention that any changes to the study protocol or intervention require ethics amendments; thus, ethical considerations should be kept in mind when making any changes. Finally, although natural experiments might not provide the most internally valid evidence, they do represent very valuable opportunities in the public health field (Petticrew et al., 2005).

4.6 Future Directions

From the present study, important lessons were learned and some improvements are recommended for conducting similar studies in the future. With regards to the interventions implemented, a longer training for physicians is recommended (e.g. more than 2 hours) in order to ensure that they develop the skills needed to deliver the clinical intervention. Physician follow-up and support might also be beneficial. Furthermore, it is very important to design interventions to target the psychological constructs hypothesized to mediate behaviour and to assess these constructs with relevant tools. It is also critical to conduct a process evaluation that can ascertain intervention dose, fidelity, and quality (Linnan & Steckler, 2002) and provide information about the “how and why” an intervention outcome was achieved (Isreal et al., 1995). Process evaluation using established frameworks such as the RE-AIM framework (Glasgow, Vogt, & Boles, 1999), could provide important information to build a broader group of conclusions that extend beyond effectiveness assessments.
In terms of the sample, a larger sample size (e.g. 150 participants) that is representative of the population (e.g. several clinics in Kingston) and that is selected randomly is also recommended for future studies. This would help ensure that there is enough statistical power to detect intervention effects and preserve the external validity of the study. With regards to measurement, objective measures of physical activity are recommended when feasible and affordable. Furthermore, future studies should measure mothers’ body mass index and waist circumference in order to have an objective measure of obesity and body fatness and evaluate possible effects of the intervention on these measures. Children’s body mass index, waist circumference, and physical activity and eating behaviours should also be measured in future interventions that intend to achieve change via an intermediary (i.e., parent).

As for the statistical analysis, a mediation analysis should also be included in future adequately powered studies to assess the mediation effect of the psychological constructs on the behaviours of interest, in this case physical activity and the obesogenic environment. Moreover, conducting a MANOVA instead of multiple ANOVAs is also recommended when conducting studies that are not exploring the effects of a new intervention in order to reduce the probability of committing type I error.

In the present study, there was only one follow-up assessment after the intervention. Longer follow-up (e.g. 12 and 24 months) should be included in future studies given that data on the sustainability of behaviour change interventions are lacking.
4.7 Conclusions

To our knowledge, this is the first study investigating the effectiveness of a combined primary care-parent-only intervention for promoting a healthy home environment and improved physical activity and eating behaviours among mothers to promote healthy weight in children. The findings from this pilot study suggest that the combined primary care-parent-only intervention was effective for promoting a healthier home environment. Furthermore, the potential and feasibility of introducing physical activity in a clinical setting was established, suggesting that this setting may be a fruitful avenue for promoting physical activity. The information and evidence obtained from this pilot evaluation can contribute to the development of a better understanding of the effectiveness of interventions in clinical and community settings and of the challenges that these types of studies represent. Finally, the present study can contribute to the body of evidence investigating strategies to improve the health of families in the context of an increasingly obesogenic society.
References


Golan, M., Fainaru, M., & Weizman, A. (1998). Role of behaviour modification in the treatment of childhood obesity with the parents as the exclusive agents of change...


Appendix A

Recruitment Materials and Letters of Information

1. Patient Invitation Letter

Dear (name of the patient):

I am writing to inform you of a research study that may be of interest to you. I support this study because it addresses two issues that contribute to obesity in the family: physical activity and the home environment.

Researchers at Queen’s University have developed a study titled “Parents, Practitioners, and Public Health for a Healthy Family Environment; a pilot evaluation to promote healthy weight in children.” The goal of this study is to contribute to the development of strategies to promote healthy eating behaviours and active lifestyles in the family. There is no charge to participate in this study.

Based on your medical records I concluded that you may be eligible to participate in this study and I am contacting you because I believe that you could benefit from participating. One of our Research Associates will contact you by telephone to explain the study and to ask you whether or not you would like to participate. If you agree to participate, a letter of information will be emailed to you as well as a link for an online survey that you can complete electronically.

Thank you for taking the time of reading this letter. I hope this was helpful information for you.

Sincerely,

___________________________

Dr.
2. Telephone Script

Hello this is __________________ from ___________________. I got your number through your health care practitioner. I am calling you because you received an invitation letter from your physician to participate in a study that may be of interest for you. We are interested in learning about physical activity and eating patterns in the home environment. With this study we are trying to investigate strategies to promote healthy weight in the family. You were selected because your health care practitioner believes that you could benefit from this study. Would you like to have more information about this study?

