Making Homes Smoke-Free: The Impact of an Empowerment Intervention for Parents

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Abstract

One-third of American children under the age of 18 years and one in ten Canadian children aged 0-11 years are exposed to environmental tobacco smoke (ETS) predisposing them to multiple health problems. Although several intervention strategies to reduce ETS exposure among children have been tested, to date there is not enough evidence to recommend one strategy over another. The objectives of this study were: (a) to test if parents' participation in an intervention based on an empowerment ideology and participatory experiences decreases the number of cigarettes smoked in homes; and (b) to identify barriers to making homes and vehicles smoke-free, as well as facilitators used by parents to manage these barriers. To enable informed decision-making on how to measure empowerment, a systematic review was conducted to identify questionnaires that best measure health-related empowerment among adults and in families.

In a randomized controlled trial, 36 families were allocated to the intervention (n=17) or control group (n=19). The six week intervention included three, two hour group sessions, followed by three follow-up telephone calls, all at weekly intervals. Data were collected in interviewer-administered questionnaires at baseline and at six months follow-up.

No significant difference was detected between the intervention and control groups in the number of cigarettes smoked in the home daily at six months follow-up. However empowerment increased and the number of cigarettes smoked in the home decreased in both the intervention and control groups from baseline (median=17) to six-month follow-up (median=5).

Parents identified multiple barriers to smoke-free homes and vehicles including personal factors, factors involving others, and factors related to the physical environment. The most commonly identified barriers to smoke-free homes were personal factors, with tobacco addiction cited most often. In describing how to overcome barriers, parents identified facilitators involving other people as most effective, yet they most often relied on themselves. None of the parents identified a health provider as a facilitator. The multiple and complex barriers identified in this study suggest that interventions and practice guidelines should incorporate multiple strategies and individualized approaches to assist parents to make their homes and vehicles smoke-free.

Précis

Le tiers des enfants américains âgés de moins de 18 ans et le dixième des enfants Canadiens de 0 à 11 ans sont exposés à la fumée de tabac ambiante (FTA), ce qui les prédispose à développer de multiples problèmes de santé. Même si on a mis à l'essai plusieurs strategies d'intervention pour réduire l'exposition des enfants à la FTA, on a trouvé jusqu'à ce jour trop peu d'évidences pour recommander une stratégie particulière qui serait meilleure que tout autre. Les objectifs de cette étude étaient comme suit: a) analyser si la participation des parents à une intervention basée sur une idéologie d'*empowerment* et à des expériences de participation permet de réduire le nombre de cigarettes fumées à domicile; (b) identifier les obstacles qui empêchent de faire des domiciles et des véhicules des endroits sans fumée aussi bien que les moyens utilisés par les parents pour faire face à ces obstacles. Pour permettre une prise de décision arrêtée sur la façon de mesurer l'*empowerment*, une revision systématique de la littérature a été complétée afin de trouver des questionnaires qui pourraient le mieux aider à mesurer l'*empowerment* des adultes et des familles dans le domaine de la santé.

En utilisant un essai randomisé contrôlé, 36 familles ont été réparties pour participer à l'intervention (n=17) ou à un groupe contrôle (n=19). L'intervention de six semaines comprenait trois rencontres hebdomadaires en groupe d'une durée de deux heures chacune suivies de trois appels téléphoniques échelonnés sur une période de trois semaines. Les participants ont également eu deux entrevues individuelles, une au début du processus et une autre à la période de suivi, six mois plus tard, afin de répondre à des questions relieés à la cueillette de données.

Aucune différence significative n'a été trouvée à la période de suivi, six mois plus tard, entre les participants à l'intervention et les participants au groupe contrôle en ce qui a trait à la quantité de cigarettes fumées chaque jour à domicile. Néanmoins, le niveau l'*empowerment* a augmenté et le nombre de cigarettes fumées à domicile a diminué dans les deux cas, soit lors des processus d'intervention et de groupe contrôle, au début (médiane=17) de l'étude et à la période de suivi, six mois plus tard (médiane=5).

Les parents ont identifié divers obstacles, notamment des facteurs personnels, des facteurs impliquant d'autres individus, et des facteurs reliés à l'environnement physique, les empêchant de faire de leurs domiciles et de leurs véhicules des endroits sans fumée. Les obstacles les plus communs à l'établissement de domiciles sans fumée étaient des facteurs personnels avec comme raison principale la dépendance au tabac. En décrivant comment surmonter les obstacles, les parents ont identifié des moyens impliquant d'autres personnes comme étant les plus efficaces, mentionnant cependant qu'ils s'étaient personnellement souvent pris en charge. Les divers obstacles complexes identifiés dans l'étude suggèrent qu'on devrait inclure de multiples stratégies et diverses approches personnelles lors d'interventions et dans les lignes directrices d'application afin d'aider les parents à faire de leurs domiciles et de leurs véhicules des endroits sans fumée.

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Contribution of Authors

The three manuscripts included in this thesis are the original work of the candidate. The candidate's supervisor and thesis committee members have been instrumental in the theoretical, methodological, statistical, and editorial aspects of the work, leading to the creation of these manuscripts. The candidate and her supervisor obtained research funding to conduct the study.

The candidate developed the research design for the systematic review reported in the first manuscript, and the committee provided suggestions for modifications. The candidate was responsible for extracting the relevant information from each article, and for compiling the manuscript. The committee provided feedback about organizational and editorial aspects of the manuscript. In the second manuscript, which describes the randomized controlled trail, the committee provided feedback about the research design, and helped address issues with study implementation. The candidate designed the intervention and coordinated all aspects of study implementation. The candidate entered the data and conducted the data analyses. The candidate's supervisor worked with the candidate to create the analytical plan and to interpret the data. For the last manuscript, describing barriers and facilitators to smoke-free homes and vehicles, the candidate analyzed the data and wrote the manuscript with feedback from committee members. The individual who facilitated the experimental sessions (SM) also coded the data so that interpretations could be compared. All other sections of the thesis were written by the candidate and revised based on input from the committee. The candidate obtained ethical approval for the study from McGill University Institutional Review Board and the University of

Prince Edward Island Research Ethics Board. Approval was also obtained from the PEI Freedom of Information Committee.

In summary, the candidate had ongoing support from her thesis supervisor and committee members from the initiation of the study to completion. However, the candidate assumes responsibility for the design and implementation of the study, accuracy of the data analysis, and dissemination of the findings.

Statement of Originality

The subject for this thesis originated from two earlier studies, the first of which compared empowering and traditional approaches to asthma education (conducted with colleague Mary Jean McCarthy), and the second which tested a social marketing study designed to help parents make their homes smoke-free (conducted with colleagues Philip Smith and Colleen MacQuarrie). This thesis benefited tremendously from the methodological, statistical, conceptual, and content expertise of committee members. The focus for the study was informed by the candidate's prior work, and the final dissertation is the original work of the candidate.

The thesis has resulted in several original contributions. To my knowledge, this is the first study to examine the impact of an empowerment intervention in the context of smoke-free homes. The systematic review of questionnaires designed to measure empowerment provides a comprehensive analysis of the validity and reliability of questionnaires associated with the measurement of empowerment, and identifies those that best measure the construct. Descriptions of barriers and facilitators to smoke-free homes and vehicles as identified by parents living in a northern climate identify a multitude of factors within and between individuals, as well as those related to the environment. Issues and strategies about working with a hard-to-reach population are identified. The content of this thesis adds to the theoretical and measurement aspects of empowerment, contributes further understanding of the barriers and facilitators to creating smoke-free homes and vehicles, and provides guidance about working with a hard-to-reach population whose members continue to smoke.

Chapter 1 - Introduction

1.1 Public Health Burden of Children's Exposure to Environmental Tobacco Smoke

Exposure to environmental tobacco smoke (ETS) in the home is a major health risk for 40-60% of British children (Rushton, 2004), 30-50% of European children (WHO, 2007), 35% of American children under the age of 18 (American Lung Association, 2007; Schuster, Franke, & Pham, 2002), and approximately one in ten Canadian children ages 0-11 (Health Canada, 2007). ETS exposure most likely poses the single greatest environmental risk for children in the United States (McMillen, Winickoff, Klein, & Weitzman, 2003).

Environmental tobacco smoke, also known as second hand smoke or passive smoking, consists of both sidestream (85%) and mainstream smoke (15%). ETS contains over 4000 substances, of which 50 are known or probable carcinogens (Rushton, 2004). Young children are particularly vulnerable to the effects of ETS as they have higher respiratory rates than adults, leading to higher internal exposures to ETS. In addition, they are unable to complain or remove themselves from the situation in which tobacco smoke is encountered (Ashley & Ferrence, 1998; Brown, 2001).

The wide ranging, adverse effects of ETS exposure on children's health from parental smoking constitutes a major public health problem (Sheahan & Free, 2005). ETS exposure is a risk factor for the onset of asthma, exacerbates existing cases, and is associated with chronic respiratory symptoms (California Environmental Protection Agency, 1997; Health Canada, 2004). Additional adverse effects include bronchitis, bronchiolitis, pneumonia (Li, Peat, Xuan, & Berry, 1999; Strachan & Cook, 1997),

wheezing (Strachan & Cook, 1998), low birth weight (Davis, 1998), ear infections, allergies (California Environmental Protection Agency, 1997), increased school absenteeism (Gillaland et al., 2003; Mannino, Moorman, Kingsley, Rose, & Repace, 2001), and a 2-3 fold increased risk of sudden infant death syndrome (Cook, & Strachan,1999; Mitchell & Milerad, 1999). Cardiovascular effects include impaired oxygen transport, decreased levels of HDL cholesterol, and endothelial dysfunction which leads to the onset of atherosclerosis in childhood (Gidding, 1999). ETS is also associated with neurodevelopmental effects including behavioural problems, learning difficulties, and language impairment (WHO, 1999).

Despite abundant documentation of the multiple adverse effects of ETS on children's health (Mannino et al., 2001; Strachan & Cook, 1998), and the fact that most people are aware of the adverse effects of ETS and are supportive of restrictions in public places, many are reluctant to impose smoking restrictions in their own homes. This is related to the belief that smoking is an individual choice within the home environment, and a fear of offending family and friends (Green, Courage, & Rushton, 2003).

A limited number of intervention studies have targeted reduction of children's ETS exposure (Emmons, Wong et al., 2001), and of those which have been conducted, few report significant findings. A Cochrane systematic review (Roseby et al., 2003) reported statistically significant beneficial intervention effects from four of eighteen controlled trials designed to reduce ETS exposure in children ages 0-12 years.

Efforts to decrease children's exposure to ETS have focused on a variety of

strategies with the most common being education, counselling, feedback on cotinine levels, smoking cessation, and advice-giving. These studies have had mixed results and in some cases are limited by design issues. Some of the strategies which have been tested are associated with aspects of empowerment; however, none of the interventions were based on a comprehensive conceptualization of empowerment that includes an empowerment ideology and participatory experiences (Dunst & Trivette, 1996).

1.2 Research Questions

The primary objective of this study was to test if parents' participation in an intervention based on an empowerment ideology and participatory experiences decreases the number of cigarettes smoked in homes daily at six months follow-up. The research questions guiding the study were:

(1) Does parents' participation in an intervention based on an empowerment ideology and participatory experiences decrease the number of cigarettes smoked in homes daily at six months follow-up?

(2) What factors are perceived by parents as barriers to making their homes and vehicles smoke-free, and what are the facilitators used by parents to manage these barriers?

The following hypothesis was tested: Parents' participation in an intervention based on an empowerment ideology and participatory experiences decreases the number of cigarettes smoked in homes daily at six months follow-up.

1.3 Organization of Thesis

This thesis is organized in accordance with the guidelines for a manuscript-based thesis (www.mcgill.ca/gps/current/programs/thesis/guidelines/). The thesis contains five chapters in which three manuscripts are embedded. The reader will note some overlap between the traditional chapters of the thesis which provide more detailed information, and the manuscripts which are more abbreviated. Each manuscript is formatted according to the requirements for the journal where it is being submitted, or has been submitted. The references, tables, and figures accompany each manuscript to increase readability of the thesis. This format for the thesis has been approved by McGill Graduate and Postgraduate Studies (personal communication, Sandra Gibson, April 24, 2008). The references pertaining to the remaining sections of the thesis are found at the end of chapter five. The appendices provide supporting documentation related to the study.

Chapter one provides an introduction to the significance of children's home exposure to ETS and justification for the study. Chapter two includes a literature review of empowerment and ETS, followed by a manuscript describing a systematic review of questionnaires that measure empowerment. Chapter three describes the research methodology. Chapter four includes two manuscripts: one reporting the results of a randomized controlled trial of the empowerment intervention and the other describing the barriers and facilitators to smoke-free homes and vehicles as described by parents. Chapter five provides a discussion of the results, implications for research and practice, study limitations, summary, and conclusion.

Chapter 2 - Literature Review

2.1 Preface

Although a large volume of literature documents the adverse effects of environmental tobacco smoke on child health, comparatively few studies have investigated strategies to reduce children's environmental tobacco smoke exposure. Similarly, an abundant amount of theoretical literature on empowerment exists; however, relatively few studies have been conducted to test the construct. This chapter presents: (a) a critique of studies designed to decrease environmental tobacco smoke and increase empowerment, (b) a theoretical description of empowerment, and (c) a systematic review manuscript of questionnaires that measure empowerment.

Criteria established by the U.S Preventive Services Task Force (Harris et al., 2001) (Appendix A) were used to assess intervention studies to reduce ETS (Appendix B) and to increase empowerment (Appendix C). Criteria include assembly and maintenance of comparable groups; equal, reliable, and valid measurements; and clear definition of interventions, to name a few. Environmental tobacco smoke studies (Appendix D) and empowerment studies (Appendix E) are grouped as good, fair, or poor (Harris et al., 2001; Nygren et al., 2008). Studies rated as "poor" were excluded from further review. Environmental tobacco smoke and empowerment studies rated as "good" and "fair" are discussed below, and summarized at the end of each section.

2.2 Environmental Tobacco Smoke Interventions

2.2.1 Studies rated as good. Six of the environmental tobacco smoke studies were rated as "good". Of these, five tested a counselling intervention and one tested an educational intervention. A summary of each study follows.

A double-blind RCT was used to test the outcome of seven, individualized behavioural counselling sessions, (three in person and four by telephone), each ranging from 12-28 minutes, and delivered over three months (Hovell, Zakarian, et al., 2000). The sample was drawn from a population of high risk, ethnically diverse, low income mothers (n=108) recruited through the US supplemental nutrition program in a large west coast city. The intervention was designed on shaping procedures to decrease children's ETS exposure, and included setting goals, selecting actions, and signing contracts. Smoking cessation was not required. Control group participants received brief advice to quit smoking and not expose their children to ETS. Children's urinary cotinine levels increased in both groups at three months. Statistically significant differences were found between the groups at 12 months as cotinine levels decreased slightly in the intervention group and increased by 50% in the control group.

Using a RCT, Hovell and colleagues (2002) conducted further investigations of a counselling intervention with Latino families who had a child with asthma exposed to ETS in the home (n=204). The intervention was described as coaching because it included behavioural shaping similar to approaches used in sports. Parents were informed that the overall goal was to help them reduce or eliminate their child's ETS exposure. During a series of seven, 30-45 minute home visits, and a follow-up telephone call, goals were set and contracts signed. Both the intervention and control groups received asthma education. At four months follow-up, the intervention group had small but significantly lower urinary cotinine levels. At 13-month follow-up, urinary cotinine levels were comparable between the groups.

Zakarian et al. (2004) conducted further testing of the behavioural counselling intervention developed by Hovell and colleagues. The RCT was conducted in community clinics with mothers of children ≤ 4 years (n=150) who were exposed to ETS in the home or car. Children's ETS exposure and urinary cotinine levels were reported at baseline, 3, 6, and 12 months. Children's urinary cotinine did not show significant changes over time in either the intervention or control group. The authors concluded that significant findings from earlier studies were related to efficacy which did not translate into effectiveness when the intervention was moved into community clinics.

Emmons, Hammond et al. (2001) conducted a RCT to compare a motivational intervention with a self-help intervention in promoting smoking cessation in parents and caregivers (n=291). The motivational intervention consisted of a 30-45 minute interview with a health educator trained in motivational interviewing, four telephone calls, and feedback about household air nicotine levels and participants' carbon monoxide levels. The intervention was designed to build motivation and address ambivalence about quitting smoking. Goal setting was used to help parents consider next steps. The self-help group received information on smoking cessation and ETS reduction. When household nicotine levels were compared between the groups at six months, significantly lower levels were reported in the intervention group.

Wilson et al. (2001) provided three counselling sessions to families with children aged 3-12 who had asthma (n=87). The intervention included behaviour change strategies and feedback from four urinary cotinine measurements in the

children. Urinary cotinine differences were non-significant at twelve months follow-up.

The final study tested an educational intervention (Chan & Lam, 2006). A RCT was used to examine the impact of a five minute, nurse-led health education intervention provided to mothers who had sick children and husbands who smoked (n=1483). The intervention group received standardized health advice about ETS, booklets about ETS reduction strategies and smoking cessation, a no-smoking sign, and a telephone reminder one week later. At three months follow-up, mothers in the intervention group were significantly more likely to move the child away from ETS exposure than mothers in the control group. However, this finding was not maintained over time as no significant differences were found at six and twelve months follow-up.

Two of the six studies rated as good reported significant findings at six months (Emmons, Hammond et al., 2001) and twelve months (Hovell et al., 2000). Two additional studies reported significant short term findings at three months (Chan & Lam, 2006) and four months (Hovell et al., 2002) but these findings were not maintained over time.

2.2.2. Studies rated as fair. Thirteen of the ETS studies were rated as "fair". Interventions incorporated one or more of the following approaches: education, cotinine feedback, cessation strategies, counselling, home visits, and advice by pediatricians or other health care providers. None of the studies using education and/or home visiting (Eriksen, Sorum, and Bruusgaard, 1996; Greenberg et al., 1994; Hughes, McLeod, Garner, & Goldbloom, 1991; Irvine et al., 1999), or those

providing cotinine feedback (McIntosh, Clark, & Howatt, 1994; Wakefield et al., 2002) reported significant outcomes. A study based on a mail out of cessation resources (Davis, Cummings, Rimer, Sciandra, & Stone, 1992) did not report significant findings; however, a nurse-delivered cessation intervention did report significant findings (Yilmaz, Karacan, Yoney, & Yilmaz, 2006). A brief pediatric counselling session reported significant findings at six months follow-up (Wall, Severson, Andrews, Lichtenstein, & Zoref, 1995) but they were not sustained at 12 months follow-up (Severson, Andrews, Lichtenstein, Wall, & Akers, 1997). The four studies reporting significant benefits are summarized below.

Wahlgren, Hovell, Meltzer, Hofstetter, & Zakarian (1997) studied the long-term outcomes of a RCT conducted by Hovell and colleagues (1994) where parents (n=91) of asthmatic children were randomly assigned to either: (a) six months of behavior modification counselling which included monitoring smoking, exposure, and children's asthma symptoms for two weeks prior to clinic visits; (b) self-monitoring control; or (c) usual medical care. The significant reductions in parent report of children's ETS exposure in the intervention group at six months post-intervention (Hovell et al., 1994), were also found at 14 and 24 months post-intervention (Wahlgren et al.,1997).

The impact of four, two minute sessions advising cessation, and delivered by pediatricians at well baby clinics, was tested in 49 pediatric practices. Significant differences were found in quit rates, relapse rates, and smoking in the home at six months follow-up (Wall et al., 1995).

More recent studies include a RCT conducted with mothers who had children under the age of fifteen (n=363) (Yilmatz et al., 2006). Two, ten minute smoking cessation interventions delivered by a nurse were compared to a control group. One intervention outlined the impact of ETS on child health, and the second described the effect of ETS on maternal health. The control group did not receive any smoking cessation advice. Both intervention groups reported statistically higher rates of cessation and smoking location change compared to those in the control group. The intervention group that focused on the effects on child health reported a significantly higher rate of cessation and smoking location change than the intervention group that focused on maternal health.

Nine studies rated as "fair" reported non-significant findings. Several used home visiting and educational interventions. An intervention based on social learning theory consisted of four home visits conducted by nurses with families who had infants ≤ six months of age (n=933) included a discussion of ETS and completion of a worksheet to decrease exposure. Non-significant group differences in urinary cotinine were found (Greenberg et al., 1994).

Two home visits were conducted with families with a child with asthma (n=501), living with a parent who smoked. Parents were given information on quitting smoking and decreasing environmental tobacco smoke exposure. Non-significant differences were found in salivary cotinine levels (Irvine et al., 1999).

An intervention for children who had been hospitalized for asthma (n=95) consisted of clinic visits every three months for one year, asthma education, and

home visits by a research nurse. Non-significant differences were found in ETS exposure, pet exposure, medical visits, and theophylline levels (Hughes et al.,1991).

An educational intervention conducted at well child clinics with families who had children ≤ four years and an adult smoker in the home (n=443) included a five minute information session about prevention of environmental tobacco smoke exposure and three brochures. No significant differences were reported between the groups concerning smoking behavior (Eriksen et al., 1996).

Several studies provided feedback on cotinine levels. Parents or guardians of children with asthma who attended pulmonary clinics (n=92) received a letter about their child's urinary cotinine, encouragement to smoke outside, and a self-help manual about smoking outside. Non-significant differences in the number of parents smoking outside the home were found at follow-up (McIntosh et al.,1994).

Families with children with asthma and a parent who smoked (n=128) received a letter with the child's cotinine-to-creatinine ratio, information booklets on environmental tobacco smoke, and two telephone calls. Non-significant differences were reported between the groups in parents' cigarette consumption, child's cotinine levels, and parental smoking status (Wakefield et al., 2002).

A motivational interviewing intervention to reduce ETS exposure and to promote cessation was piloted by public health nurses during home visits to women in the Healthy Baby program (n=114), a program that provides medical and social services to low income, pregnant women at risk for poor birth outcomes. Feedback was also given about nicotine levels in the home. No significant differences were found with cessation or smoking rates between the groups (Emmons et al., 2000).

Severson et al. (1997) compared extended and minimal approaches to advice-giving. Those in the extended intervention received advice from a pediatrician, nurse practitioner, or physician assistant during four well baby visits; received written materials; and watched a video. Those in the minimal group received a package of ETS information. Non-significant differences were found at twelve months.

Mothers with young children (n=630) were mailed one of three cessation guides. Non-significant findings in cessation rates were reported (Davis et al.,1992).

2.2.3 Summary of Environmental Tobacco Smoke Intervention Studies.

Counselling was the most common approach used in ETS studies rated as "good". Of the six studies rated as "good", five tested counselling interventions, and two of these reported significant findings (Emmons, Hammond et al., 2001; Hovell et al., 2000). While the studies are robust in design, both treated parents as passive participants who were directed or guided by a coach or motivational interviewer. Shaping and persuasive strategies were implemented, as opposed to participants being encouraged to draw on their strengths and resources.

Of the 13 studies rated as "fair", counselling interventions were a commonly tested strategy, with two of the three studies reporting significant results (Hovell et al., 1994; Wahlgren et al., 1997). Other studies which reported significantly beneficial findings tested advice-giving by a pediatrician (Wall et al., 1995), and a nurse-delivered educational intervention (Yilmatz et al., 2006).

Recommendations from a Cochrane Review of controlled trials (n=18) designed to reduce children's environmental tobacco smoke exposure concluded that there is insufficient evidence to recommend one approach, and that there is limited evidence

for intensive counselling interventions (Roseby et al., 2003). A critical review of the ETS literature (n=19 studies) from 1987-2002 addressing household exposure from birth to adolescence (Gehrman & Hovell, 2003) suggests a more engaging and capacity-building approach with participants. The authors recommend that future interventions: (a) target outdoor smoking as opposed to cessation; (b) use behavior modification principles and social cognitive theory; (c) provide information regarding adverse effects of ETS and skill training to reduce ETS exposure at home; (d) promote self-reinforcement and shaping of behaviors by clinical or research staff in initiating and maintaining the desired behaviors; and (e) assist parents in reducing barriers to a smoke-free home. The authors suggest using a group format to promote social support, sharing, and the acquisition of new problem-solving skills.

Inherent in these recommendations is the recognition that individuals possess strengths and the capacity to acquire new skills. Similarly, use of a group process that incorporates problem-solving, social support and sharing, suggests a perspective that recognizes individuals' strengths and abilities. This philosophical orientation is clearly aligned with empowerment theory.

2.3 Empowerment Interventions

Much of the empowerment literature is theoretical in nature; however, an increasing number of intervention studies are being reported. The following sections contain a review of the theoretical literature and intervention studies based on empowerment.

2.3.1 Theoretical basis. Empowerment, a multi-level concept which occurs at individual, organizational, and community levels, was founded in the context of the social action movements of the 1960s and 1970s including the civil rights, women's, and gay movements (Hage & Lorensen, 2005). The philosophical basis of empowerment is rooted in Freire's (1970) critical pedagogy. Freire viewed education as a participatory process where people are engaged as active rather than passive participants in identifying their problems and solutions (Wallerstein & Bernstein, 1994). A fundamental aspect of Freire's approach is the process of consciousness-raising through critical reflection about everyday experiences (Fahlberg, Poulin, Girdano, & Dusek, 1991), using a learning cycle of listening, dialogue, and action. While definitions of empowerment vary, common attributes include that it is a contextual, participatory process, which enables individuals to achieve a sense of control over their lives. Empowerment is both a process and an outcome, with empowerment processes being essential in achieving empowerment outcomes (Zimmerman, 1995).

Empowerment occurs at the individual, organizational, and community level (Zimmerman, 1990). Empowerment at the individual level is defined as a process by which individuals gain mastery and control over their lives, and an understanding of

their environment (Zimmerman, Israel, Schulz, & Checkoway, 1992). Psychological empowerment, which occurs at the individual level, includes intrapersonal, interactional, and behavioural components. Intrapersonal aspects refer to the way people think about themselves and includes dimensions of self-efficacy, perceived control, motivation to control, perceived competence, and mastery. Interactional components describe interactions between individuals and their environments that enable successful mastery of social or political systems. Behavioral components describe the actions one takes to influence the social and political environment (Zimmerman, 1990, 1995).

The language of empowerment has gradually been adopted in patient education. A search of three databases for the period 1995-2005 identified fifty-five articles (23 research papers and 28 theoretical papers) concerning empowerment and patient education (Aujoulat, d'Hoore, & Deccache, 2007). A number of the research papers refer to the term empowerment but do not elaborate on it theoretically or measure it as a construct. The authors conclude that empowerment is a complex experience involving personal change which can be facilitated by health care providers if they adopt a patient-centred approach to care which acknowledges patients' experience, priorities, and fears. They also noted that several of the papers measured a related construct such as self-efficacy or guided self-determination.

Although empowerment and self-efficacy are sometimes used interchangeably in the literature, empowerment has a broader theoretical perspective than self-efficacy (Perkins & Zimmerman, 1995; Scheel & Rieckmann, 1998). Empowerment has been described as people controlling their own lives (Rappaport, 1981), and as processes

and outcomes related to issues of control, critical awareness, and participation (Perkins & Zimmerman, 1995). Self-efficacy, defined as beliefs in one's capabilities to organize and execute the courses of action necessary to produce given attainments (Bandura, 1997), is described as both a component (Gibson, 1991; Scheel & Rieckmann, 1998; Wallerstein, 1992; Zimmerman, 1995) and an outcome of empowerment (Dunst, Trivette, & Deal, 1994).

2.3.2 Studies rated as good. Of the twelve empowerment studies reviewed, one was rated as "good". The study used a wait-list design to examine the effect of a group education empowerment program on glycemic control and empowerment for teenagers with Type 1 diabetes (n=32) (Viklund, Ortqvist, & Wikblad, 2007). The program consisted of six weekly, two hours sessions and included topics on coping, life satisfaction and goal setting, problem solving, social support, and motivation. No glycemic or empowerment effects were found from the empowerment intervention.

2.3.3 Studies rated as fair. Seven of the empowerment studies were rated as "fair". Six of the studies tested educational interventions (Byrne et al., 1999; Davison & Degner, 1997; McCarthy et al., 2002; Mishra et al., 1998; Pellino et al., 1998; Tsay & Hung, 2004). A summary of each study follows.

An educational breast cancer control intervention consisting of four, two hour group sessions based on self-efficacy and Freire's pedagogy was tested with Latina women (n=88) (Mishra et al., 1998). Women in the control group did not receive any intervention. Immediately following the intervention, participants reported increased self-efficacy, greater skill in conducting breast self-examination, and were more likely to be knowledgeable about breast health than control participants.

Orthopaedic patients (n=83) scheduled for elective surgery were randomly assigned to either a traditional or empowering preoperative teaching group to examine whether those educated with an empowerment model would have better outcomes (Pellino et al., 1998). Empowerment and self-efficacy were not measured at baseline. Patients in the experimental group reported higher empowerment and self-efficacy scores, and had greater confidence in performing perioperative tasks than those in the control group.

An intervention designed to provide men with newly diagnosed prostate cancer (n=60) with resources to acquire information from their physicians was compared to a control condition (Davison & Degner, 1997). The intervention group received an information package, questions to ask their physician, and a tape to record the meeting with the physician. The control group received only the written information package. Participants in the intervention group reported more active decision-making and lower anxiety levels at six weeks follow-up.

A non-equivalent, pretest-posttest control group design was conducted with parents (n=57) to investigate the effects of traditional and empowering approaches to asthma education. While both groups received three group sessions with similar content, the process during the sessions varied, and the empowerment group also received six monthly telephone calls. At six months post-intervention, the empowerment group had significantly higher levels of sense of control, ability to make decisions, and ability to provide care for their children (McCarthy et al., 2002).

One study compared an empowerment education intervention, a health education intervention, and a control group for individuals with chronic mental illness

(n=214). The empowerment intervention consisted of two hour group sessions help twice a week for twelve weeks, followed by weekly sessions for nine months. Sessions consisted of listening, dialogue, and understanding the problem. The health education intervention consisted of twelve, one hour weekly sessions on wellness topics. While all three groups reported increases in life satisfaction, no significant differences were found between the groups (Byrne et al., 1999).

A RCT was used to examine the outcomes of an empowerment program for patients in end-stage renal disease (n=50) (Tsay & Hung, 2004). Those in the intervention program received individual consultations with a clinical nurse specialist three times a week for four weeks. The program focused on goal setting, problem solving, coping with stress, social support, and motivation. Statistically significant differences (improvements) in empowerment, self-care self-efficacy, and depression were reported for the intervention group at six weeks post-intervention.

An empowerment intervention for HIV infected mothers (n=94) was tested using a non-equivalent pretest-posttest control group design. The intervention consisted of six weekly, 2-3 hour group sessions, where the mothers identified needs, designed action plans, and evaluated actions through group dialogue. The intervention group reported significantly improved coping ability, quality of life, and maternal role adaptation at completion of the six week intervention (Jirapet, 2000).

2.3.4 Summary and critique of empowerment studies. Six of the eight empowerment studies rated as "good" or "fair" had an educational focus. Significantly beneficial findings were reported by six studies, including four educational interventions. Outcomes from these six studies included a more active

role in decision-making and lower anxiety levels (Davison & Degner, 1997); increased levels of coping ability, quality of life and maternal role adaptation (Jirapet, 2000); increased sense of control, ability to make decisions, and ability to provide care (McCarthy et al., 2002); increased knowledge, higher levels of self-efficacy, and greater skill at performing BSE (Mishra et al.,1998); higher empowerment, self-efficacy, and confidence (Pellino et al., 1998); and significantly greater improvement in empowerment, self-care self-efficacy, and depression (Tsay & Hung, 2004). None of the six used intent-to-treat analysis, and two did not use adequate randomization (Jirapet; McCarthy et al.).

2.4 Synthesis of Literature

While numerous adverse effects of children's ETS exposure are clearly documented in the literature, a limited number of intervention studies have reported reductions in children's ETS exposure. Two of the more robust studies (Emmons, Hammond et al., 2001; Hovell et al., 2000) focused on motivational and behavioural shaping strategies which positioned the interviewer or coach as expert, and the participants as passive recipients. Recommendations from Gehrman and Hovell (2003) for future ETS interventions suggest a more participatory, capacity building approach that builds on participants' strengths and abilities. This perspective is congruent with empowerment theory, a multi-dimensional construct consisting of ideology, processes, and outcomes. Interventions based on empowerment theory suggest positive outcomes for clients including more active decision-making, lower anxiety levels, increased levels of coping, quality of life, maternal role adaptation,

sense of control, ability to make decisions and to provide care, knowledge, self-efficacy, empowerment, and confidence.

2.5 Theoretical Framework

The Family-Centered Assessment and Intervention Model by Dunst et al., (1994) provided the theoretical framework for this study. The model consists of four components, three of which address family characteristics and the fourth which describes professional behaviours. The components include: (a) needs and aspirations, (b) strengths and capabilities, (c) social supports and resources, and (d) professional help-giving behaviors. The model posits that professional help-giving behaviours assist families to become empowered through the acquisition and use of competencies to obtain supports and mobilize resources to meet their needs.

A synthesis of the empowerment literature by Dunst, Trivette, and LaPointe (1994) revealed that empowerment has been described in six varying but conceptually congruent ways including philosophy, paradigm, process, partnership, performance, and perception. Dunst and Trivette (1996) incorporated these perspectives into a united framework consisting of an empowerment ideology, participatory experiences, and empowerment outcomes.

An empowerment ideology encompasses an empowerment philosophy and paradigm, and articulates the belief that people have the capacity to increase competence. Participatory experiences include processes and partnerships for individuals to strengthen capabilities and acquire new competencies. Empowerment outcomes are consequences of enabling experiences, and consist of behaviours as well as the control appraisals people make about their capabilities such as personal

control, self-efficacy, self-esteem, and locus-of-control (Dunst & Trivette,1996; Trivette, Dunst, Hamby, & LaPointe, 1996). The united framework proposes that professional help-giving practices founded on an empowerment ideology and participatory experiences promote empowering outcomes for families. Structural equation modeling was conducted with data obtained from 74 mothers who were involved with an early intervention/family support program to test whether the relationships between the six dimensions of empowerment specified in the united framework were supported by the data. Mothers completed the Helpgiving Practices Scale which measured the helpgiving attitudes, beliefs, and behaviours of a target help giver, and the Empowerment Survey which measured parent beliefs about events or situations that reflect a sense of control. The data fit the hypothesized paths specified in the unified framework. All path coefficients were significant except for the non-significant relationship between participation and perception. The authors concluded that the results were highly consistent with the united framework (Trivette et al., 1996).

The united framework was used to develop the intervention tested in our RCT. An empowerment ideology which states that people have the capacity to build skills and increase competence was incorporated in the script of the intervention. A group facilitator was selected who incorporated a strengths-based philosophy in her previous work with families. Participatory experiences which enabled participants to identify their strengths and acquire new competencies were included in the intervention. A full description of the intervention is found in chapter 3.

2.6 Causal Diagram

The causal diagram (Appendix F) shows the relationships between the variables tested in this study. Parent/child factors and household smoking characteristics are potential confounders.

2.7 Manuscript One

Running head: MEASURES OF EMPOWERMENT

Measures of empowerment in health decision-making:

A systematic review of empowerment questionnaires

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Abstract

Objective: To identify questionnaires in the published literature that best measure health-related empowerment among adults and in families.

Methods: A systematic review of studies which include questionnaires that measure empowerment in adults and families. A search of nine data bases identified 8,269 abstracts that made reference to empowerment. Full article review was completed for abstracts that met the inclusion criteria or that could not be excluded with certainty (n=124).

Results: Fifty distinct, modified, or translated questionnaires measuring empowerment were identified in 74 articles. Based on the strength and completeness of their reliability and validity data, two were rated as "high quality," three as "medium quality," and 45 as "low quality."

Conclusions: Insufficient psychometric data for many questionnaires assessed in this review could relate to a lack of consensus on the theoretical underpinnings and operational definition of empowerment. Empowerment needs to be differentiated from related concepts, and valid and reliable instruments developed to measure it.