YES or NO

Would you like to participate in this study?

If NO = Thanks and have a good day.
If YES = Do you have time now or do you want me to call later?
   If NO – ask when would be convenient?
   If YES – Great. Because this is a research study, I need to take a moment to tell you about the project and your rights as a volunteer.

Okay, as mentioned earlier, we wish to gather your perspective on physical activity and healthy eating. To do so, we will email you a link for an online survey that will take about 25 minutes to complete. If you agree, after completing the survey, you will have to meet with your physician for a brief consultation.

It is important that you understand that you are not required to answer any questions especially those that make you uncomfortable, that you are able to withdraw from this study whenever you wish to withdraw with no penalty to you. There are no known risks to your involvement in answering these questions and all your answers are confidential to the researchers only. Your name will not be included in any publications, and your confidentiality will be protected at all costs. Do you understand these rights or want any explained further?

YES or NO

So, when would you like to set your appointment?

It is important that I leave you with contact information should you have any concerns about this interview. Can I leave you with some contact information (phone number or email)?

I you wish to speak to me, my name is Karla Galaviz and I can be reached at _7kg18@queensu.ca or 613-533-6000 ext 74699. If you wish to speak to someone from the research ethics office you may call Chair Joan Stevenson at Chair.GREB@queensu.ca or 613-533-6081.

Do you have any questions? Thanks so much for taking the time to participate in this study.
3. Email Script

Dear participant,

Thank you for participating in this study. Your collaboration is highly appreciated.

Attached you will find the letter of information which contains further information about this study and the researchers’ contact information. Please read it carefully before you answer the survey and do not hesitate to contact the researchers if you have any questions.

As part of this study, you are required to answer an electronic survey that will take you about 25 minutes to complete. Below you will find the link for the electronic survey and the instructions that will guide you through the process. You just have to click on the link and the first page of the survey will appear. It is very important that you remember that you must COMPLETE this survey BEFORE you meet with your physician.

In order to keep track of your surveys throughout the study, we must provide you with a Personal Identification Number (PIN). This PIN will also help us to protect the privacy and confidentiality of your answers. You will use this PIN every time you answer a survey in this study. Please write this PIN down in a safe place because you will need it for future surveys. Please note that your PIN contains the first four letters of your last name and the last four numbers of your phone number.

Survey instructions:

1. Click on the link
2. Enter your PIN
3. Click on FINISH when you are done.
4. Please note that once you start answering the survey, you will not be able to log out from it and then log in to continue where you were. If you log out while answering the survey, you will have to start answering it from the beginning.
5. Please answer this survey only once. Every time that you click on the link, a new survey will be opened and data will be recorded.

REMEMBER: Please complete the electronic survey BEFORE you come to your consultation. Thank you very much for being part of this project, it would not be possible without your participation!

Have a wonderful day!

Karla Galaviz
This research study is being conducted by a master’s research student, Karla Galaviz and supervised by Dr. Lucie Lévesque from the School of Kinesiology and Health Studies at Queen’s University, Canada.

The purpose of this research study is to understand the effects of two intervention strategies on participants’ physical activity and eating behaviours as well as on the participants’ home environment. To do so, we need your participation and collaboration, which will vary depending on the group you are randomized to. Randomization means that the group you will be in is determined in the same way as it would be by a flip of a coin. There are three groups involved in this study: the Prescription Plus group, the Prescription Only group, and the Usual Care group.

**Prescription Plus group.** This arm includes a primary care-based intervention and a community-based intervention (Motiv8). In the primary care-based intervention, patients will receive a 3 to 5-minute physical activity counselling, a physical activity prescription, and a referral to a community program. In the community-based intervention, patients will receive an 8-week physical activity and healthy eating program focused on developing skills needed to achieve behaviour change.

**Prescription Only group.** This arm includes only a primary care-based intervention. In this group, patients will receive a 3 to 5-minute physical activity counselling and a physical activity prescription. If you are randomized to the Prescription Plus group or the Prescription Only group, you will receive one group-based 40-minute training session at your clinic, which will be scheduled based on your time and needs. This training session will be delivered by the student researcher, in addition and you will receive some written materials for your future reference. Lunch will be provided at this training session.

**Usual Care group.** Patients in this group will receive the usual care offered at the primary care clinic but no other intervention. If you belong to group 3, you will not be required to complete the training session. If you volunteer to participate, you will be asked to sign this consent form, and you will be randomized to one of the three groups of this study. The group you will be placed will be the group to which your patients will be automatically placed in for this study.