Practice Implications: We recommend that researchers use the two questionnaires identified as being "high quality," and that further reliability and validity data be collected on the other questionnaires

Keywords: Empowerment, systematic review, questionnaire, measurement

1. Introduction

The term empowerment has become entrenched in everyday language in diverse professional fields including business, health, education, and psychology. Underlying routine use of the term, is a broad theoretical construct which is philosophically grounded in Freire's (1) classic work on education. Freire believed that every individual, given adequate resources, is capable of perceiving his/her personal and social reality, and of critically addressing this reality to move forward to a richer life. The social action movement in the 1960's and the self-help (2) and consumer movements in the early 1970's (3) emphasized the importance of citizen participation in decision-making. Individual and community participation in health care was reflected in the Alma Alta Declaration (4) and the Ottawa Charter (5).

The construct of empowerment emerged in the field of psychology in the 1980's to counteract a deficit orientation to individuals perpetuated by social scientists (6), to provide an alternative perspective in mental health to that of the medical model (7), and to address societal oppression and inequality (8). During the last 15 years, the literature on the theoretical underpinnings of empowerment has proliferated, although relatively few measurement instruments have been developed. The objective of this systematic review was to identify questionnaires measuring empowerment with the best evidence of validity and reliability.

1.1 Empowerment theory

Empowerment is a multi-dimensional construct applicable to individuals, organizations, or neighbourhoods (9). It is viewed as a construct rather than a concept because it is not directly observable (10). One of the earliest references to

empowerment describes it as "...the possibility for people to control their own lives"(11). Perkins and Zimmerman (12) describe empowerment as processes and outcomes related to issues of control, critical awareness, and participation. Empowerment is also characterized as a democratic process, with the goals of redistributing power, advancing social justice, and increasing personal, interpersonal, or political power to address issues of powerlessness (13). Empowerment takes different forms in different contexts or settings (14). While specific definitions vary, empowerment is commonly described as a contextual, participatory process, which enables individuals to achieve a sense of control over their lives.

Empowerment processes are essential in achieving empowerment outcomes (15). These processes are transactional in that they involve interactions with others (2). Examples of empowerment outcomes include improved diabetic control in children of empowered mothers (16); more active decision-making and lower anxiety levels in men with prostate cancer (17); increased self-efficacy, skill, and knowledge in women learning about breast cancer control (18); and improved empowerment, self-care self-efficacy, and depression for those with end-stage renal disease (19).

Psychological empowerment refers to empowerment at the individual level. It varies between people, fluctuates over time, and operates through intrapersonal, interactional, and behavioural processes. The intrapersonal aspect refers to how people think about themselves; the interactional component addresses how people understand and relate to their social environment; and the behavioural component includes actions that address needs in a specific context (14).

The health literature on empowerment has increased exponentially since the early1990's, particularly in relation to chronic conditions such as mental illness or disability (20), diabetes (21), and childhood emotional and behavioral disorders or disabilities (22). A particular focus has been in health education interventions wherein the language of empowerment has gradually been adopted by health care providers (23).

Empowerment is sometimes used interchangeably with other constructs, and in particular with self-efficacy (24). While they are related constructs, empowerment has a broader theoretical perspective than self-efficacy (12;25). Perceived self-efficacy is defined as the belief in one's own capabilities to organize and implement the actions necessary to produce given attainments (26). Self-efficacy has been characterized as both a component (2;25;14) and an outcome of empowerment (27).

The literature on empowerment has evolved from a primarily theoretical perspective (2), to testing and theoretical re-definition (28) with a greater focus on measurement. The context-specific nature of empowerment and increased emphasis on its measurement has resulted in the development of questionnaires designed for specific populations.

1.2 Measurement theory

Clearly articulated theoretical and operational definitions provide the link between theory and practice. A solid theoretical foundation is essential for the measurement of concepts, with theoretical definitions providing a foundation for the development of operational definitions. Operationalizing a concept involves developing a theoretical definition, specifying variables based on the definition,

selecting indicators, developing measures of the indicators, and evaluating the adequacy of the resulting operational definition (29).

Reliability and validity data provide critical information with which to assess the accuracy of instruments. Reliability assesses how close to the true measure a score is, or conversely, the amount of error in any measurement. Error may arise from inconsistencies. Validity assesses whether a scale is measuring what it was intended to measure, and the degree of confidence that can be placed on inferences about individuals based on the scores (30).

Validity is usually described in terms of content, criterion, and construct validity. Content validity assesses whether the domains articulated in the theoretical definition are represented in the scale. Criterion validity refers to the correlation of a scale with another measure of the trait that is being explored, preferably a gold standard if one exists. Construct validity is an ongoing process of making predictions based on a theory or construct and testing them with methods such as exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) (31;32;30). Factor analysis, an approach to construct validation, clusters variables related to dimensions of a particular construct, and tests relationships between variables (33). EFA identifies the factor structure of data while CFA examines whether hypothesized factors are supported by the data (34). Both EFA and CFA are important steps in examining the congruence between theoretical and operational definitions of empowerment, and in differentiating it from related constructs.

The objective of this review was to identify questionnaires in the published literature that measure empowerment among adults and in families, and demonstrated

the best evidence of validity and reliability. Questionnaires measuring empowerment in adults focus on the individual, while those measuring empowerment in families include items that refer to family functioning and to other family members. The term questionnaire, rather than scale, is used herein because questionnaires may contain more than one scale (35).

2. Methods

Systematic reviews use quantitative or qualitative methods to synthesize knowledge across investigations (36). We used a qualitative approach in this review because the purpose was to identify questionnaires which best measure empowerment in adults and families.

Nine databases were searched to identify articles eligible for inclusion: CINAHL, Medline, PsycINFO, PubMed, Web of Science, Sociological Abstracts, Embase, Health and Psychosocial Instruments, and the Cochrane Library. Search terms included: empower and instrument; empower and tool; empower and measure; empower and scale; empower and survey; empower and questionnaire; empower and test. Truncation symbols were used to include all possible endings for all terms. The term empower* was entered in each database to determine when the term first appeared, and searches were initiated from that point forward. Searches were completed in June, 2007. Since keyword searching was used, any article that contained the word empower was identified, even if the substance of the article was not about empowerment. Thus some search periods predate the origins of the construct of empowerment.

All citations were imported into Reference Manager ®. A two-step process was used to select relevant articles. Each abstract was initially screened to assess eligibility for inclusion. Eligibility criteria included abstracts that reported measurement of empowerment in adults or families in health-related situations, and were published in English. Abstracts were excluded if they included only measures to assess worksite, organizational, or community empowerment or, if they were based on dissertations due to the prohibitive cost of retrieval. Full articles were reviewed for abstracts which met the inclusion criteria. The following information, if available, was abstracted from the articles retained: (a) the theoretical basis for the instrument; (b) a description of the instrument including number of items and method of administration; (c) population(s) studied; (d) data on reliability (internal consistency, test-retest reliability), and; (e) data on content or construct validity.

Questionnaires were rated as high, moderate, or low quality according to: (a) whether or not data were provided on validity and/or reliability; and (b) the strength of the data supporting reliability and validity. High quality questionnaires reported both reliability and validity correlation coefficients of ≥ 0.8; moderate quality questionnaires reported both reliability and validity correlation coefficients of ≥ 0.7; and low quality questionnaires reported reliability and validity correlation coefficients of < 0.7, or did not report any reliability and/or validity data. Questionnaires which commented on validity and reliability but did not provide data were rated as low quality. These criteria were used in a previous systematic review which assessed the reliability and validity of questionnaires used to measure the health of refugee women (37). In other literature, coefficients of 0.8 and above have been recommended for

internal consistency, a measure of whether items are tapping different aspects of the same attribute (30). Test-retest reliability coefficients above 0.8 have been deemed acceptable (33).

Ratings were assigned to questionnaires according to reliability and validity data reported in individual articles. Questionnaires described in more than one article were rated according to the highest reliability and validity coefficients reported.

3. Results

3.1 Overview of findings

A total of 8,269 citations were reviewed. All abstracts that met the inclusion criteria as well as those which could not be rejected with certainty were retained for an in-depth review of the full text articles (n=124) (Figure 1). This review, which used the same criteria as the abstract review, resulted in the identification of 74 articles that met the inclusion criteria. The articles were published between 1988-2007, with the majority (n=63) published after 1995. Most (n=52) were published in American journals. Each time a scale was modified (translation was considered a modification), it was considered as a separate instrument. Fifty unique questionnaires were identified in the 74 articles. Table 1 groups the questionnaires by title, and categorizes them by study population. Two articles described the use of multiple scales to measure empowerment (14,38). The most frequently cited questionnaires were the Diabetes Empowerment Scale (21) and the Family Empowerment Scale (22).

3.2 Study designs and populations

Study designs for articles included in this review varied considerably, and

included measurement studies, descriptive studies, program evaluation studies, and randomized controlled trials testing empowerment interventions. The most frequently studied population was parents of children with emotional, behavioral, or mental disorders and disabilities. Other study populations included caregivers, individuals with chronic health conditions, and students.

3.3 Description of empowerment questionnaires

Questionnaires to measure empowerment were self-administered in the majority of studies, although several used interviewer-administered questionnaires in structured face-to-face or telephone interviews. The number of items per instrument ranged from 1 to 64.

3.3.1 Theoretical basis of questionnaires. All articles included a description of the theoretical basis on which the instrument was based, although these varied widely across studies. The most frequently cited theoretical underpinning was psychological empowerment (n=17). Other theoretical perspectives included diabetes-related psychological self-efficacy; efficacy, knowledge, support, aspiration; decision-making; and coping. Some questionnaires included the word "empowerment" in the title of the instrument although the theoretical basis in fact represented a different construct.

The conceptual complexity of empowerment was demonstrated by Zimmerman and Rappaport (38) who identified 11 dimensions and scales to measure psychological empowerment (i.e., internal political efficacy, external political efficacy, mastery, self-efficacy, perceived competence, desire for control, civic duty, control ideology, chance control, internal control, and powerful others). In a later

study, Zimmerman (39) used four scales representing personality, cognition, and motivation to assess psychological empowerment.

3.3.2 *Reliability and validity.* Both reliability and validity data were reported for 28 of the 50 questionnaires. Reliability data only were reported for 14 of the questionnaires, and validity data only were reported for four questionnaires. Neither reliability nor validity data were reported for four questionnaires. Reliability data were most often reported using Cronbach's alpha as a measure of internal consistency. Internal consistency ranged between 0.71-0.96. Test-retest reliability data were reported for five questionnaires and ranged between 0.49-0.79. Several studies presented test-retest data on subscales.

The most frequently reported method of examining construct validity was factor analysis. Very few studies related the results of factor analysis to the theoretical definition of the construct. The congruency between theoretical and operational perspectives was discussed in two articles, one which reported the Family Empowerment Questionnaire (40), and one which reported the Family Empowerment Scale (22). Both articles examined content as well as construct validity. Although content validation is an important step in examining whether an instrument measures the underlying theoretical construct (41), few studies discussed this form of validity.

Two questionnaires were classified as high quality, three as moderate quality, and 45 as low quality (Figure 1). High quality questionnaires included the Parent Empowerment Survey (42), developed to measure parents' sense of control over life events; and the Empowerment Questionnaire (43), developed to measure empowerment in individuals with brain damage. Moderate quality questionnaires

included the Family Empowerment Scale (22), created to measure empowerment in parents and caregivers of children with emotional disabilities; the Family Empowerment Questionnaire (40), developed to measure empowerment in family members and care givers of a brain-damaged family member; and the Psychological Empowerment Scale, designed to measure empowerment in parents of children with a disability (44).

4. Discussion

Despite increased interest in empowerment, there is as yet little consensus on its theoretical underpinnings, definition, characteristics, or boundaries. This lack of consensus relates to the broadness of the construct and the overlap with related constructs such as self-efficacy and decision-making ability. Differentiation of empowerment from related constructs will be an important step forward in consolidating theoretical perspectives, as well as the processes and outcomes associated with empowerment.

Enhanced theoretical clarity will also address confusion associated with the measurement of empowerment. Varying conceptualizations of empowerment have led to the development of instruments which measure different dimensions of empowerment, or entirely different constructs, thus limiting the ability to compare and synthesize data on empowerment across studies. For example, although entitled the "Diabetes Empowerment Scale" (21), the authors describe it as a measure of diabetes-related psychosocial self-efficacy. Theoretical clarification will also help delineate operational definitions and minimize use of multiple constructs to define and measure empowerment.

Increased emphasis on instrument validation is needed to better link theoretical definitions with operational definitions. Examining content validity during the instrument developmental phase would increase congruence between theoretical and operational definitions. Although enhancing content validity strengthens construct validity (33), content validity was seldom reported in the articles reviewed for this study. Similarly, although factor analysis was frequently reported, there was little discussion of the congruence between the factors identified and the theoretical definitions or frameworks which guided questionnaire development. Although researchers reported factors that emerged from the analyses, the reader is often left to interpret the congruency of these factors with the theoretical perspective. Analyzing congruency is an important step in examining construct validity.

Valid and reliable instruments would enable researchers to accurately and consistently test the theoretical construct of empowerment, and to conduct comparative analyses of interventions designed from other theoretical perspectives. Use of questionnaires with poorly substantiated reliability and validity necessitates cautious interpretation of findings. Over-reliance on data gathered from instruments without established validity and reliability could lead to measurement error and biased conclusions.

Increased theoretical clarity and the creation of valid and reliable questionnaires will help empowerment evolve to a more mature concept. Mature concepts are well-defined, with clearly described characteristics, delineated boundaries with established preconditions and outcomes. Mature concepts are useful concepts for quantitative research (45).

Relevant articles may have been missed either in the search strategy or in the abstract review phase of this systematic review. Restricting the search process to articles published in English is also a limitation. Inconsistent use of terminology used to describe validity may have affected our comparison of validity data across studies.

4.1 Conclusion

Despite increased interest in empowerment among health researchers, and a large and growing literature, further work is needed to clarify and delineate its theoretical underpinnings and operational definition. In particular, empowerment must be differentiated from related concepts. Further, more evidence on the reliability and validity of questionnaires to measure empowerment is required. Of the 50 questionnaires reviewed for this study, only two reported high quality evidence for validity and reliability. This may relate to: (a) lack of consensus on theory and definition, and (b) researchers not being interested or thorough in establishing and reporting evidence for reliability and validity in their articles. The literature will continue to be confusing until there is clarity and researchers begin to report more thoroughly on the performance of their measures. Increased theoretical clarity and greater emphasis on reliability and validity of empowerment instruments will improve the quality of the literature on empowerment, and contribute to the maturation of the construct.

4.2 Practice implications

Questionnaires that measure empowerment in specific populations are identified and rated according to validity and reliability. We recommend that researchers use the two questionnaires identified as "high quality", and that further reliability and validity

data be collected on other questionnaires. Caution must be exercised in interpreting data collected using instruments without evidence of validity and reliability to avoid measurement error and biased conclusions.

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Table 1

Description of Empowerment Questionnaires

Category of Participant	Instrument, Administration # Items	Study Population	Theoretical Basis	Validity	Reliability
Diabetes Empowerment Scale and Modifications					
Clients with diabetes	1) Diabetes Empowerment Scale (DES) (21). Self-admin, 37 items	Patients with diabetes (n=64)	Diabetes-Related Psychosocial Self-Efficacy	Not reported	Cronbach's alpha sub-scales 0.57-0.85
Clients with diabetes	1) Diabetes Empowerment Scale (46) Mail Survey, 37 items	Male veterans with diabetes (n=211)	Diabetes-Related Psychosocial Self-Efficacy	Not reported	Cronbach's alpha total scale α 0.96; Subscales α 0.56-0.90.
Clients with diabetes	1) Diabetes Empowerment Scale (24) Mail Survey, 37 items	Adult patients with diabetes (n=375)	Diabetes-Related Psychosocial Self-Efficacy	PCA yielded 3 factors and 28 items (Managing the Psychosocial Aspects of Diabetes, Assessing Dissatisfaction and Readiness to Change, and Setting and Achieving	Test-retest correlation (six week) of 37 item pilot version r = 0.79 Coefficient α 28 item total scale 0.96, and 0.81, 0.91, and 0.93 for subscales.

				Diabetes Goals). Concurrent validity: correlated 3 subscales Diabetes Care Profile (r 0.32 -0.59).	
Clients with diabetes	1) Diabetes Empowerment Scale (47) 28 items	Adults with Type 2 Diabetes (n=314)	Diabetes-Related Psychosocial Self-Efficacy	Not reported	Not reported
Clients with diabetes	2) Diabetes Empowerment Scale (48). Interviewer admin, 30 items (different number from Anderson et al., 1995 and 2000)	Patients with diabetes (n=119)	Diabetes-Related Psychosocial Self-Efficacy	Not reported	Not reported
Clients with diabetes	3) Diabetes Empowerment Scale (49). Used 23 items of the DES	Women with gestational diabetes (n=58)	Self-Efficacy	Not reported	Reliability (0.94) total scale. Test-retest 0 .79 (50)
Clients with	4) Diabetes	Patients with	Diabetes-Related Psychosocial Self-	FA revealed 5 factors	Test-retest (two week)

diabetes	Empowerment Scale - Chinese Version (C-DES) (Back translated the DES). (51) . 20 items	diabetes in Hong Kong (n=207).	Efficacy	(Overcoming barriers, determining barriers, achieving goals, obtaining support, coping) and 20 items. Content validity ratio 4.3 indicated items valid. Criterion validity: Pearson's r = - 0.17, p=.0.03 between C- DES-20 and HbA_{1C} .	reliability ICC 0.75. Cronbach's alpha five subscales 0.76-0.89 & 0.86 entire scale.
Clients with diabetes	4) Diabetes Empowerment Scale - Chinese Version (C-DES) (52) Interviewer admin, 20 items	Community dwelling individuals with type 2 diabetes (n=102)	Diabetes-Related Psychosocial Self-Efficacy	Concurrent validity with General Self-Efficacy Scale Pearson's r = 0.48, p = 0.001.	Cronbach's alpha 0.93.
Clients with diabetes	4) Diabetes Empowerment Scale (C-DES) (53) 20 items	Patients with Type I and II Diabetes (n=189)	Diabetes-Related Psychosocial Self-Efficacy	CFA:items loaded on five subscales of the C-DES. Convergent validity between C-DES sub-scales and HbA_{1C} not found.	Cronbach's alpha total scale 0.85 and subscales 0.69-0.90.
Clients with	5) Diabetes	Patients with	Diabetes-Related Psychosocial Self-	Content validity supported	α 0.84

diabetes	Empowerment Scale Short Form (DES-SF) (54), 8 items	diabetes (n=229)	Efficacy	as both DES-SF and HbA1C scores improved after education program.	
Clients with diabetes	5) DES-SF (55)	Patients with diabetes (n=239)	Psychosocial Self-Efficacy	Not reported	Not reported
Clients with diabetes	6) Swedish-DES-23 (56), 23 items	Youth 12-17 with Type 1 diabetes (n=55).	Diabetes-Related Psychosocial Self-Efficacy	Not reported. States questionnaire is valid (article in press)	Not reported- States questionnaire is reliable (article in press)
Clients with ESRD	7) Diabetes Empowerment Scale (Modified to ESRD (19) Interviewer admin, 28 items	Adult ESRD patients on hemodialysis (n=50)	ESRD Related Psychosocial Self-Efficacy	Report validity findings from (24). Validity testing not done on modified version.	Internal consistency 0.93
Empowerment Scale and Modifications					
Psychiatric clients or self-help members	8) Empowerment Scale (Consumer Constructed Empowerment	Members of self-help programs (n=271	Attributes of empowerment developed by self-help leaders.	PCA revealed 5 factors: (Self-esteem/self-efficacy; power-powerlessness; community activism/	Cronbach's alpha 0.86

	Scale). (57). Self-admin, 28 items	individuals in 6 self-help programs in 6 states).		autonomy; optimism/ control over future; and righteous anger). Construct validity: Significant positive correlations with five constructs: r=0.15-0.51. Known-groups validity.	
Psychiatric clients or self-help members	8) Empowerment Scale (58), 28 items	Patients with diagnosis of schizophrenia (n=172)	Attributes of empowerment developed by self-help leaders.	Not reported	Reported internal consistency 0.85 from (59) and 0.86 (60)
Psychiatric clients or self-help members	8) Empowerment Scale (60), mail survey, 28 items	Psychiatric patients, (n=283)	Attributes of empowerment developed by self-help leaders	PCA confirmed the 5 scales found by (57).	Cronbach's alpha 0 .85 for entire scale; subscales 0.55-0.91
Psychiatric clients or self-help members	8) Empowerment Scale (61), Interviewer admin, 28 items	Psychiatric disabilities (n=1,824)	Attributes of empowerment developed by self-help leaders.	Reported 5 factors by (57) and validity satisfactory (62).	Reported reliability satisfactory from (62)
Psychiatric clients or self-help	8) Empowerment Scale (63), Self-admin, 28 items	Recipients of mental health services	Attributes of empowerment developed by self-help leaders.	Convergent validity supported. Different factors from (57) (manuscript	Reported *good internal* consistency from (57)and in manuscript under review.

members		(n=66).		under review)	
Psychiatric clients or self-help members	8) Empowerment Scale (64) Self-admin, 28 items	Individuals with bipolar disorder (n=19)	Attributes of empowerment developed by self-help leaders.	Not reported	Not reported
Psychiatric clients or self-help members	8) Consumer Constructed Empowerment Scale (Same as Empowerment Scale) (65), Self-admin, 28 items	Adult Psychiatric consumers (n=47)	Attributes of empowerment developed by self-help leaders.	Reported factors identified by (57). Reported adequate validity from (66).	Reported adequate internal consistency from (66).
Psychiatric clients or self-help members	9) Empowerment Scale (67) Self-admin, 23 items	Adolescence girls who experienced sexual abuse (n=42)	Attributes of empowerment developed by self-help leaders	Not reported	Reported alpha coefficients from (60) for total scale 0.85 and subscales 0.55-0.91
Psychiatric clients or self-help members	10) Making Decisions (Swedish version Emp Scale) (68). Interviewer admin, 28 items	Persons with a mental illness (n=92)	Attributes of empowerment developed by self-help leaders.	PCA of 5 subscales revealed 2 super- ordinate factors: Self-esteem and activism; Community and power. Correlation total score with	Cronbach's alpha 0.84 total scale and .45-.90 for five subscales

				7 measures -.28-.58.	
Empowerment Questionnaire					
Brain Injury Family, Clients, or Caregivers	11) * **Empowerment Questionnaire** (43). Interviewer administered, 42 items	Persons with brain damage (n=10 in pilot; 107 main study)	Empowerment model consisting of information, skills, support, and hope	Content validity: Kappa 0.87 between 6 experts. EFA found 4 factors: support, skill, aspiration, and knowledge. Consistent with theoretical model.	Cronbach's alpha 0.96 total scale, 0.76-0.93 for subscales.
Family Empowerment Questionnaire					
Brain Injury Family, Clients, or Caregivers	12) ⇑ Family Empowerment Questionnaire (40), 52 items	Chinese Family members of brain injured pts (n=211)	Empowerment model consisting of knowledge, skill, and support at the personal, familial and societal levels.	Content Validity: Kappa between raters 0.87; Construct validity examined with FA. 4 factors: Efficacy, Support, Knowledge, and Aspiration. Consistent with theoretical model.	Internal consistency alpha coefficients of total scale and four subscales 0.76-0.96.
Brain Injury Family, Clients, or Caregivers	12) Family Empowerment Questionnaire (69), 52 items	Chinese Family members of brain injured pts (n=50)	Based on factor analysis(40) empowerment conceptualized as efficacy, knowledge, support, and aspiration.	Reported previous work (40) that identified 4 factors: efficacy, knowledge, support, and aspiration. No statistics given.	Not reported.

Brain Injury Family, Clients, or Caregivers	12) Family Empowerment Questionnaire (70) Self-admin, 52 items	Family data from 1998. (n=211 clients; 77 Profs)	Based on factor analysis (40) empowerment conceptualized as efficacy, knowledge, support, and aspiration.	Reported previous work (40) that identified 4 factors: efficacy, knowledge, support, and aspiration. No statistics given.	Internal consistency 0 .76-0.96 for four dimensions.
Family Empowerment Scale and Modifications					
Parents or caregivers	13) ⍓ Family Empowerment Scale (FES) (22), Mail survey, 34 items	Parent organizations and parents of children with emotional, behavioral, and mental disorders (n=440)	Two dimensional conceptual framework: 1) level of empowerment (family, service system, community /political; 2) the way empowerment is expressed (attitudes, knowledge, and behaviors).	Kappa 0.77 among 25 raters for item congruence with construct definitions. FA revealed 4 factors: advocacy for services; parents' understanding service system and self-confidence; family empowerment; parents decision-making right. Factors correspond with level of empowerment.	Cronbach's alpha for the level of empowerment dimension subscores (family, service system, community/political) 0.87-0.88. Four week test-retest reliability for level of empowerment subscores Pearson Correlations 0.77-0.85
Parents or caregivers	13) Family Empowerment Scale (71)	Parents of children with emotional	Koren's two dimensional model of family empowerment	FA identified 4 factors: systems advocacy, knowledge, competence,	Split-half reliability was 0.93

	Mail survey, 34 items	disturbance or ADHD, (n=228)		and self-efficacy. Congruent with original scale (22)	
Parents or caregivers	13) Family Empowerment Scale (72) Mail survey, 34 items	Parents of children with emotional disorders (n=164)	Koren's two dimensional model of family empowerment	Reported factors from (71)	Reported from (71) instrument is psychometrically sound
Parents or caregivers	13) Family Empowerment Scale (73). Mail survey, 34 items	Parents of children with ADHD (n=228)	Koren's two dimensional model of family empowerment	Reported factors from (71)	Reported from (71) adequate internal consistency
Parents or caregivers	13) Family Empowerment Scale (25). 34 items	Parents of children ages 3-5 (n=75)	Koren's (1992) two dimensional model of family empowerment	Reported 3 subscales from (22)	Reported internal consistency test-retest reliability .from (22).
Parents or caregivers	13) Family Empowerment Scale (74). 34 items	Caregivers of children using mental health services (n=2,308)	Koren's two dimensional model of family empowerment	Reported factor analysis by (22) and (71).	Reported reliability from (22) .
Parents or	13) Family	Parents of	Koren's two dimensional model of	FA identified a single factor	Reported Cronbach's alpha

caregivers	Empowerment Scale (75). Mail survey, 34 items (minor changes)	children with a disability (n=141)	family empowerment	structure: did not support the factor structure reported by (22).	0.93 for total scale.
Parents or caregivers	13) Family Empowerment Scale (76). Telephone interview, 34 items	Family education participants (n=95)	Koren's two dimensional model of family empowerment	Not reported	Not reported.
Parents or caregivers	13) Family Empowerment Scale (77). Self-report, 34 items	Parents of hospitalized children (n=19)	Koren's two dimensional model of family empowerment	Reported validity from (22).	Reported reliability from (22).
Parents or caregivers	13) Family Empowerment Scale (78). Home interviews, 34 items.	Family members of children with disabilities (n=63) and support workers (n=6)	Koren's two dimensional model of family empowerment	Not reported	Not reported
Parents or caregivers	13) Family Empowerment	Parents of children with	Koren's two dimensional model of family empowerment	Reported validity from (22).	Internal consistency three subscales ranged from α 0

	Scale (79). 34 items	(n=100) and without disabilities (n=100).			.86-0.89 in this study.
Parents or caregivers and youth	13) Family Empowerment Scale (80) 34 items	Juvenile offenders with substance abuse (n=118)	Koren's two dimensional model of family empowerment	Reported adequate psychometric properties from (22).	Reported adequate psychometric properties from (22)
Parents or caregivers	14) Family Empowerment Scale - used 4 questions from FES (81) Telephone interview, 4 items	Family caregiver of children 0-18 referred to rehabilitation services (n=172)	Partly based on Koren's two dimensional model of family empowerment	Not reported	Report Cronbach's alpha 0.87 and test-retest 0.77 for the service system subscale from (22)
Parents or caregivers	15) Family Empowerment Used 16 items FES (82). Self-admin, 16 items	Parents of children with a developmental delay (n=39)	Koren's two dimensional model of family empowerment	Did not report on shortened scale. Reported validity total scale from (22)	Cronbach's alpha 0.77 and 0.80 at pre and post-test.
Parents or	16) Family	Laotian	Partly based on Koren's two	Report interrater agreement	Reliability not reported for

caregivers	Empowerment Scale (selected items; modified to family context; translated to Laotian using back translation) (83). Interviewer admin.	refugee caregivers of a mentally ill relative in outpatient psychiatric treatment (n=22)	dimensional model of family empowerment	for back translation of scale as 87%. Reported good evidence of construct validity of original scale from Fischer and Corcoran (84)	translated questionnaire.
Parents or caregivers	17) Family Empowerment Scale (Translated into Hebrew using back translation) (16). Self-admin, 34 items	Mothers of children with IDDM (n=88)	Koren's two dimensional model of family empowerment	Concurrent validity: Pearson Correlations with self-esteem ($r = .54$, $p < .001$) and mastery ($r = .23$, $p < .05$).	Cronbach's alpha total scale from current sample was 0.91
Parents or caregivers	18) Family Empowerment Scale School Version (Modified FES to assess parents' views on school services)	Parents with school-aged children at risk of mental health problems (n=82)	Koren's two dimensional model of family empowerment	Did not report validity testing on modified scale. Reported 4 factors identified by (71).	Not reported

	(85). Self-admin, 34 items				
Parents or caregivers	19) Empowerment Scale (included actual and modified FES items and new items) (86), Mail Survey, 16 items	Parents of children with food allergies (n=165)	Partly based on Koren's two dimensional model of family empowerment	Did not report validity testing on modified scale. Report construct validity is demonstrated by (22).	Cronbach's alpha 0.91
Community residents	20) Control Over Services (Adapted 10 items from FES. Translated to Hebrew). ◊ (87). Self-admin, 10 items	Community activists in a deprived neighborhood in Israel (n=190)	Partly based on Koren's two dimensional model of family empowerment	Did not report validity testing on modified scale. Reported 3 factors identified by (22).	Cronbach's alpha 0.89
Women	21) Sense of Empowerment (88) Self-admin, 20 items	Women who stayed at eight domestic shelters (n=40)	Partly based on Koren's two dimensional model of family empowerment	Not reported	Cronbach's alpha 3 subscales: (Personal empowerment 0.92; Professionals 0.82; Services 0.82).

Personal and Community Control and Modifications

Community residents	22) Personal and Community Control (7 items); Perceived Effectiveness (8 items) Perceived Difficulty (3 items) (89) Interviewer admin.	Adults living in housing units in Detroit area (n= 911)	Intrapersonal component of psychological empowerment	Discriminant function analysis found 3 measures correctly classified 44% of participant community participation.	1) Cronbach alpha 0.68 2) Cronbach'a alpha 0.79 3) Cronbach's alpha 0.78.
Community residents	23) Personal and Community Control (Adapted (89). ◊ (87). 7 items	Community activists in a deprived neighborhood in Israel (n=190)	Psychological empowerment	Not reported	Cronbach's alpha 0.74

Perceived Control Scale and Modifications

Community residents	24) Perceived Control Scale (90) Interviewer admin, 12 items	Adults living in housing units in Detroit area (n=916)	Perceived control as a dimension of empowerment.	FA identified 3 factors corresponding to perceived control at 3 levels: individual, organizational	Cronbach's alpha for multilevel scale 0.71, and for three level scales 0.61-0.66.

				and community	
Individuals with disabilities	24) Multiple Levels of Empowerment Indices (Same as Perceived Control Scale) (91) 12 items	Individuals with a spinal cord injury (n=17)	Community Empowerment (1)) . Assesses individual perceptions of control.	Correlations of the MLEI and CHART (community integration for spinal cord injuries), indicate greater control correlated with better community integration.	Internal Consistency: Correlation of total score with the three subscales ranged from 0.47-0.62.
Parents or caregivers	25) Revised Perceived Control Scale (92). Interviewer admin, 12 items	African American caregivers of children (n=679)	Perceived control as a dimension of empowerment.	Not reported	Internal consistency composite scale 0 .81; subscales 0.63-0.81.
Personal Opinions Questionnaire					
Individuals with disabilities	26) Personal Opinions Questionnaire (93) Self-administered, 64 items.	Veterans or students with disabilities (n=156)	Intrapersonal component of psychological empowerment including perceived control, self-efficacy, sense of community, and perceived competence.	PCA revealed 3 factors: personal competence, group orientation, self-determination. Added 4th Positive Sense of Identify as a Person. Correlations with 16 Personal Factor Scale -	Internal consistency alpha 0.80-0.89

				0.52 -0.44. Construct validity supported.	
Individuals with disabilities	26) Personal Opinions Questionnaire (94). Self-report, 64 items	Vocational Rehabilitation Clients (n=473)	Intrapersonal component of psychological empowerment	CFA report 4 subscales: personal competence; group orientation; self-determination; positive identify.	Internal consistency alpha 0 .93
Sociopolitical Scale and Modifications					
Students and community residents	27) Sociopolitical Control Scale (95) Self-admin, 17 items	Students (390) Community Residents (n=205) Church members (n=143).	Sociopolitical Control - a component of intrapersonal psychological empowerment	FA revealed 2 factors: leadership competence, policy control. Convergent validity: correlations (-0.49-0.44) alienation and leadership scales.	Cronbach's alpha .76 and .75 for 2 subscales
Community Residents	28) Sociopolitical Control Scale (◊ (96). Self-admin., 6 items taken from Zimmerman & Zahniser, 1991.	Community residents (n=674).	Sociopolitical Control -an intrapersonal aspect psychological empowerment	Not reported.	Not reported
Community	29) Sociopolitical	Community	Sociopolitical control - a component of	Used CFA to compare 2	Alpha of 0.78 and 0.81 for

Residents	Control Scale (SPCS) compared with the SPCS-R. SPCS had positive and negative statements; SPCS-R had all positive statements. (97). Interviewer admin, 17 items each	residents (Sample 1, n= 316) (Sample 2, n=750)	intrapersonal element of psychological empowerment	scales using data from two samples. Factor analysis of the SPCS-R provided support for the original two factor structure of the SPCS leadership competence and policy control.	two subscales of the SPCS-R.
Scales Reported in Single Studies					
Women	30) Empowerment Scale (98). Self-admin, 21 items	Divorced women in Hong Kong (n=67)	Psychological empowerment	Not reported	Cronbach's alpha of subscales 0.55-0.78
Women	31) Reproductive Health Questionnaire (99). Face-to-face interviews, 2 items	Omani women (n=2037)	Empowerment-used interchangeably with autonomy.	Not reported	Cronbach's alpha for household decisions making 0.56 and freedom of movement 0.82.
Women	32) Personal Progress Scale-	Female university	Empowerment Model that defines outcomes for women	EFA found 7 factors, consistent with	Internal consistency α 0.88 current study

	Revised (100) Self-administered 35 (28 final version)	students and women from the community (n=222)		Empowerment Model. Convergent validity: positive significant correlations with 3 variables (r=0.65- 0.81). Discriminant validity: negative significant correlations with 4 variables (r= - 0.65-0.50)	
Employees	33) Torre's General Measure of Empowerment ◊ (101), Self-admin, 40 items	Employees School of Public Health (n=160)	Psychological Empowerment	Construct validity: significant correlations between sub-scales (0.24-0.53) and total score (0.58) of alcohol-specific and general empowerment scales.	Cronbach's alpha 0.84 for entire scale; Subscales 0.57-0.87
Employees	34) Alcohol-specific psychological empowerment questionnaire ◊ (101), Self-admin	Employees School of Public Health (n=160)	Psychological Empowerment	Better predictive validity of empowerment for alcohol related issues than a general empowerment scale. Construct validity: significant correlations	Cronbach's alpha 0.78 for entire scale; Subscales 0.50-.067

				between sub-scales of the alcohol-specific and general empowerment scales (0.24-0.53; and total scores of both (0.58).	
Students	35) Student Psychological Empowerment Scale (102). Self-admin, 21 items.	Grade 8 students (n=60)	Psychological Empowerment	Alcohol use negatively associated with alcohol-specific psychological empowerment ($F_{1,59}$ = 28.32, p=0.0001). Predictive validity not found.	Cronbach's alpha 0.80
Clients with HIV	36) Treatment-related Empowerment Scale (TES) (103) Self-admin, 10 items	Patients with advanced HIV (n=43)	Choice, decision-making, communication, and satisfaction.	Criterion validity found between TES and Beliefs about Medicines (-0.35, p<0.01). Discriminant validity: Intentional non-compliance correlated with TES scores (0.30, p<0.05).	Cronbach's alpha 0.85
Clients in Coronary Care	37) Patient Empowerment Questionnaire. (104). Mail Survey,	Patients who had been in coronary care (n=103)	Collaborative interaction between clients and care providers	Claim face and content validity since based on relevant literature. No specifics provided.	Cronbach's alpha 0.82

	17 items				
Seniors	38) Health Care Empowerment Questionnaire (105). Interviewer admin, 17 items	Seniors >75 years (n=873).	Individual empowerment related to personal health care and services.	After item revision, EFA and CFA done on 10 items. 3 factors identified. Correlations between observed and latent variables 0.61-0.86. Report convergent and discriminant validity.	Internal consistency total scale alpha 0.83, and for three factors .79, .79, and .89.
Clients with cancer	39) Patient Empowerment Scale (*106*), Self-admin, 28 items	Clients with cancer (n=100)	Coping strategies and self-efficacy	Validity examined with Extended Rasch Model. Data fit model well. Item-trait interaction test of fit across all items Chi-Square = 96.3, p=0.17 (df = 84).	Person Separation Index 0.92 (Extended Rasch Model)
Parents or caregivers	40) * **Parent Empowerment Survey** (42). Self-administered, 40 items.	Mothers early intervention family support program (n=74)	Performance and perception components of empowerment (27)	Structural equation modeling goodness-of- fit indices >0.92 indicating data fit the hypothesized relationships) (27)	α 0.93
Parents or caregivers	41) Personal Control Scale (107)	Parents of pre-school	Perceived control as a component of Psychological Empowerment	Correlates (.70) with a multiple item measure of	Not reported.