If you agree to participate a research assistant will create a list of your eligible patients through your Electronic Medical Records, and a letter to participate in the study will be sent to your eligible patients, requesting their participation.
Eligible consenting patients, will have the following baseline measurements taken; demographics, family eating and activity questionnaire, parental confidence questionnaire, self-efficacy, outcome expectancies, quality of life, perceived competence and self-regulation, and self-reported physical activity questionnaires. Participants then will have their appointment with you where you will follow the assigned protocol.

If you belong to the Group 1, Prescription Plus group, you will offer a brief physical activity counselling, a physical activity written prescription, and a referral to the Motiv8 community series. If you belong to Group 2, Prescription Only group, you will offer the brief physical activity counselling protocol and the physical activity written prescription. Finally, if you belong to Group 3, the Usual Care group, you will follow your regular consultation protocol.

Your patients will not experience any pain or discomfort resulting from this study. There are no known risks associated with this study, and although we hope there may be some health benefits there may not be any direct benefit to your participating patients.

This study is voluntary. As a volunteer, you are free to choose whether or not you would like to participate in this study and may withdraw at any time without any consequences. All information collected during this study will be kept confidential. Your privacy and your patients’ privacy will be protected at all times. Identifying information will be stored in locked files behind locked doors. Participants will not be identified in any publications or reports. All electronic data will be protected with passwords and stored in locked research offices. The information collected during this study will be used in analyses and will be published/presented to the scientific community at meetings and in journals.

Any questions about study participation may be directed to the research investigators Karla Galaviz at 7kg18@queensu.ca, Sharon Cuthbertson at sc3@queensu.ca, and Dr. Lucie Lévesque at 613-533-6000, ext. 78164 or lucie.levesque@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen’s policies.
SIGNATURE OF HEALTH CARE PRACTITIONER

I have read and understand what is being asked of me for this study. I have had the purpose, procedures and technical language of this study explained to me. I have had the opportunity to ask questions, which have been answered to my satisfaction. I am voluntarily signing this form. I will keep a copy of this consent form for my information.

I hereby consent to participate in this study.

___________________________________
Name of participant

___________________________________
Signature of participant

___________________________________
Name of Investigator

___________________________________
Signature of Investigator

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5. Participant letter of information and consent form

This study, “Parents, Practitioners, and Public Health for a Healthy Family Environment: a pilot evaluation to promote healthy weight in children” is being conducted by Karla Galaviz and supervised by Dr. Lucie Lévesque from the School of Kinesiology and Health Studies at Queen’s University, Canada.

We are interested in learning about physical activity and eating patterns in the home environment. To do so, we are asking you to respond to a survey that will take about 25 minutes to complete. You will be asked questions about your own physical activity, your family’s eating and physical activity patterns, and general question about your health. You will be contacted by telephone 3 more times to answer the same questions: once in approximately eight weeks, then six, and twelve months from the first contact.

After completing the initial survey you will receive a small gift. Following this, your name will be entered in a draw to win one of three $25 CAD gift cards for a popular sport shop for every survey that you complete.

After completing the first survey you will be asked to attend a consultation with your health care practitioner where you will receive support on physical activity as well as personalized information on how implement it into your daily routine. In addition he/she will invite you to attend a workshop series consisting of eight 90 minute sessions delivered by dietitians and physical activity specialists. The workshops will be held at the local public health unit in the winter 2010 (from January 14th to March 4th), a daytime and evening workshop series will be offered.

There are no known risks associated with participating in this study. You may find some questions to be of a personal nature, in the sense that they deal with your feelings about eating and exercise, but you should know that you do not have to answer any questions if they make you uncomfortable in any way.

This study is voluntary. As a volunteer, you are free to choose whether or not you would like to participate in this study and may withdraw at any time without any consequences. You may also ask to have your data removed from the study by contacting the research staff in person, via e-mail (7kg18@queensu.ca), or by phone (613-533-6000 x74699). You can refuse to answer any of the study’s questions at any time, without any consequences, while still remaining in the study. If you withdraw from the study, you will still be entered in the draw for the gift cards.
Your answers will be kept confidential. Your contact information will be stored on a password-protected School of Kinesiology and Health Studies computer. This file will be stored separately from your answers. This format for handling and storing the data conforms to the Queen’s University General Ethics Board requirements. The data will be published in composite form with no ability to trace you as an individual. All records will be secured safely under password protection and in locked cabinets until publication after which time all files will be destroyed.

Any questions about study participation may be directed to the research investigators Karla Galaviz at 7kg18@queensu.ca, Sharon Cuthbertson at sc3@queensu.ca, and Dr. Lucie Lévesque at 613-533-6000, ext. 78164 or lucie.levesque@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen's policies.

SIGNATURE OF PARTICIPANT

I have read and understand what is being asked of me for this study. I have had the purpose, procedures and technical language of this study explained to me. I have had the opportunity to ask questions, which have been answered to my satisfaction. I am voluntarily signing this form. I will keep a copy of this consent form for my information.

I hereby consent to participate in this study.

_____________________________________
Name of participant

_____________________________________
Signature of participant

Date

_____________________________________
Name of Investigator

_____________________________________
Signature of Investigator

Date
Appendix B
Questionnaires

Section 1. Demographics questionnaire

1. Your age: ______
2. Postal code: ______________________________

3. Does an adult partner or spouse live with you and your child/children?
   [ ] Yes, full time.
   [ ] Yes, part time.
   [ ] I am the only adult living in the home.

4. Number of children between the ages of 5-12 years living in the house (full time or part time) ______

5. Number of children 13 years and over living in the house (full time or part time) ______

6. Languages spoken:
   [ ] English  [ ] French  [ ] Other ____________________

7. Annual Family Income:
   [ ] < 20,000  [ ] 20,000 – 29,999  [ ] 30,000 – 49,999
   [ ] 50,000 – 79,999  [ ] 80,000 – 99,999  [ ] > 100,000

8. Education Level (choose the highest level completed)
   [ ] Some high school
   [ ] Completed high school
   [ ] Some post secondary education
   [ ] Completed a post secondary college diploma or bachelor degree
   [ ] Completed a degree beyond the bachelor level (e.g. Masters, PhD, MD, Law School etc.)

9. Employment status:
   [ ] Full time employment outside of the home
   [ ] Part time employment outside of the home
   [ ] Not currently employed outside of the home
   [ ] Other. Please describe: ____________________
Section 2. Obesogenic Home Environment Questionnaire

Please refer your answers to questions 1-4 to yourself, your live-in partner and your 5-12 year child. If you have more than one child between 5 and 12 years of age, please answer the questions with your oldest child in mind. If no other adult lives in your house, please answer for yourself and your child only.

Child’s date of birth: Year ________ Month ______

10. How many **hours** per week on average do you watch television and/or play computer games?

Mother: ______ Partner: ______ Child: ______

11. How many **hours** per week on average do you engage in the following activities?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mother</th>
<th>Partner</th>
<th>Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ride bicycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take a walk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swim</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do gymnastics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Play tennis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Physical Activity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12. How many **times per week** on average do you attend exercise classes? (if none, write 0).

Mother: ______ Partner: ______ Child: ______

13. When you are alone and are not busy, do you get bored? (Circle appropriate response for each person).

<table>
<thead>
<tr>
<th>Response</th>
<th>Never</th>
<th>Almost never</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Partner</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Child</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
In modern society, people often skip meals, or eat snacks instead of proper meals or eat irregularly or depending on their mood. The following questions are related to the types of foods you and your family eat, and your eating behaviour.

14. Which of the following snacks are usually found in your home? (Circle all that apply)

Cheetos/Cheesies  Pretzels  Potato Chips/Ruffles  Corn chips/Tortilla chips
Popcorn  Sunflower seeds  Peanuts  Almonds  Pistachios  Nuts
Other

15. Which of the following types of sweets are usually found in your home? (Circle all that apply)

Chocolate and chocolate bars  Candy  Wafers  Cookies  Jam
Other

16. How many types of cake are usually found in your home? _________

17. How many types of ice-cream and popsicles are usually found in your home?

_______

18. During the weekend, do you add more of the foods listed in 5 – 8?

0 - Don't add
1 - Add

19. You usually keep the snacks and sweets in your home in:

0 - A hiding place
1- Known but not seen place
2- Reachable place
20. To what degree can your child eat snacks and/or sweets without your permission?

0 - Never
1 - Almost never
2 - Sometimes
3 - Frequently
4 - Always

21. How frequently does your child buy his/her own sweets?

0 - Never
1 - Almost never
2 - Sometimes
3 - Frequently
4 - Always

22. When your child asks to eat, does he/she claim to be hungry?

0 - Yes
1 - No

23. Usually when the child eats:

1 – He/she asked for it.
2 - The food was offered by the mother/partner.

24. If it is meal time and your child is not hungry, how would you respond?

0 - You suggest that the child will eat later.
1 - You suggest that the child sit at the table with the rest of the family but would not eat.
2 - You suggest that the child sit at the table with the rest of the family but would eat less.
3 - You convince the child to eat with the rest of the family.
4 - This is an irrelevant question, the child is always hungry.
25. When it is meal time and you are not hungry what would you do? (Please circle the appropriate answer for each parent).