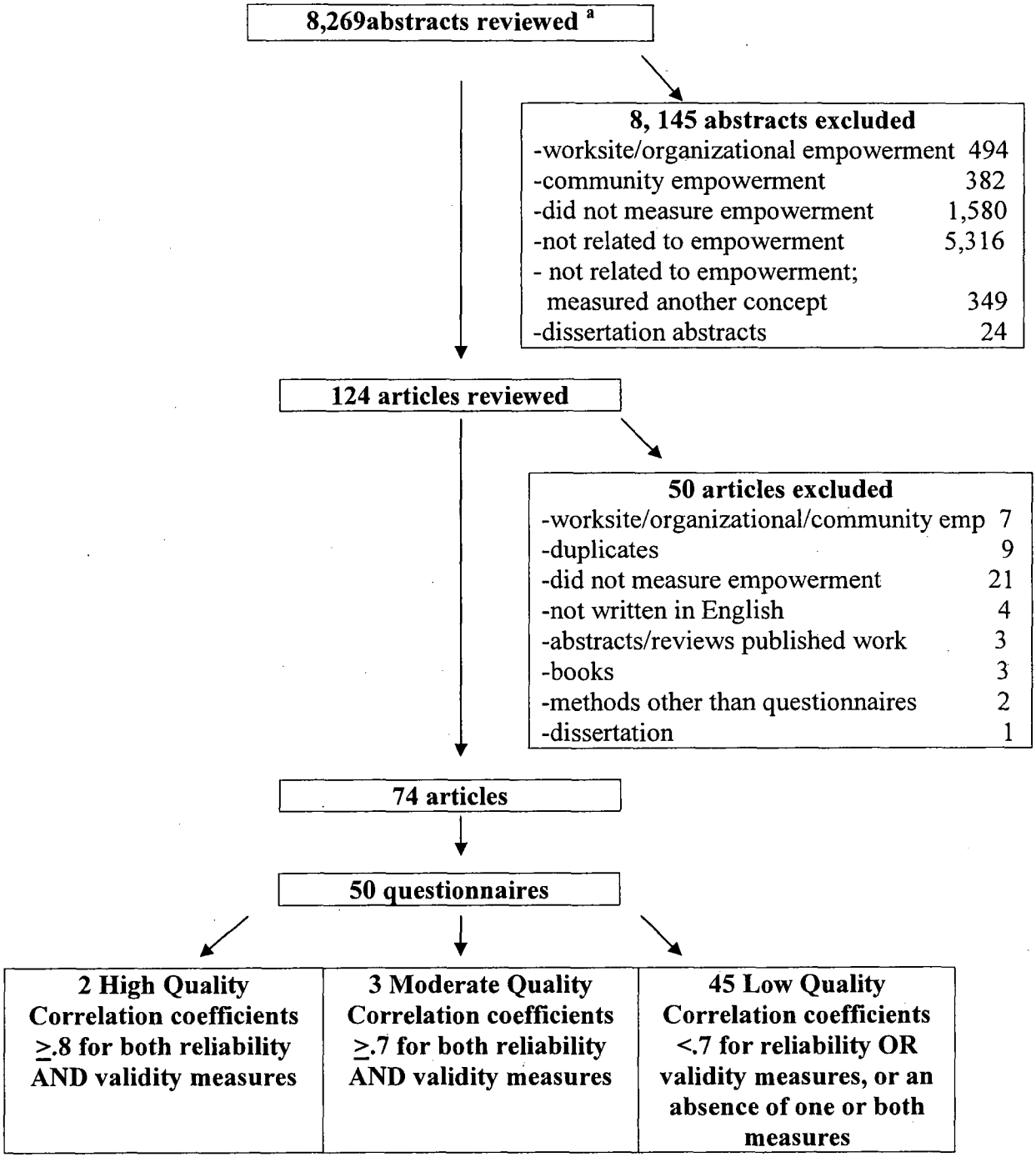
	Self-admin, 1 item	children (n=220)		perceived control.	
Parents or caregivers	42) Enabling Practices Scale (108), 24 items	Parents with adult child intellectual disability (n=127)	(109) enabling and empowering practices	Content validity examined 12 professionals. FA 3 factors: comfort with relationship, collaboration, and parental autonomy. Congruent with (109)	Cronbach's alpha 3 subscales, 0.70. 0.85, 0 .93.
Parents or caregivers	43) Psychological Empowerment Scale (44). Self-admin, 32 items	Parents of a child with a disability (n=293)	Psychological empowerment (Intrapersonal, Interactional, and Behavioral)	Convergent validity with Family Empowerment Scale supported (0.74). CFA identified 4 factors congruent with psychological empowerment.	Cronbach's alpha 0.91-0.94 subscales.
Parents or caregivers	44) Sense of Control Scale (110). Interviewer-admin, 23 items.	Parents of children with asthma (n=57).	Empowerment defined as Sense of Control	Not reported	Alpha reliability subscales at time 1: 0.67-0.88
Teens	45) Interpersonal Power, Personal Power,	Heterosexually active teens between 14-19	Interpersonal power, relationship power, and personal power	FA identified 3 factors: interpersonal power, personal power, and	Cronbach's alpha interpersonal power 0.68, personal power 0.68, and

	Relationship Power (111) Self-admin & interviewer-admin , 16 items	(n=333)		relationship power.	relationship power 0.58.
Community residents	46) Collective Action and Interpersonal Relationship Scale. Telephone admin, 6 items. ◊ (96)	Community residents (n=674).	Interactional aspect of psychological empowerment	PCA revealed 2 factors: collective action and interpersonal relationships.	Cronbach's alpha two subscales 0.66 and 0.62.
Psychiatric clients or self-help members	47) Personal Empowerment Scale (20). Items not reported	Users with severe mental disabilities of four self-help agencies (n=241)	Derived from 12 months observation at a self-help agency. Measures control over life events.	Convergent discriminant validity analysis baseline and 6 months r = ≤.66. Personal empowerment consistent psychological empowerment.	Cronbach's alpha baseline 0 .84 and 6 months 0 .85. Stability 6 months Pearson Correlation Coefficient 0.49.
Psychiatric clients or self-help members	48) Personal Empowerment Scale (different from Segal et al., 1995) (112).Self-admin in group	Self-Help groups (n=100 groups; 719 individual responses)	Personal Empowerment (Intrapersonal, interpersonal, and extrapersonal)	Not reported	Cronbach's alpha 0.95

	setting, 20 items				
Students and community residents	49) Psychological Empowerment (Used 11 different scales). (38). Self-report	Three studies. 1 & 2 students (n=392). 3) Community residents (n=205).	11 scales described in text	Not reported	Not reported
Students and community residents	50) Psychological Empowerment (39) (Used four different scales). Self-report	1) University students (n=388) and 2) community residents (n=205).	1) Internal political efficacy, 2) perceived competence, 3) internal locus of control, and 4) desire for control.	Reported scales are psychometrically sound.	Reported scales are psychometrically sound but reliability not described.

Note. ◊ - Articles are listed twice in table with different questionnaires identified
* - High quality questionnaires
♗ - Moderate quality questionnaires
FA- Factor analysis
EFA – Exploratory factor analysis
CFA – Confirmatory factor analysis

Figure 1. *Method of Identifying Articles for Systematic Review*



[a] CINAHL 2273; Medline 2181; PsycINFO 2186; PubMED 1850; Web of Science 2786; sociological Abstracts 2503; Embase 1395; Health and Psychological Instruments 43; Cochrane Library 188. Total = 15,405 including duplicates. 8,269 following duplicate removal.

Chapter 3 - Methods

This chapter provides an in-depth description of the methods used in this thesis. In accordance with journal stylistic and reporting requirements, abbreviated descriptions of the methodology are included in the two manuscripts in chapter four, which report the study findings.

3.1 Study Design and Population

The study design selected for this project was a randomized controlled trial. Randomization tends to produce comparable groups thereby reducing the potential for bias resulting from imperfect participant allocation. However, it cannot be assumed that the characteristics of interest and importance will be totally balanced in the intervention and control groups especially if the sample size is small (Friedman, Furberg, & Demets, 1998).

The sample was drawn from the population of families in Prince Edward Island with children aged ≤5 years who are exposed to daily smoking in the home. Eligibility criteria included: (a) a minimum of one cigarette per day was smoked within the home; (b) the family had one or more children aged ≤5 years who resided in the home at least 50% of the time; and (c) one parent (not necessarily a smoker) was willing to participate in the intervention if randomized to this option. Exclusion criteria included not having a fixed address. The same parent was asked to participate in both the data collection and the intervention if randomized to this arm of the study.

3.2 Preparation for Study Initiation

Meetings were held with all public health nurse managers in the province (n=5) during the planning phase of the study. All managers requested that their offices be

included in the study. A presentation was given to staff in each participating public health nursing office (n=5) and family resource centre (n=5), and individual meetings were held with directors of kindergarten and day care centers (n=8).

3.3 Availability of Participants

Almost all families with young children in PEI use public health nursing (PHN) services; in 2004, approximately 5,600 families with children < 6 years of age visited the PHN offices. In 2003, 16% of children <12 years of age in PEI were exposed to ETS in the home (Health Canada, 2004); therefore 896 families were potentially eligible for inclusion in the study. Although this may be an overestimate since smoking in the home is less likely when there are younger children in the home (Schuster et al., 2002), the estimate seemed reasonable since provincial data indicated that 40% of males and 28% of females aged 20-34 years were current smokers (Van Til, 2003). In addition, 22% of the 1,308 new mothers in 2002 were smokers at the time of delivery (PEI Reproductive Care Program, 2006).

3.4 Recruitment Activities

Families were recruited from 18 sites across the province including all five public health nursing (PHN) offices, five family resource centers, and eight daycares and kindergartens (Appendix G). Public health nurses were asked to speak to all families individually about the study. In addition, a research assistant recruited families one day per week in the largest public health nursing office. Family resource staff and research staff gave information sessions for participants in parent and child programs offered by their centers. Staff in daycares and kindergartens distributed

information about the study to parents, included descriptions of it in their newsletters, and discussed it at parent meetings.

Recruitment posters (Appendix H) and information letters (Appendix I) were placed in public areas in each location. Parents who expressed interest in the study provided their names and telephone numbers on a short form, and depending on the site, placed it in a drop box, gave it to a staff member, or returned it to the recruiter. A research assistant contacted parents to answer questions about the study and to arrange a home visit. Recruitment occurred between February 2005 and June 2006.

Ongoing personal and telephone contacts were made with staff in the largest public health nursing office on a weekly or bi-weekly basis, and with staff in the smaller public health nursing sites on a bi-monthly basis. Staff members in family resource centres were contacted every two months. Ten presentations were made at the largest family resource centre, and a minimum of two presentations were made to program participants in each of the smaller family resource centres. Ongoing telephone contact was made with kindergartens and daycares.

The principal investigator (RH) visited the public health office where the recruiter was located weekly or bi-weekly to maintain good relationships with the staff, remind staff of the study, assess recruitment problems, and obtain names of families interested in participating in the study which were left in the drop-box. Because this office was our main source of participants, it was essential that we maintain a positive working relationship with the staff. RH contacted the recruiter on a weekly basis to discuss recruitment and to problem-solve.

3.5 Selection and Training of Research Team

Research assistants were hired part-time to assist with recruitment, data collection, and group facilitation. Each of the three positions required individuals with strong communication skills who conveyed acceptance verbally and non-verbally to parents who exposed their children to ETS at home. The importance of showing respect and acceptance was emphasized repeatedly with research staff. It was important for ethical reasons and for minimizing socially desirable responses from respondents that the research staff not contribute to parents' feelings of guilt about their children's exposure to ETS.

All research staff were oriented to the study goals and objectives, and received information specific to their roles. Recruiter orientation included an in-depth discussion about strategies to approach families diplomatically, and problem-solving about situations that might arise. Orientation for data collectors included discussing how to introduce oneself to families when telephoning to arrange visits, and how to reach families who were difficult to contact; strategizing on ways to locate families who live in rural areas; discussing how to initiate the visit, gather the data, and complete the visit; discussing how to conduct the visit with partners, children, or other relatives/friends present; discussing how to gather Fagerstrom data (a measure of nicotine addiction) from other smokers in the home who may not have been supportive of participating in the study; and discussing how to obtain the second completion of the empowerment scale for test-retest purposes. The importance of completing the questionnaires accurately and thoroughly, while respecting individuals' rights to refrain from answering questions, was reviewed.

Training of the facilitator who conducted all of the group interventions consisted of an orientation to the Family-Centered Assessment and Intervention Model (Dunst et al.,1994), the intervention, and health issues associated with children's exposure to environmental tobacco smoke.

3.6 Randomization and Allocation Concealment

Participants were randomly assigned to the intervention or control group using a computer generated, randomization sequence with block sizes of four and six. Allocation concealment was attained by placing assignments in sequentially numbered, opaque, sealed envelopes (Altman & Schultz, 2001). To avoid allocation bias during data collection, group allocation was conducted by the group facilitator following completion of the baseline visits.

3.7 Intervention

The intervention consisted of three, two-hour weekly group sessions, followed by telephone contacts once a week for three consecutive weeks. The telephone contacts were conducted to provide support for transitioning to a smoke-free status (McCarthy et al., 2002). An experienced group facilitator led the groups in an interactive discussion about the effects of ETS, benefits of smoke-free homes, and strategies to make homes smoke-free. Participatory experiences, defined as collaborative activities where knowledge is shared, solutions are generated, and capabilities are strengthened (Dunst & Trivette, 1996), were incorporated into each session. Examples include sharing feelings about smoking in the home and identifying personal strengths and challenges in transitioning to a smoke-free home and vehicle. A detailed outline was prepared for each session. The sessions were

piloted with a group of three individuals who were university students or part-time employees. Changes were made in the sequence of activities based on the feedback.

The intervention promoted the implementation of a total smoking ban in the home by directing smokers to smoke outdoors with the door closed (Johansson, Hermansson, & Ludvigsson, 2004). Parents were not asked to quit smoking (Winkelstein, Tarzian, & Wood, 1997). Freire's (1970) structured dialogue approach whereby members participate as co-learners and critical thinkers in the learning cycle of listening, dialogue, and action guided the group process (McQuiston, Choi-Hevel, & Clawson, 2001; Wallerstein, 1992; Wallerstein & Sanchez-Merki, 1994). To implement this process, the facilitator encouraged participants to: (a) discuss experiences, (b) describe aspects of the problem, (c) share similar experiences, (d) question reasons for the existence of the problem, (e) develop a plan of action, and (f) reflect on the effectiveness of the plan (vanWyk, 1999).

At the beginning of the first session, the facilitator introduced an empowering ideology (i.e. the belief that all people have strengths and capabilities, as well as the capability to learn further competence through participatory experiences) (Dunst & Trivette, 1996; Dunst et al.,1994) by stating that parents make decisions every day that reflect their care and concern for their children, that parents know their children better than anyone else, that parents already have many skills needed to create change in their lives, and that by working together as a group participants could help each other create smoke-free homes and vehicles. Parents' strengths and skills in caring for their children were emphasized throughout the sessions.

During the initial session, parents were asked to identify strengths, challenges, and supports in making their homes and vehicles smoke-free, and to share their experiences of living in homes where smoking occurs. Parents also discussed the effects of ETS with a particular focus on children. The facilitator supplemented the group discussion of the effects of ETS on children's health, supplying information that was not identified by parents.

During the second session, a guest parent who had made her home smoke-free shared her experiences with the group. Participants created individual collages of pictures symbolizing their transition to a smoke-free home, and identified personal strengths that would be used in that process. In the last session, the group generated strategies for creating smoke-free homes and vehicles, and individuals created personal action plans that identified actions and timelines for moving towards a smoke-free status, or becoming smoke-free.

Control intervention. When this study was being planned, current practice (i.e. usual treatment) in PEI consisted of intermittent distribution of ETS brochures to families during visits to PHN offices. Therefore, during the baseline home visit the control group received an ETS brochure (Appendix J) which included a plastic smoke-free home decal that could be posted on a door or window. Both the brochure and decal were produced by the PEI Tobacco Reduction Alliance. The brochure and decal were also given to all intervention parents during the baseline home visit.

3.8 Data Collection

Data collection was conducted by research assistants who visited participants in their homes at baseline and again at six months follow-up. Informed consent was

obtained at the beginning of each visit (Appendix K). Every effort was made to establish rapport with participants, to ensure that participants felt respected, and to convey that they were good parents.

Demographic data were collected at baseline. Data on barriers and facilitators to smoke-free homes and vehicles were collected at six months follow-up. All other data including number of cigarettes smoked in the home, household smoking characteristics, nicotine dependence, and empowerment were collected at both baseline (Appendix L) and six month follow-up (Appendix M).