<table>
<thead>
<tr>
<th>Mother</th>
<th>Partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - Not eat</td>
<td>0 - Not eat</td>
</tr>
<tr>
<td>1 - Eat less</td>
<td>1 - Eat less</td>
</tr>
<tr>
<td>2 - Eat the same</td>
<td>2 - Eat the same</td>
</tr>
<tr>
<td>3 - It never happens</td>
<td>3 - It never happens</td>
</tr>
</tbody>
</table>

Frequently, we just grab something to eat, or eat under certain conditions or moods. (Please refer your answer to questions 17 - 20 to yourself, your partner and your child and circle appropriate answer).

26. How frequently do the following behaviours occur for each family member:

<table>
<thead>
<tr>
<th>Mother</th>
<th>Never</th>
<th>Almost never</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eat while standing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat straight from the pot/baking pan/bowl/frying pan</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat while watching television, reading, working</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat when bored</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat when angry or in other negative mood states</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat in disorderly way during the afternoon</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat late in the evening or at night</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Partner</td>
<td>Never</td>
<td>Almost never</td>
<td>Sometimes</td>
<td>Frequently</td>
<td>Always</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>-------</td>
<td>--------------</td>
<td>-----------</td>
<td>------------</td>
<td>--------</td>
</tr>
<tr>
<td>Eat while standing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat straight from the pot/baking pan/bowl/frying pan</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat while watching television, reading, working</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat when bored</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat when angry or in other negative mood states</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat in disorderly way during the afternoon</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat late in the evening or at night</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Child</th>
<th>Never</th>
<th>Almost never</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eat while standing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat straight from the pot/baking pan/bowl/frying pan</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat while watching television, reading, working</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat when bored</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat when angry or in other negative mood states</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat in disorderly way during the afternoon</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eat late in the evening or at night</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
In many houses eating is not limited to the dining room or kitchen.

27. How often do you eat in the following rooms? (Please circle the appropriate answer. If you do not have such a room in the house, please circle the N/A option)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost never</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living room/TV room</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>N/A</td>
</tr>
<tr>
<td>Bedroom</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>N/A</td>
</tr>
<tr>
<td>Office</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>N/A</td>
</tr>
<tr>
<td>Partner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living room/TV room</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>N/A</td>
</tr>
<tr>
<td>Bedroom</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>N/A</td>
</tr>
<tr>
<td>Office</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>N/A</td>
</tr>
<tr>
<td>Child</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living room/TV room</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>N/A</td>
</tr>
<tr>
<td>Bedroom</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>N/A</td>
</tr>
<tr>
<td>Office</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>N/A</td>
</tr>
</tbody>
</table>
28. Compared to other people your age, how would you rate your eating pace:

<table>
<thead>
<tr>
<th></th>
<th>Slow</th>
<th>Average</th>
<th>Fast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Partner</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Child</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

29. How often do you customarily ask for or take a second helping?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost never</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Partner</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Child</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

30. How often do you or your partner eat with the child?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost never</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Lunch</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Afternoon snack</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Dinner</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Section 3. Mother’s confidence for making obesity related changes questionnaire.

This questionnaire asks about how confident you feel in making changes for promoting healthy eating and physical activity in your home.

Please circle the appropriate answer.

**This is how confident I am that I can do the following things:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Not confident</th>
<th>A little confident</th>
<th>Confident</th>
<th>Extremely confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.</td>
<td>Change my family’s eating patterns</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>32.</td>
<td>Change my family’s activity patterns</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>33.</td>
<td>Limit my child’s television viewing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>34.</td>
<td>Reduce my child’s intake of soda, juice, or other sweetened drinks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>35.</td>
<td>Remove the television from my child’s room</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>36.</td>
<td>Reduce my child’s intake of fast food</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
## Section 4. Exercise self-efficacy questionnaire.

This section looks at how confident you are for exercising when other things get in the way. Read the following items, and circle one answer that best expresses how each item relates to you in your leisure time.

**This is how confident I am that I can exercise when:**

<table>
<thead>
<tr>
<th></th>
<th>Not at all confident</th>
<th>Somewhat confident</th>
<th>Moderately confident</th>
<th>Very confident</th>
<th>Completely confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>37. I am under a lot of stress</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>38. I feel I don’t have the time</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>39. I have to exercise alone</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>40. I don’t have access to exercise equipment</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>41. I am spending time with friends or family who don’t exercise</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>42. It’s raining or snowing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>43. I am tired</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Section 5. Physical activity outcome expectations questionnaire.

This section looks at the expectations you might have about being physically active. Read the following items, and circle one answer that best expresses how each item relates to your physical activity expectations.

**These are my expectations about physical activity:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>Quite a lot</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>44.</td>
<td>Physical activity would help me reduce tension or manage stress.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>45.</td>
<td>I would feel more confident about my health by getting regular physical activity.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>46.</td>
<td>I would sleep better.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>47.</td>
<td>Physical activity would help me have a more positive outlook.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>48.</td>
<td>Physical activity would help me control my weight.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>49.</td>
<td>I am too tired to get physical activity because of my other daily responsibilities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>50.</td>
<td>Physical activity would take too much of my time.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>51.</td>
<td>I would have less time for my family and friends if I participated in physical activity.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>52.</td>
<td>I’d worry about looking awkward if others saw me being physically active.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>53.</td>
<td>Getting physical activity would cost too much money.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

The following question relates to the reasons why you would either start to exercise regularly or continue to do so. Different people have different reasons for doing that, and we want to know how true each of the following reasons is for you.

Please indicate the extent to which each reason is true for you (circle the appropriate answer).

The reason I would exercise regularly is:

54. Because I feel that I want to take responsibility for my own health.

1 2 3 4 5 6 7
not at all somewhat very
true true true

55. Because I would feel guilty or ashamed of myself if I did not exercise regularly.

1 2 3 4 5 6 7
not at all somewhat very
true true true

56. Because I personally believe it is the best thing for my health.

1 2 3 4 5 6 7
not at all somewhat very
true true true

57. Because others would be upset with me if I did not.

1 2 3 4 5 6 7
not at all somewhat very
true true true
58. I really don't think about it.

1 2 3 4 5 6 7

not at all somewhat very
true true true

59. Because I have carefully thought about it and believe it is very important for many aspects of my life.

1 2 3 4 5 6 7

not at all somewhat very
true true true

60. Because I would feel bad about myself if I did not exercise regularly.

1 2 3 4 5 6 7

not at all somewhat very
true true true

61. Because it is an important choice I really want to make.

1 2 3 4 5 6 7

not at all somewhat very
true true true

62. Because I feel pressure from others to do so.

1 2 3 4 5 6 7

not at all somewhat very
true true true
63. Because it is easier to do what I am told than think about it.

   1  2  3  4  5  6  7
not at all      somewhat      very
true       true      true

64. Because it is consistent with my life goals.

   1  2  3  4  5  6  7
not at all      somewhat      very
true       true      true

65. Because I want others to approve of me.

   1  2  3  4  5  6  7
not at all      somewhat      very
true       true      true

66. Because it is very important for being as healthy as possible.

   1  2  3  4  5  6  7
not at all      somewhat      very
true       true      true

67. Because I want others to see I can do it.

   1  2  3  4  5  6  7
not at all      somewhat      very
true       true      true
68. I don't really know why.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not at all</td>
<td>somewhat</td>
<td>very</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>true</td>
<td>true</td>
<td>true</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 7. Perceived competence for exercise questionnaire.

Please indicate the extent to which each statement is true for you, assuming that you were intending either to begin now a permanent regimen of exercising regularly or to permanently maintain your regular exercise regimen (circle the appropriate answer).

69. I feel confident in my ability to exercise regularly.

1 2 3 4 5 6 7
not at all somewhat very true true true

70. I now feel capable of exercising regularly.

1 2 3 4 5 6 7
not at all somewhat very true true true

71. I am able to exercise regularly over the long term.

1 2 3 4 5 6 7
not at all somewhat very true true true

72. I am able to meet the challenge of exercising regularly.

1 2 3 4 5 6 7
not at all somewhat very true true true
Section 8. Physical activity questionnaire.

a) Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities are activities that take hard physical effort and make you breathe much harder than normal and that make your heart beat really fast. Think only about those physical activities that you did for at least **10 minutes** at a time.

During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, running, or fast bicycling?

73. Times per week _______

74. How long did these sessions usually last:

- [ ] About 10-15 minutes
- [ ] From 16 to 30 minutes
- [ ] From 31 minutes to an hour
- [ ] More than an hour
- [ ] I don't know

b) Now think about all the moderate activities that you did in the last 7 days. Moderate activities are activities that take medium physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or playing baseball? Do not include walking.