Number of cigarettes smoked in the home. The primary outcome was the parental report of the usual number of cigarettes smoked in the home daily. This was computed as the number of cigarettes smoked in the home during a typical week day of the previous week multiplied by 5, plus the number of cigarettes smoked in the home during a typical week-end day the previous week-end multiplied by 2, divided by 7 (Greenberg et al., 1994).

Household smoking characteristics. Data were collected on the number of smokers in the home, conflict between household members regarding smoking in the home, number of quit attempts by the respondent or other parent during the last 12 months, and maternal smoking during pregnancy.

Nicotine dependence. Nicotine dependence was measured with the Fagerstrom Test for Nicotine Dependence (Appendix N), a six-item scale scored 0-10, with higher scores reflecting greater nicotine dependence. Test-retest reliability of the FTND = 0.88, Cronbach's alpha = 0.64, and correlation with plasma cotinine = 0.39 (Pomerleau, Carton, Lutzke, Flessland, & Pomerleau, 1994). Permission is given

to use the scale for research purposes (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991). Fagerstrom scores were obtained for each individual in the home who smoked. For analysis, we identified the highest score obtained by any individual in the home, and we dichotomized the score (<6; ≥ 6).

Empowerment. Empowerment was measured with the Revised Personal Assessment of Parent Empowerment Scale for Smoke-Free Homes/Vehicles. Since there were no known instruments which measure empowerment with respect to ETS, we modified the Personal Assessment of Parent Empowerment Scale (Dunst, 1989) which is based on the conceptual framework selected for this study (Dunst, Trivette, & Deale, 1994). The original scale measures domains of personal control, self-efficacy, and participatory competence (Dunst, 1989) with respect to obtaining child care. Response items in the original scale are rated on a five point Likert scale. The sum of item scores provides an overall measure of empowerment, with higher scores reflecting higher levels of empowerment. A statement on the scale indicates that it may be modified for research purposes. In consultation with Dr. Carol Trivette, we modified the scale to incorporate items relevant to the context of making homes and vehicles smoke-free (personal communication, July 15, 2004).

The content validity of the revised scale was examined using the judgment-quantification stage described by Lynn (1986). Of the eight empowerment experts (had published on empowerment) who were contacted, two responded. They reviewed the scale, selected the domain each item measured, and rated the relevancy of each item to that domain using a 4-point rating scale. One expert rated all items as very relevant (score of 4), and the second expert rated 15 of the 16 items as very

relevant and one as quite relevant (score of 3). The experts agreed on the domains for 50% of the items, with both indicating there were similarities between the domains. Lynn (1986) suggested that a rating of 3 or 4 by all of the judges constitutes content validity, and defined the content validity index (CVI) as the proportion of items that are rated as a 3 or 4. In this case, the CVI = 0.5 as the judges agreed on the domains for eight items, and rated each as a 3 or 4. While this CVI is somewhat low, it is not unexpected, as empowerment is a broad construct with poorly differentiated dimensions. Dunst (1989) refers to the interrelatedness of the domains of the scale, suggesting that they are not mutually exclusive.

Following expert review, a focus group of parents (Appendix O) was held to review the instrument. Participants included five parents who lived in homes where daily smoking occurred, and who had children aged ≤ 5 years. After consent was obtained (Appendix P), parents were asked to evaluate the overall scale as well as each individual item in terms of interpretability, ambiguity, double-barreled questions, jargon, value-laden words, negatively worded items, and length of items (Streiner & Norman, 2003). Parents generally found the scale clear, easy to read, and free of ambiguous terms. After suggestions from the PEI Literacy Alliance were incorporated, the scale was assessed at a 7.9 Grade Level. The final scale consisted of fourteen items each rated on a five point Likert scale (Appendix Q). Test-retest reliability was assessed by asking all participants to complete the empowerment scale a second time, two weeks after completion of the six month follow-up visit. Participants had the option of returning it in a prepaid stamped envelope, having a data collector pick it up, or providing responses by telephone.

Two week test-retest reliability for the total score in the current study was adequate (r=0.84; n=18). The internal consistency was also adequate at baseline (Cronbach's alpha = 0.86) and at the six month follow-up (Cronbach's alpha = 0.80) respectively. Baseline and follow-up empowerment scores were dichotomized according to the distribution of scores at baseline (<60; ≥60).

Demographic and child health data. Dichotomized variables were created for parental age (<20, ≥20 years), parental education (high school not completed, high school completed or post-secondary education), marital status (no partner, partner), income (< $15,000, ≥ $15,000), and child characteristics including age (<2 years, ≥ 2), and child health conditions (presence or absence of asthma, pneumonia, ear infections, or low birth weight <2500 g).

Season. Although seasonal variation may affect ETS exposure due to unfavorable weather conditions, it has not been reported in ETS interventions (Gehrman & Hovell, 2003). In this study, season when outcome data were collected was dichotomized into cold seasons (fall/winter) and warm seasons (spring/summer).

Barriers and facilitators to smoke-free homes and vehicles. Parents were asked a series of open ended questions to identify: (a) barriers encountered in attempting to make their homes and vehicles smoke-free, including those barriers they considered to present the greatest challenge(s); (b) what they did to overcome the barriers; (c) what they found worked best in making homes and vehicles smoke-free, and (d) what they would recommend to others who want to make this change (Appendix R). Responses were recorded verbatim.

3.9 Quality Assurance

The data were entered and analyzed using SAS^R 9.1. Two coders entered the data. Data were checked for ranges of scores to identify data entry error and missing values. The data set was complete for all outcome data. Only a few data points were missing for other variables. They were distributed similarly between intervention and control participants, and observed at random. Data were missing because of data collection omissions and occasional refusals to answer questions. Participants were re-contacted by telephone to obtain missing data related to data collection errors. The median was used to replace missing values for continuous variables and the mode was used to replace missing values for categorical variables (Acuna & Rodriguez, 2004).

3.10 Statistical Analysis

A causal diagram identifying potential causal relationships between predictor variables, potential confounders, and the outcome of interest, was used to guide the analysis (Appendix F). Variables listed on the left of the causal diagram could potentially cause the variables listed on the right to change (Dohoo, Martin, & Stryhn, 2003).

Intention-to-treat analyses were conducted whereby data from all participants were analyzed regardless of whether they completed the intervention. Univariate analysis was performed on all variables to determine the number of missing values, to examine minimum and maximum values, and to assess the distribution of responses to each variable. Characteristics of the entire sample and comparability of the control and intervention groups at baseline were examined (mean, SD, median for

continuous variables; percentages for categorical variables).

Primary outcome. The primary research question "Does parents' participation in an intervention based on an empowerment ideology and participatory experiences decrease the number of cigarettes smoked in homes daily at six months follow-up?" was analyzed using multivariable linear regression to control for potential confounders (Elwood, 2007). The assumptions supporting linear regression including homoscedasticity and normality of the residuals were examined.

Potential confounders were defined as variables which: (a) had a greater than 25% difference between the experimental and control groups at baseline, and (b) were associated with a greater than 25% difference in the outcome variable (number of cigarettes smoked in the home daily). All potential confounders were entered into a multivariable linear regression model with the group (intervention/control) variable. Variables which resulted in a change of ≥ 0.5 of a cigarette in the coefficient for group when removed from the model one at a time were considered to be actual confounders, and were therefore retained in the final model.

Secondary research question. The secondary research question "What factors are perceived by parents as barriers to making their homes and vehicles smoke-free, and what are the facilitators used by parents to manage these barriers?" was analyzed using a general inductive approach whereby frequent or dominant themes related to the research objectives emerge from the data (Thomas, 2003). The verbatim responses of parents to a series of open-ended questions were typed, read in their entirety, and then systematically examined. Codes were assigned to words, phrases, or sentences that described a particular notion or idea. After coding was completed,

all codes were reviewed and themes were assigned to groups of codes with similar meaning (Ulin, Robinson, & Tolley, 2005). Themes were defined as they were identified. Two members of the research team did the initial coding. Coders compared their interpretations, discussed differences, and reached consensus through discussion.

Facilitators and barriers were compared between parents who made the greatest and least change in the number of cigarettes smoked in the home daily between baseline and follow up. Intervention and control groups were compared with respect to barriers and facilitators reported for making homes smoke-free. Data were compared according to whether they were collected in a warm (May-October) or cold (November- April) season.

3.11 Ethical Considerations

Ethical approval for the study was obtained from the Institutional Review Board of McGill University (Appendix S) and the Research Ethics Board at the University of Prince Edward Island (Appendix T). In addition, in the absence of an ethical review board for community agencies, and at the request of a chief executive officer (CEO) of one health region, a presentation was made to the provincial Freedom of Information and Protection of Privacy Committee. The Committee gave approval to conduct the research, and communicated this to the CEO of each health region (Appendix U).

Written informed consent indicating that participants could withdraw from the study at any time without prejudice was obtained from all participants. Confidentiality was maintained by using code numbers for all participant

documentation. Data are kept in locked files in a research office at the UPEI School of Nursing. Only the research team has access to the data. Data will be kept for a maximum of seven years and then shredded. Electronic files pertaining to the study are password protected. At completion of the study, files will be copied to a memory stick and stored in a locked filing cabinet.

Chapter 4 - Results

4.1 Preface

This chapter includes two manuscripts. The first describes the results of the randomized controlled trial testing the empowerment intervention. The second manuscript describes barriers and facilitators to smoke-free homes and vehicles as described by parents. The references and tables are included with each manuscript.

4.2 Manuscript Two

Running head: TESTING AN EMPOWERMENT APPROACH

Testing an Empowerment Intervention to Help Parents Make Homes Smoke-Free: A Randomized Controlled Trial

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To be submitted to the Journal of Community Health

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Abstract

The objective of this randomized controlled trial was to test if parents' participation in an intervention based on an empowerment ideology and participatory experiences decreased the number of cigarettes smoked in homes. Thirty-six families were randomized to the intervention (n=17) or control (n=19) groups. The intervention included three weekly group sessions followed by three weekly follow-up telephone calls over six consecutive weeks. During group sessions, parents shared experiences about environmental tobacco smoke, identified personal strengths and resources, and developed action plans. Data were collected in interviewer-administered questionnaires at baseline and six months follow-up. No statistically significant difference was detected between groups in the number of cigarettes smoked in the home daily at six months follow-up. However, the median number of cigarettes smoked in the home daily decreased from 17 to 5 in both groups. Participation in the study, independent of group, may have resulted in parents decreasing the number of cigarettes smoked in the home.

Key words: Randomized controlled trial, smoke-free homes, empowerment, children

Introduction

One-third of American children under the age of 18 years [1,2] and one in ten Canadian children aged 0-11 years (354,888 children) [3] are exposed to environmental tobacco smoke (ETS) in the home, predisposing them to multiple health problems [4] including asthma [5], bronchitis, pneumonia [6,7], low birth weight (8), ear infections, Sudden Infant Death Syndrome [9,10] and behavioral and learning difficulties [11]. Exposure occurs primarily in the home [12], although ETS exposure in vehicles is also a concern.

The prevalence of smoking has declined from approximately 50% of the Canadian population aged 15 years and older in 1965, to 24% in 2000. Since 2000, the prevalence has continued to decrease but at a slower rate, suggesting that smokers today may have more difficulty quitting than those who have already quit [13]. The Federal Tobacco Control Strategy at the Midway Mark [14] suggests that accessing harder-to-reach smokers including Aboriginal people, some recent immigrants, and individuals with mental illness, with effective cessation strategies remains a challenge. Of five million Canadians aged 15 and over who continue to smoke, half are not ready to quit [14]. Individuals of low-socioeconomic status are at higher risk of tobacco use [15].

Despite an abundant literature documenting the adverse effects of ETS, few studies evaluate the effectiveness of interventions to reduce ETS exposure among children. A Cochrane Review [16] which synthesized findings across 14 randomized and four non-randomized controlled trials concluded that the evidence was insufficient to recommend any one approach, and that there is limited evidence for

intensive counselling interventions.

We identified six "robust" intervention trials that met all the internal validity criteria established by the US Preventive Services Task Force [17]. Five tested a counselling intervention, and one tested an educational intervention. Two of the six trials showed a positive intervention effect. Specifically, Hovell et al. [18] tested shaping and coaching procedures (i.e. setting goals, selecting actions, signing contracts), delivered over seven sessions to 108 ethnically diverse, low income mothers. Statistically significant reductions in children's urinary cotinine levels were observed in the intervention group at 12 months follow-up. Emmons et al. [19] tested a motivational intervention consisting of a 30-45 minute interview, four telephone calls, and feedback on household air nicotine levels and participants' carbon monoxide levels with a self-help intervention to promote cessation in parents and caregivers (n=291). Significantly lower levels of household nicotine levels were observed in the intervention group at six month follow-up. Studies which reported non-significant effects tested an educational intervention [20], counselling [21,22] and cotinine feedback combined with asthma education [23].

A review of 19 intervention studies that aimed to reduce household ETS exposure from birth to adolescence [12] recommended that future interventions: (a) target outdoor smoking using a stepped approach rather than cessation; (b) use behavior modification principles and social cognitive theory; (c) provide information on the adverse effects of ETS and skill training to reduce ETS exposure at home; (d) promote self-reinforcement and shaping of behaviors by clinical or research staff to initiate and maintain desired behaviors; and (e) assist parents to reduce barriers to a

smoke-free home. The authors suggest using a group format to promote social support, sharing, and the acquisition of new problem-solving skills. These recommendations are philosophically aligned with empowerment theory, the origins of which are grounded in Freire's [24] critical pedagogy whereby individuals develop and use knowledge, competence, and confidence to make their voices heard [25].

Empowerment intervention studies met fewer of the internal validity criteria established by the US Preventive Services Task Force [17] than ETS intervention studies, and were therefore generally less robust. Of the eight more robust studies, four randomized trials reported significant findings including more active decision-making and lower anxiety levels in men with prostate cancer [26]; increased self-efficacy, skill, and knowledge in women learning about breast cancer control [27]; improved empowerment and self-efficacy, and decreased depression in individuals with end-stage renal disease [28]; and higher empowerment, self-efficacy, and confidence performing perioperative tasks in orthopaedic patients [29].

Our research objective was to test if parents' participation in an intervention based on an empowerment ideology and participatory experiences decreased the number of cigarettes smoked in homes daily at six months follow-up. To replicate follow-up periods reported in previous ETS intervention studies [30], participants were followed for six months. Data were collected on covariates identified as important in previous work including age of children, socio-economic status, marital status, presence of other household smokers, education level, and season when the outcome data were collected [12].

The Family-Centered Assessment and Intervention Model [31] provided the theoretical framework for this study. This model posits that professional help-giving behaviours assist families to become empowered through the acquisition and use of competencies to obtain support and mobilize resources to meet their needs.

Methods

Design

A randomized controlled trial was conducted between February 2005 and February 2007. Ethical approval was obtained from the McGill University and UPEI ethics boards prior to recruitment.

Study Participants

The sample of families was drawn from five public health nursing offices, five family resource centres, and eight daycare centres and kindergartens. Eligibility criteria included: (a) a minimum of one cigarette per day was smoked within the home; (b) the family had one or more children aged ≤5 years who resided in the home at least 50% of the time; and (c) one parent (not necessarily a smoker) was willing to participate in the intervention.

Randomization and Allocation Concealment

Participants were randomly assigned to the intervention or control group using a computer generated, randomization sequence with block sizes of four and six. Assignments were placed in sequentially numbered, opaque, sealed envelopes. Participants were notified of their assignment after baseline data collection.

Intervention

The intervention consisted of two-hour group sessions held once a week for three consecutive weeks, followed by three weekly telephone calls. Following a detailed outline of the content and participatory experiences for each session, an experienced group facilitator led the groups in an interactive discussion. Intervention participants were asked to implement a total ban on smoking in the household [32] rather than attempt to quit smoking [33]. Freire's [24] structured dialogue technique whereby members participate as co-learners and critical thinkers in the cycle of listening, dialogue, and action guided the group process [34-36]. To implement this process, the facilitator encouraged participants to (a) discuss experiences, (b) describe the problem, (c) share similar experiences, (d) question reasons for the existence of the problem, (e) develop a plan of action, and (f) reflect on the effectiveness of the plan [37]. In addition, an empowerment ideology (i.e. the belief that all people have strengths and capabilities, as well as the capability to learn further competence through participatory experiences) [31,38], was incorporated into the intervention by identifying parents' strengths and skills in caring for their children. The content of the sessions included discussion of the effects of ETS, benefits of smoke-free homes, and strategies to make homes smoke-free [39].

Both intervention and control participants received a brochure on ETS (which served as the control condition) during the baseline visit.

Data Collection

Data were collected in two interviewer-administered questionnaires completed in participants' homes by trained research assistants at baseline and six months

follow-up.

Number of cigarettes smoked in the home. The primary outcome (i.e. dependent variable) was the parent report of the usual number of cigarettes smoked in the home daily computed as the number of cigarettes smoked in the home during a typical week day of the previous week multiplied by 5, plus the number of cigarettes smoked in the home during a typical week-end day the previous week-end multiplied by 2, divided by 7 [40] .

Household smoking characteristics. Data were collected on number of smokers in the home, conflict between household members regarding smoking in the home, number of quit attempts during the past 12 months by the respondent and/or other parent, and maternal smoking during pregnancy. Dichotomized variables were created for the number of smokers (1, >1), and parent quit attempts during past 12 months (0, ≥1).

Nicotine dependence. Nicotine dependence was measured with the Fagerstrom Test for Nicotine Dependence (FTND), a six-item scale scored 0-10, with higher scores reflecting greater nicotine dependence. Test-retest reliability of the FTND = 0.88, Cronbach's alpha = 0.64, and the correlation with plasma cotinine = 0.39 [41]. Fagerstrom scores were obtained for each individual in the home who smoked. The highest score obtained by any individual in the home was dichotomized (<6; ≥6).