75. Times per week _______

76. How long did these sessions usually last:

- [ ] About 10-15 minutes
- [ ] From 16 to 30 minutes
- [ ] From 31 minutes to an hour
- [ ] More than an hour
- [ ] I don't know
c) Now think about all the light activities that you did in the last 7 days. Light activities are activities that take little physical effort such as snow-mobiling, fishing off a riverbank or easy walking.

During the last 7 days, on how many days did you do light physical activities?

77. Times per week _______

78. How long did these sessions usually last:

☐ About 10-15 minutes
☐ From 16 to 30 minutes
☐ From 31 minutes to an hour
☐ More than an hour
☐ I don't know
Appendix C
Physical Activity Prescriptions

1. Physical activity prescription for PP group.

![FITT Diagram]

**FITT**
Frequency / Intensity / Type / Time

**Ask**
- Safe to participate in physical activity (PAR-Q)
- BMI ≤ 35
- Active < 150 minutes/week

**Advise**
- Increase energy
- Reduce stress
- Help manage weight
- Prevent chronic diseases

**Agree**
- **F** At least ______ times per week.
- **I** Light □ Moderate □ Vigorous
- **T** Walking □ Dancing □ Skating □ Strength training □ Gardening □ Stair climbing □ Swimming □ Cycling
- **T** At least ______ minutes per session.

☐ Agree to register for the Motiv8 Community Series (see reverse)

Signature: __________________________ Date: __________________________

www.kingstongetsactive.ca
Motiv8 Community Series
221 Portsmouth Avenue, Kingston, ON
613-549-1232, ext. 1203

- Eight skill building, 90 minute physical activity and healthy eating sessions.
- Facilitated by a public health physical activity specialist, public health dietitian, public health nurse, and community food advisors.
- An opportunity to learn how to use a pedometer, incorporate flexibility and strengthening exercises into your activity, observe food demonstrations, participate in cooking classes, read food labels, and menu plan.

www.eatwellgetfitlivelife.ca
2. Physical activity prescription for PO group.

### FITT

**Frequency / Intensity / Type / Time**

**Patient’s Name:**

**Ask**
- [ ] Safe to participate in physical activity (PAR-Q)
- [ ] Active < 150 minutes/week

**Advise**

**Physical activity can:**
- [ ] Increase energy
- [ ] Reduce stress
- [ ] Help manage weight
- [ ] Prevent chronic diseases

**Agree**

<table>
<thead>
<tr>
<th>F</th>
<th>At least _______ times per week.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>□ Light □ Moderate □ Vigorous</td>
</tr>
<tr>
<td>T</td>
<td>□ Walking □ Strength training □ Swimming</td>
</tr>
<tr>
<td></td>
<td>□ Dancing □ Gardening □ Cycling</td>
</tr>
<tr>
<td></td>
<td>□ Skating □ Stair climbing □ _________</td>
</tr>
<tr>
<td>T</td>
<td>At least _______ minutes per session.</td>
</tr>
</tbody>
</table>

Signature:                      Date:

[www.kingstongetsactive.ca](http://www.kingstongetsactive.ca)
Be physically active as a family!

Here are some things you can do together:

- Walk your children to school.
- Go for a family walk after supper.
- Play hide and seek.
- Teach your children to ride bicycles and then ride with them.
- Take your children on a treasure hunt.
- Have your children help you with snow clearing and make a snow sculpture.
- Go skating, skiing, or swimming with your children.
- Let your children help you rake leaves and make a game of it.

![Kids FITT Rx](image)

**Ask**
- Patient's Name:
- □ Age 6 to 9  □ Age 10 to 14  □ Active < 90 minutes/day

**Advise**
- **Tune into physical activity to:**
  - □ Build strong bones and strengthen muscles
  - □ Achieve and maintain a healthy weight
  - □ Meet new friends
  - □ Promote good posture and balance
  - □ Enhance healthy growth and development

**Agree**
- **F**  Build up to **90 minutes** of physical activity a day.
- **I**  □ Moderate  □ Vigorous
- **T**  □ Jogging  □ Hiking  □ Soccer
  □ Bike riding  □ Playing outdoors  □ Skating
  □ Swimming  □ Basketball  □ _______
- **T**  At least _____ minutes per session.