Empowerment. The Personal Assessment of Parent Empowerment Scale [42] was modified in consultation with Dr. Trivette, a co-author of the theoretical framework that guided this study [31,38], to measure empowerment in the context of

smoke-free homes and vehicles. Expert review by two nurse researchers indicated that the modified scale demonstrated components of content validity [43]. A focus group with five parents assessed the scale in terms of interpretability, ambiguity, double-barreled phrasing, length, use of jargon, value-laden words, and negative wording [44]. Parents reported the scale was easy to understand, easy to read, and free of ambiguity. One item was deleted due to redundancy. Plain language suggestions from the PEI Literacy Alliance were incorporated into the scale. The literacy level of the final version was assessed to be grade 7.9. The scale included 14 items, with response choices on a five-point Likert scale with higher scores reflecting greater levels of empowerment. Two week test-retest reliability for the total score in the current study was adequate ($r=0.84$; $n=18$). The internal consistency was also adequate at baseline (Cronbach's alpha = 0.86) and at the six month follow-up (Cronbach's alpha = 0.80) respectively. Baseline and follow-up empowerment scores were dichotomized according to the distribution of scores at baseline (<60; ≥ 60).

Demographics. Dichotomized variables were created for: parental age (<20, ≥ 20 years), education (high school not completed; high school completed/post-secondary education), marital status (no partner, partner), income ($<$ \$15,000, $\geq$ \$15,000); and child factors including age (<2 years, ≥ 2), and child health conditions (presence or absence of any of asthma, pneumonia, ear infections, or low birth weight <2500 g).

Season. Although unfavorable weather may affect ETS exposure, no ETS intervention studies to date take seasonality into account. In this study, season when outcome data were collected was dichotomized into fall/winter and spring/summer.

Statistical Analysis

The data set was complete for all outcome data. Only a few data points were missing for other variables and they were distributed similarly between intervention and control participants. The median was used to replace missing values for continuous variables, and the mode was used to replace missing values for categorical variables [45]. Data were analyzed using an intent-to-treat approach.

Primary outcome. Because the sample was too small to rule out the possibility of confounding (46), we conducted a multivariable analyses to take potential confounders into account. Potential confounders were defined as variables which: (a) had a greater than 25% difference between the experimental and control groups at baseline, and (b) were associated with a greater than 25% difference in the outcome variable (number of cigarettes smoked in the home daily). All potential confounders were entered into a multivariable linear regression model [47] with the group (intervention/control) variable. Variables which resulted in a change of ≥ 0.5 of a cigarette in the coefficient for group when removed from the model one at a time were considered to be actual confounders, and were therefore retained in the final model.

Results

Participants

Among the 97 parents who expressed interest in the study, 54 were eligible for inclusion, and 36 (67%) including 33 mothers and 3 fathers (all from different families) participated in the trial (Figure 1). Intervention and control parents differed

at baseline in number of quit attempts, presence of partner (marital status), number of smokers in the home, and highest household Fagerstrom Score (Table 1).

Cigarettes Smoked in Home at Follow-up

In multivariable analysis controlling for data-driven confounders (baseline Fagerstrom score, number of smokers in the home, number of quit attempts by a parent, and season), no statistically significant difference was detected between the groups at six months follow-up. Intervention participants smoked 5.8 (95% CI -2.4,14.0) more cigarettes per day compared to control participants (Table 2) . However, the number of cigarettes smoked in the home decreased from baseline to follow-up in both groups. Intervention participants declined from a median of 18 to 5 cigarettes per day; control participants declined from a median of 14 to 4 cigarettes per day. As the outcome variable was not normally distributed, the Wilcoxon Signed Rank Sum Test was used to examine changes from baseline to follow-up. Changes in both the intervention (S=48, p=0.01) and the control (S=60.5, p=0.002) groups were statistically significant.

Empowerment. Empowerment scores increased from a median of 58 at baseline to 63 at six month follow-up in the intervention group, and from 61 to 66 in the control group. Neither difference was statistically significant.

Discussion

This RCT testing an empowerment intervention for parents did not detect a beneficial intervention effect in reducing the number of cigarettes smoked in the

home. However, both the intervention and control groups reported substantial decreases in the number of cigarettes smoked in the home at the six months follow-up.

Our study differs from 19 previous RCTs testing ETS interventions because it was based on empowerment theory, it used a group format for the intervention, and it tested the intervention in a "hard-to-reach" population that lived in predominantly rural province, many of whom were disadvantaged socio-economically.

The study benefited from a number of strengths. Working with 18 rural and urban community partners provided access to the majority of families with young children (≤5 years) in the province. Parents enjoyed the intervention and rated the sessions between 4-5 on a five point Likert scale, with an overall mean of 4.7. Many participants made substantial efforts to participate in the sessions (i.e. they brought their children to the sessions, came directly from work, used taxis etc.). All but one attendee were present at all three sessions, indicating the degree to which parents valued the intervention.

Research assistants and the group facilitator were trained to be non-threatening, respectful, and accepting of participants. In conjunction with the researcher, they were effective at problem-solving in recruiting and locating participants who moved frequently, regularly changed or disconnected their telephone numbers, and screened their telephone calls. We found that having a research assistant recruit was more effective than relying on agency staff for recruitment. Contacting parents immediately after they expressed interest in the study, and conducting eligibility screening in the home rather than by telephone also increased

enrollment. Speaking with people directly (by telephone) rather then leaving messages was essential because very few people returned calls.

We were effective in recruiting participants at higher risk for tobacco use including those in low income groups [48,15] and those in rural areas [49]. Forty-four percent (n=16) of participants reported annual household incomes less than $15,000 which is below the 2006 low income cut-off after taxes for two-person families in both rural and small urban areas in Canada [50]. Seven of the 36 participants lived in rural areas.

Another strength of the study was that it incorporated many of the recommendations for ETS interventions [12] including: (a) promoting outdoor smoking as opposed to cessation, (b) providing information on the adverse effects of ETS and skill training to reduce ETS exposure at home, (c) assisting parents to reduce barriers to a smoke-free home, and (d) using a group format to promote social support, sharing, and acquisition of new problem-solving skills.

The inability to detect an intervention effect in this trial could relate to several issues. First, during the baseline home visits which lasted 45-60 minutes, participants were interviewed about their child's ETS exposure and they were given a brochure about ETS. It is possible that the home visit and brochure increased awareness about ETS and encouraged parents in the control group to reduce smoking in the home. Equivalent (although non-significant) increases in empowerment scores in both intervention and control participants support this contention. As noted in the systematic review of ETS interventions [16], comparison conditions can be more effective than anticipated. Second, the design and/or length of the intervention may

not have been optimal in terms of allowing detection of an intervention effect over and above the improvement observed in control homes. Third, the Hawthorne Effect whereby people change simply because they are aware that they are being studied [51,52], may have caused people to decrease the number of cigarettes they smoked in the home. Finally, participants may have exaggerated decreases in smoking in the home due to a social desirability bias [51].

Our results are in fact concordant with 13 of 19 previous RCTs that did not report an intervention impact. Of these 13 studies, four were robust, including two that tested counseling interventions [21,22], one that tested an educational intervention [20], and one that tested cotinine feedback combined with asthma education [23]. In a systematic review of ETS interventions targeted to parents and caregivers of children aged 0-12 years, 12 of 18 studies reported reduced child ETS exposure regardless of group assignment [16].

Limitations

Several important study limitations should be noted. Difficulty recruiting families into the study resulted in a small sample size. Recruitment challenges led to the addition of five family resource centres and eight kindergartens/daycares as recruitment sites. While the population targeted was large, many families indicated that they had already made the transition to smoke-free homes and thus were not eligible for inclusion in the study. Several possible explanations for this include: parents' reluctance to discuss their children's ETS exposure with public health nurses, parents' discomfort with expressing interest in the study when other parents in the

recruitment sites might become aware of this fact, and the use of ETS exposure as a factor in child custody decisions in divorce cases [53].

Smoking in the home was measured with self-report data rather than biomarkers. The original protocol included testing children's urinary cotinine, a biomarker of nicotine exposure. However, low enrollment and feedback from the recruitment sites about parents' fear of detection of illegal substances and utilization of this information in child custody cases, necessitated a change to self-report.

Because no existing questionnaire measured empowerment relevant to making homes smoke-free, we modified an empowerment instrument to incorporate applicable questions. Confirmation of the appropriateness of this modified scale was obtained in two ways: (a) content validity was assessed with expert reviewers, and (b) feedback about the questionnaire was obtained from a focus group of five parents. Further psychometric testing would be beneficial.

Implications and Future Research

While no significant intervention effect was detected, the number of cigarettes smoked in the home decreased substantially, and the level of empowerment increased in both groups. These improvements warrant further investigation to determine if either a one-time home visit to complete a questionnaire on ETS, or the ETS brochure on its own, had an impact. Larger samples are needed to increase the precision of the study.

Future studies could benefit from our learnings about strategies to recruit and retain participants in disadvantaged groups. The most important strategy was to have

non-judgmental staff with excellent communication skills. These attributes were essential for every aspect of the study.

Although neither the decrease in smoking nor the increase in empowerment attained statistical significance, both differences were important "clinically" in a beneficial direction. Further investigation is needed to increase understanding of the mechanism underlying these changes. Increasing our understanding of how parents make this significant transition to smoke-free homes will be very beneficial to child health.

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Figure1. Flow of Participants Through RCT

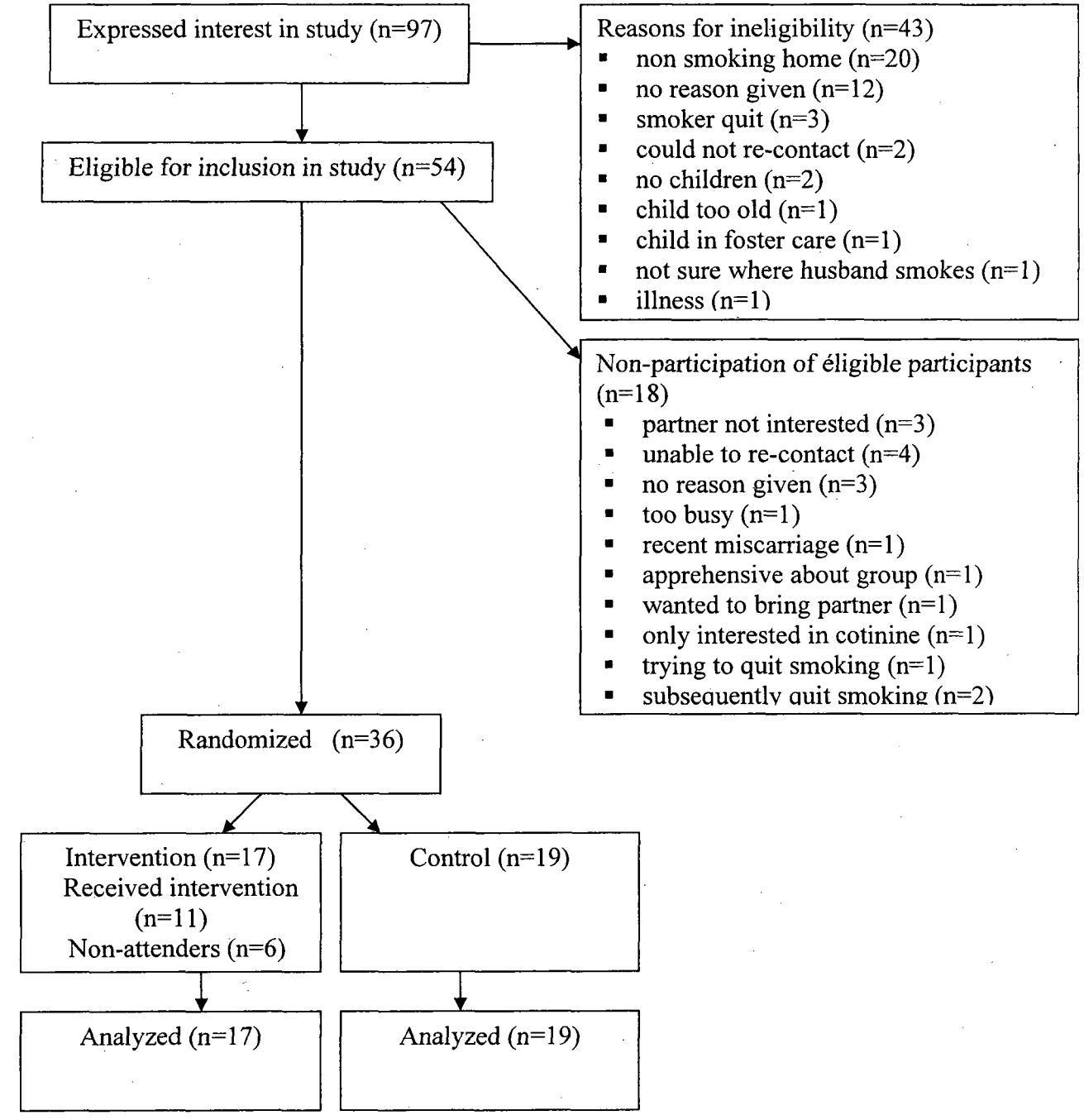

Table 1 Baseline Comparison of Intervention and Control Participants (n=36)

Characteristic	Experimental (n=17)	Control (n=19)
	%	%
Parent (Mother)	94	89
Age ≥20 years	94	84
Education < high school completion	30	32
No quit attempts	65	27
No partner (marital status)	42	69
Household income <$15,000	42	48
Number of smokers household >1	82	58
Youngest child <2 years	65	53
One or more child health conditions	88	74
Highest household Fagerstrom score baseline ≥6	70	47
Empowerment score at baseline <60	53	37
Conflict re household smoking	41	52
Maternal smoking pregnancy	88	68
Outcome data collected in warmer weather	42	69
Baseline number of cigarettes smoked in household		
Mean (SD)	27(25)	23(20)
Median	18	14

Table 2 Summary of Multivariable Linear Regression Testing Intervention and Controlling for Confounders (n=36)

Variable	Coefficient	SE	t	p-value	95% CI
Intercept	1.01	4.98	0.20	0.83	- 9.16, 11.1
Fagerstrom Baseline (≥6)	2.92	3.65	0.80	0.42	- 4.52, 10.37
Number smokers (>1)	- 3.89	3.90	-1.00	0.32	-11.86, 4.07
Quit attempts (≥1)	7.97	3.80	2.09	0.04	0.19,15. 75
Season (Nov-April)	3.43	3.68	0.93	0.35	- 4.07, 10.95
Random (Experimental)	5.76	4.01	1.44	0.16	- 2.42, 3.95

4.3 Manuscript Three

Running head: DO IT FOR THE KIDS

"Do it for the kids": Barriers and facilitators to smoke-free homes and vehicles

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Abstract

Despite abundant evidence about the adverse effects of environmental tobacco smoke on child health, few reports describe barriers and facilitators encountered by parents in making their homes and vehicles smoke-free. This paper describes perceptions of barriers and facilitators to making homes and vehicles smoke-free among 36 parents with a child aged five years or younger. Interview data were collected as part of a randomized controlled trial that tested an intervention to empower parents to make their homes and vehicles smoke-free. Themes that emerged from the coding process were congruent with an ecological conceptualization of health. The greatest barriers were intrapersonal factors, with nicotine addiction most frequently identified. The most frequently reported facilitators were intrapersonal factors such as quitting smoking. Parents did not seek advice from health care providers. These data suggest that the transition process is complex and individualistic; health care providers need to tailor strategies by considering individuals' specific context.

Key words: Smoke-free homes, barriers, facilitators, children, parents

"Do it for the kids": Barriers and facilitators to smoke-free homes and vehicles

Exposure to environmental tobacco smoke (ETS) in the home is a major health risk for 40-60% of British children (Rushton, 2004), 30-50% of European children (World Health Organization Regional Office for Europe, 2007), 35% of American children less than18 years (American Lung Association, 2007; Schuster, Franke, & Pham, 2002), and approximately one in ten Canadian children ages 0-11 (Health Canada, 2007). ETS exposure likely poses the single greatest environmental risk for children in the United States (McMillen, Winickoff, Klein, & Weitzman, 2003). Despite abundant evidence of the many adverse effects of ETS on child health (Cook & Strachan, 1999; Mannino, Moorman, Kingsley, Rose, & Repace, 2001; Strachan & Cook, 1998), relatively few studies identify barriers and facilitators encountered by parents in making their homes or vehicles smoke-free. Most people are aware of the adverse effects of ETS and supportive of restrictions in public places, yet many are reluctant to restrict smoking in their own homes. This relates to the belief that smoking is an individual choice in the home environment, and fear of offending family and friends (Green, Courage, & Rushton, 2003).

ETS exposure among children is directly influenced by adult smoking. Smoking rates among Canadians aged 15 years and older have declined markedly from approximately 50% in 1965, to 33% in 1985, to 19% in 2005. Those who continue to smoke are a hard-to-reach population (Health Canada, 2006b), many of whom may not be ready to quit (Health Canada, 2006a). The Federal Tobacco Control Strategy at the Midway Mark reports that accessing harder-to-reach smokers including individuals with mental illness, Aboriginal people, and some recent immigrants with effective cessation strategies remains a challenge (Health Canada, 2006a). Smoking rates are also higher in certain occupational groups; a

Canadian survey reported that of smokers who were employed, the highest prevalence was among those involved in trades, transport, or operation of equipment (36%); followed by those in utilities operations, processing, or manufacturing (35%); sales and services (30%); administrative, financial or clerical positions (18%); and professional occupations (16%) (Health Canada, 2003).

Individually-oriented behaviour change strategies have been criticized as victim blaming, ignoring the influence of social norms on individual behaviour (McLeroy, Bibeau, Steckler, & Glanz, 1988), and focusing on behaviours at the individual level (Stokols, 1996). In contrast, ecological models view behaviour and the environment as co-existing in reciprocal determinism whereby each influences the other (Green, Richard, & Potvin, 1996). Ecological models conceptualize health as the interplay between characteristics or aspects of the individual (herein labeled "intrapersonal factors"), processes or relationships between individuals (herein labeled "interpersonal factors"), institutional factors, community factors, and public policy (McLeroy et al.).

Review of Literature

A limited number of qualitative studies have identified barriers to smoke-free homes. Focus groups conducted in Australia with 33 parents who smoked identified weather, mosquitoes, and dissenting friends or relatives as barriers to implementing and maintaining smoking bans in the home (Wakefield, Roberts, Miller, & Banham, 2000).