Agree to review Canada's Physical Activity Guide for
- □ Children 6 to 9 years of age  □ Youth 10 to 14 years of age

Signature:  Date:  

www.kingstongetsactive.ca
Here are some great ways to be active:

- Walk to school instead of taking the bus or getting a ride.
- Rake leaves, shovel snow, or carry groceries.
- Put on some music and dance to the beat.
- Join a sports league like soccer, basketball, or volleyball.
- Take a class like yoga, hip hop, or gymnastics.
- Go for a hike on a trail.
- Play hide and seek, tag, or have a scavenger hunt.
- Skateboard, inline skate, or scoot around your neighbourhood.
- Run, jump, skip, skate, toboggan, ski... you get the picture.

www.eatwellgetfitlivelife.ca
## Appendix D

### Motiv8 Detailed Series Content

<table>
<thead>
<tr>
<th>Motiv8 Community Series Outline</th>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
<th>Session 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Public Health Nurse</td>
<td>Public Health Dietitian and CFA</td>
<td>Public Health Physical Activity Specialist</td>
<td>Public Health Dietitian</td>
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<tr>
<td>0:00-0:05</td>
<td>Greet participants</td>
<td>Greet participants</td>
<td>Greet participants</td>
<td>Greet participants</td>
</tr>
<tr>
<td>0:05-0:15</td>
<td>Introduction to program -Overview of program -8 messages sit/stand game</td>
<td>Welcome back and review of last week’s progress - Session outline</td>
<td>Welcome back and review of last week’s progress - Session outline</td>
<td>Welcome back and review of last week’s progress - Session outline</td>
</tr>
<tr>
<td>0:15-0:25</td>
<td>SMART Goals -discuss goal setting and choice of goals</td>
<td>Review goal setting</td>
<td>Review identifying barriers and goal setting -fill in logbook</td>
<td>Review identifying barriers and goal setting -fill in logbook</td>
</tr>
<tr>
<td>0:25-0:35</td>
<td>Review goals and allow time for revision of goals.</td>
<td>Review identifying and overcoming barriers</td>
<td>Endurance activities -Intro -Examples</td>
<td>Label reading -Informed choices</td>
</tr>
<tr>
<td>0:35-0:45</td>
<td>Physical activity primer Just Walk!</td>
<td>Fill in logbook</td>
<td>-Intensity levels (4) -How much endurance exercise is needed?</td>
<td>Ingredients list</td>
</tr>
<tr>
<td>0:45-0:55</td>
<td>Pedometer introduction</td>
<td>Managing eating behaviour -Food choice influences</td>
<td>-Increasing intensity -Interval training ideas</td>
<td>Nutrition facts</td>
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<tr>
<td>0:55-1:05</td>
<td>Pedometer activity</td>
<td>Intuitive Eating Eating Well with CFG -Portion Size</td>
<td>Flexibility -Intro -Examples -Types</td>
<td>Comparisons -% daily value</td>
</tr>
<tr>
<td>1:05-1:15</td>
<td>Logbook introduction -Allow time to try logging their day</td>
<td>Regular eating Patterns -Meals -Snacks</td>
<td>-Start stretching</td>
<td>Claims</td>
</tr>
<tr>
<td>1:15-1:25</td>
<td>Change is hard -Breaking down barriers</td>
<td>-Snack demo</td>
<td>-Stretching activity</td>
<td>Labels and Motiv8 -Virtual grocery tour</td>
</tr>
<tr>
<td>1:25-1:30</td>
<td>Wrap up, evaluations and answer questions</td>
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<td>Wrap up, evaluations and answer questions</td>
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<tr>
<td>Time</td>
<td>Session 5</td>
<td>Session 6</td>
<td>Session 7</td>
<td>Session 8</td>
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<tr>
<td>0:15-0:25</td>
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</tr>
<tr>
<td>0:25-0:35</td>
<td>Strength training -General information</td>
<td>Benefits and challenges of making supper meals at home</td>
<td>Planning family meals</td>
<td>Endurance Activity</td>
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<tr>
<td>0:35-0:45</td>
<td>-Using a band</td>
<td>Planning family meals</td>
<td>Recipes and tools to save time</td>
<td>Strength exercises</td>
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<tr>
<td>0:45-0:55</td>
<td>Strength exercises</td>
<td>‘How to’ for your family’s needs</td>
<td>Food storage and safety</td>
<td>Strength exercises</td>
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<tr>
<td>0:55-1:05</td>
<td>Strength exercises</td>
<td>Kitchen inventory -Shopping</td>
<td>Family menu and CFG</td>
<td>Flexibility Routine</td>
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<tr>
<td>1:05-1:15</td>
<td>Strength exercises</td>
<td>Cooking demonstration and taste test</td>
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<td>Review environmental supports to promote behaviour change</td>
</tr>
<tr>
<td>1:15-1:25</td>
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<td>Cooking demonstration and taste test</td>
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<td>Celebration</td>
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