Semi-structured interviews with 20 Australian smokers identified barriers as the desire to smoke in warmth, comfort, and/or privacy (50%); nicotine dependence

(45%); the desire to accommodate visitors' preferences (40%); lack of outdoor space (20%); and need to supervise children (15%). All participants were current smokers who had implemented protective measures for non-smokers (Hill, Farquharson, & Borland, 2003). Barriers identified through focus groups with 54 mothers in the UK, all of whom smoked, included care of young children, the emotional cost of leaving children, personal safety issues associated with outdoor smoking, and home security (Robinson & Kirkcaldy, 2007).

To date, a limited number of studies have been conducted in North America. Interviews with 158 parents and caregivers from 102 households in the southern US identified the following reasons for not discussing household smoking restrictions: participant had not thought about it, participant smoked inside, head of the household was a smoker, and participant lived with extended family. Reasons for deciding to restrict household smoking included: protecting children, including those with asthma or bronchitis; following physician recommendations to protect children; acknowledging an aversion to smoke among children or adult non-smokers; disliking the smell of smoke; viewing ETS as dangerous; being influenced by own upbringing; and having few smoking visitors. Almost 40% of participants were non-smokers and 29% of the households had no smokers (Kegler, Escoffery, Groff, Butler, & Foreman, 2007).

Interviews conducted with 15 parents of children with asthma in the northeastern US (eight of whom were current smokers), identified having young children, living with relatives who smoked, and feeling unsafe to smoke outside due

to neighbourhood violence as barriers to making their homes smoke-free (Halterman et al., 2007).

Of the studies identified, no Canadian studies were found. Only one study was conducted in a harsh winter climate (Halterman et al., 2007). None of the studies explored strategies used to overcome barriers. At least one study included households where no smokers resided (Kegler et al., 2007). In spite of differing study populations, the following barriers were identified across studies: factors related to friends and relatives (Halterman et al.; Hill et al., 2003; Kegler et al.; Wakefield et al., 2000); supervision of young children (Halterman et al.; Hill et al.); and lack of access to outdoor space (Halterman et al.; Hill et al.). The primary objectives of this study were to describe factors perceived by parents as barriers to making their homes and vehicles smoke-free, and to identify facilitators used by parents to manage these barriers. The study was conducted in a predominantly rural province in Atlantic Canada.

Methods

Study Design

Data were collected as part of a randomized controlled trial which tested an intervention to empower parents to make their homes and vehicles smoke-free. Families were recruited in five public health nursing offices, five family resource centers, and eight daycare centers and kindergartens located across the province of Prince Edward Island. Families eligible for inclusion included those who: (a) resided in a home where at least one adult smoked one or more cigarettes in the home daily; (b) had a child aged 0-5 years who resided in the home at least 50% of the time; and

(c) had a parent who was willing to participate in the intervention if randomized to the intervention arm.

Data Collection

Semi-structured interview data on barriers and facilitators to making homes and vehicles smoke-free were collected in participants' homes at six month follow-up by trained research assistants. Parents were asked to identify: (a) barriers encountered in attempting to make their homes and vehicles smoke-free, including those barrier(s) they considered to present the greatest challenge(s); (b) what they did to overcome barriers; (c) what they found worked best in making their homes and vehicles smoke-free; and (d) what they would recommend to others who want to make this change. Because many parents did not understand the meaning of "barriers", we defined them as "things that stand in the way of making homes and vehicles smoke-free". Similarly, facilitators were defined as "things that participants did to overcome barriers". Responses were recorded verbatim.

Data Analysis

The data were analyzed using an inductive approach whereby frequent or dominant themes related to the research objectives emerged from the data (Thomas, 2008). Participants' responses to the interview questions were read in their entirety to familiarize those conducting the analysis with the content. Responses to each question were then read and codes were assigned to words, phrases, or sentences that described a particular idea. After coding was completed, all codes were reviewed and themes were assigned to groups of codes with similar meaning (Ulin, Robinson, & Tolley, 2005). Themes were defined as they emerged. Two members of the research team did

the initial coding. Coders compared their interpretations, discussed differences, and reached consensus through discussion.

Facilitators and barriers were compared between those who made the greatest and least change between baseline and follow up in the number of cigarettes smoked in the home daily. Because no intervention effect was detected in the RCT, the intervention and control groups were treated as a single sample in the primary analyses. Secondary analyses included comparison of the intervention and control groups with respect to barriers and facilitators. Data were analyzed according to season (November-April or May-October).

Results

Description of Participants

Participants included 33 mothers and 3 fathers aged 18-42 years. Eleven respondents (31%) had less than high school education. Sixteen (44%) reported annual household incomes less than $15,000 which is well below the 2006 low income cut-off after taxes for two-person families in both rural and small urban areas in Canada (Statistics Canada, 2007). Twenty respondents (56%) were separated, divorced, widowed, or single and 16 (44%) were married or living common-law. Twenty-one (58%) had more than one child and 21(58%) had one or more children aged less than two years. Mothers in 28 families (78%) smoked during pregnancy, and mothers in 29 families (80%) were current smokers; there were 18 families (50%) in which the father was a current smoker.

Themes

Consistent with an ecological model of health promotion (McLeroy et al.,1988;

Stokols, 1996) the codes for both barriers and facilitators clustered into themes related to intrapersonal factors, interpersonal factors, and the physical environment (Table 1).

Barriers to Smoke-Free Homes

Intrapersonal barriers. Intrapersonal barriers were commonly reported as the greatest barriers to smoke-free homes, with nicotine addiction the most frequently identified. A 27 year old mother of two stated: "I can't quit. It's the addiction part of it." A 20 year old single mother of two added: "Quitting...the cravings, they really get to me." Other intrapersonal barriers included the time and effort required to transition to a smoke-free home. A 23 year old single mother of two stated: "The time and effort that it really does take. You think it's easy, but it's not." Several participants commented on lack of knowledge about the harmful effects of smoking. A 27 year old single mother of four commented "If I had facts about the harmful effects of smoking (like the intervention group), then I would know how harmful it can be."

Less common intrapersonal barriers included being lazy, feeling a smoke-free home was inconvenient, wanting to relax with a glass of wine, being sick, not viewing smoke-free spaces as a priority, feeling stressed, being able to smoke and multi-task at the same time, perceiving it as a treat to smoke inside the house when the child was away, and experiencing discomfort when smoking outside.

Interpersonal barriers. The need to supervise young children was a commonly reported interpersonal barrier. Parents also spoke of children wanting to be with the parent who smoked, and their reluctance to bundle up a young child to go

outside, especially in unfavorable weather conditions. A 20 year old single mother of a one year old child explained: "It's hard to bundle her up and go outside. I can't leave her unattended."

Barriers concerning partners included references to partners wanting to continue smoking inside the home. The following quote by a 42 year old mother of seven children describes her husband's smoking habit: "He really likes to smoke. When he's on the computer it's hard for him not to smoke and he needs to be on the computer for work."

Displeasure from relatives was a common theme, with some relatives being quite vocal about their feelings. The commitment to a smoke-free home is evident in this 21 year old single mother of a 16 month old child who previously lived with her parents who smoked. "When they come over they still express unhappiness about having to go out on the porch, but they do it. Going smoke-free was really the first thing I've done independently against my parents' opinion."

Not owning or renting one's own home or apartment caused participants to feel that they had little influence over household practices. A 27 year old mother of four children explained "We live in grandmother's house-it's her habit." Less commonly reported interpersonal barriers included reluctance to remind people of the smoke-free status of the home, temptation to smoke in the home as a result of being around others who smoke, and difficulty dealing with visitors who smoke.

Barriers related to the physical environment. Weather and lack of access to the outside were commonly reported physical environmental factors. Weather barriers included references to how inclement weather (e.g. cold, winter weather, and/or rain)

discouraged people from smoking outside. A 25 year old mother of two children commented that "Going out during the winter and in the rain" were barriers to smoking outside. A 27 year old mother of four stated "It's getting colder-I don't like to go outside."

Lack of access to the outdoors also constituted a physical environmental barrier for some parents. This was a commonly reported theme particularly among participants with young children who required supervision. A 27 year old single mother of a three year old child who lived in a third floor apartment building with no balcony stated: "My daughter is too young to leave alone." Because of her responsibility for her child and limited access to the outdoors, she felt the need to smoke inside.

Barriers to Smoke-Free Vehicles

Intrapersonal barriers. Intrapersonal barriers were the most frequently reported, and largest barriers encountered in making vehicles smoke-free. They included the habit of smoking while driving, the need for relaxation and enjoyment, the lack of planning to prevent smoking while driving, and cravings to smoke while on long drives. The association between smoking and driving is evident in the comment by a 27 year old mother of two children who stated "I love to smoke when I'm driving."

Interpersonal barriers. The habits and routines of partners and relatives were identified as barriers to smoke-free vehicles. A 42 year old married mother of seven children commented about her husband "He's made the connection in his head… when he drives he smokes. On trips, it keeps him awake, he has nothing to

do." Not owning a vehicle and travelling with others was an issue for several participants, because they did not feel that they could request a smoke-free environment when traveling with another person.

Facilitators to Smoke-Free Homes and Vehicles

Intrapersonal facilitators. When participants were asked what they did to overcome barriers, responses most commonly referred to intrapersonal factors. Many participants spoke of changes within themselves including quitting smoking, considering quitting, or smoking less; altering smoking location; changing habits to increase the amount of outdoor smoking; reminding oneself of the change; making the decision to go smoke-free; committing to it; learning about the effects of ETS; looking for solutions as opposed to viewing this issue as a problem; getting a better job; and not taking cigarettes in the vehicle.

Using a newly learned communication method to convey her wishes to others is demonstrated in the following quote by a 27 year old mother of four. "I tried 'I' statements learned in the group instead of 'You should.'" Changing habits and incorporating smoking with outdoor activities is reflected in the following comment by a 19 year old single mother of a two month old: "I take a smoke if I'm going outside to take garbage." Interspersed with the description of facilitators were frequent references to the degree of effort required to make the transition to a smoke-free home. A 27 year old separated mother of a 2 year old commented "It's driving me crazy. Big struggle with myself." Other intrapersonal facilitators included being committed to going smoke-free, decreasing smoking, attending the empowerment

group, getting a new car, not wanting to damage the car with cigarette burns, and watching television commercials about the effects of ETS.

Interpersonal facilitators. Many facilitators involved working with others through interpersonal processes such as talking with household members about making the transition to a smoke-free home, telling others of the change, increasing awareness among smokers about the adverse effects of ETS on children's health, ending the relationship with a partner who was a smoker, avoiding confrontation with smokers, avoiding smokers, and keeping children away from smoking areas in the home. Several participants moved to a new location to avoid smokers who lived in their previous household. A 20 year old single mother of two who had previously lived with her parents commented "Moving out, that worked best. I got tired of fighting with them about the smoking."

When asked what worked best for them in making their homes smoke-free, the most common response pertained to interpersonal facilitators related to children. Parents articulated that feeling guilty, having a child in the house, worrying about the effects of ETS on children, and having a child with asthma, were facilitators. A 41 year old separated father of three children described that guilt worked best. "Guilt. No, just guilt. Knowing it's not good for non-smokers and kids." A 27 year old separated mother of two children also spoke of her children. "Having children and the environment. Thinking of someone else helps." Informing people that the home was smoke-free, and the frustration associated with this communication, was commonly mentioned. One 32 year old mother of five children stated that "Letting people know

that there's no smoking in the house...if you get annoyed enough they get the point" worked best in making her home smoke-free.

When participants were asked what worked best in making their vehicles smoke-free, the most common response also pertained to interpersonal facilitators concerning children. A 25 year old mother of two commented "The only thing I found is the two kids...they complain." Other interpersonal facilitators identified as working best in attempting to transition to smoke-free vehicles included telling friends, having smoke-free rules for the vehicle, and having smokers speak with a doctor about the adverse effects of ETS.

Comparative Analysis

Comparison of those who made the most (n=10) and least change (n=10) in the number of cigarettes smoked in the home daily indicated that of those who made the most change, all were mothers in their twenties, seven had partners, six had more than one child, and eight had a child ≤ 2 years of age. Those who made the least change included nine mothers and one father; six of whom had partners. Two were in their teens, five were in their twenties, and three were in their thirties. Four had more than one child, and seven had a child ≤ 2 years.

Comparison of barriers identified among those who made the most (n=10) and least change (n=10) in the number of cigarettes smoked in the home daily, indicated that the barriers were similar with the exception that three participants who made the greatest change identified not owning their own house as a barrier. Comparison of facilitators between the two groups indicated that five of the ten who had made the most change moved to another location whereas no one in the group with the least

amount of change had done so. The intervention (n=17) and control (n=19) groups identified similar barriers with the exception that several intervention participants identified partners as barriers. Only one of 11 intervention participants did not identify any facilitators, compared to four control participants. Individuals in the intervention group tended to report use of multiple strategies as illustrated by a 27 year old mother of four children who lives in her grandmother's house. "Sarah (pseudonym) did puffers in front of grandma and dad. Grandma is going to the next appointment for asthma-it may help with her behaviour. I tried 'I' statements learned in the group instead of 'you should.'" A simpler approach is portrayed in this comment by an 18 year old single mother in the control group. When asked what she had done to overcome the barriers, her comment was "I talked about it." No differences in facilitators were noted according to whether data were collected in the spring/summer or fall/winter.

Recommendations to Others

Participants reported a variety of recommendations for those wanting to make their homes and vehicles smoke-free. The most common theme related to being committed to the change, and to being consistent in following through with the decision. An 18 year old single mother of a three year old explained "You have to set your mind to it" and a 25 year old mother of two added "You have to be consistent." Several participants recommended a quick initiation of the change. A 24 year old mother of three children stated: "Just do it. Don't put it off." Other suggestions included quitting smoking, learning about the effects of ETS, planning, having appropriate clothing for smoking outside, weighing the pros and cons, staying busy,

being positive, taking the empowerment course, moving to another location, setting an example to others by smoking outside, finding the right method for each family, and making the change incrementally.

Interpersonal themes included making the change for children and telling others about the change. A 25 year old mother of two stated "Do it for the kids" and a 22 year old mother of five children added "Tell your friends and family." It was suggested that discussions about quitting smoking be avoided with those who were smokers. Seeking out sources of support particularly from non-smokers was suggested. Several recommendations pertained to the physical environment including keeping the home and vehicle clean and smelling "nice."

Discussion

Perceived barriers and facilitators to smoke-free homes and vehicles were identified by parents, many of whom were mothers who had smoked during pregnancy and had low socio-economic status. Intrapersonal factors were most commonly identified as barriers, and among intrapersonal factors, nicotine addiction was mentioned most often. Interpersonal factors were also commonly noted, and included relationships and communication with others such as the need to supervise young children, difficulties taking children outside, and dissension with partners and other relatives about smoking outside.

Our results concur with previous work reporting that nicotine dependence (Hill et al., 2003); supervision of children (Halterman et al., 2007; Hill et al., 2003; Robinson & Kirkcaldy, 2007); issues with friends and relatives (Halterman et al.; Hill et al.; Wakefield et al., 2000); weather (Hill et al.; Wakefield et al.;) unsafe

outdoor environment (Halterman et al., 2007; Robinson & Kirkcaldy); and lack of outdoor space (Hill et al.; Robinson et al.) are barriers. Similarly, our findings support previous findings (Green et al., 2003) that parents generally know and understand the adverse effects of ETS, but may lack specific information such as the increased risk for inner ear infections (Helgason & Lund, 2001). Robinson and Kirkcaldy found that parents were somewhat familiar with the scientific evidence concerning ETS exposure; however, they actively contested the evidence and constructed their own interpretations informed by personal experience and local networks.

This study was unique in that it was conducted in a Canadian province which experiences harsh weather conditions. Weather was identified as a barrier to smoke-free homes in two previous studies (Hill et al., 2003; Wakefield et al., 2000), however weather conditions are much more severe on the East Coast of Canada than in Australia.

Frequent references to nicotine addiction and the degree of effort required to make homes and vehicles smoke-free suggest that transitioning to a smoke-free environment is difficult. Parents identified interpersonal facilitators as most effective, yet they most often relied on themselves to facilitate the change to a smoke-free status, and none identified health care providers as facilitators. However the diversity of barriers identified in this research suggests that the process of making homes and vehicles smoke-free is complex, and that no single course of action will suffice in all situations. Health care providers and intervention programs need to assess each parent's context in order to offer concrete and helpful assistance that is relevant to each person's reality.

Limitations of this study include that data on barriers and facilitators were collected in interviews designed to gather data to evaluate an intervention. Interviews that focused solely on barriers and facilitators to smoke-free homes and vehicles may have provided more in-depth data. Taping the interviews might have enriched the data by providing information about voice inflection and pauses in the conversation.

The current study describes parents' perceptions of the barriers to smoke-free homes and vehicles, and their recommendations about strategies to overcome the barriers. Considering the many diverse barriers, it is remarkable that anyone succeeds in making the transition to smoke- free homes and vehicles. However, the data show that some things do help and success may depend on focusing on these facilitators. Parents could benefit from help in making this change, but likely are unaware of whom to ask for help. Health care providers may need training on how to offer helpful advice, and parents likely need to be told that health care providers can help. Nurses are well positioned to help families with this transition, as they work in multiple health care sites accessed by families with young children. Most parents want to protect their children from ETS. Finding meaningful ways to help them make this difficult and significant transition will greatly benefit children by protecting them from the multiple, adverse effects of ETS.

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Table 1.

Barriers and Facilitators to Smoke-free Homes and Vehicles

Theme	Description
Barriers	
Intrapersonal barriers	Personal factors
	Addiction
	Time and effort to make change
	Lack of knowledge about ETS
	* Habit of smoking while driving
	* Need for relaxation
	* Lack of planning
	* Cravings on long drives
Interpersonal barriers	Child factors
	Supervision of children
	Preparation of children to go outside
	Child wants to be with parent
	Partners and relatives
	Smoker's need/wish to smoke inside
	Conflict about indoor smoking

	Presence of smokers in home
	Home belongs to a relative
	* Habits of partners and relatives
	* Not owning own vehicle
Physical environmental barriers	Weather
	Winter conditions (cold)
	Rain
	Lack of access to the outdoors
	Upstairs apartment with no balcony
Facilitators for Homes and Vehicles	
Intrapersonal facilitators	Quit or consider quitting smoking, smoke less
	Change to outdoor smoking location
Interpersonal facilitators	Talk about it with household members
	Tell people and self of the change
	Move living location

Note: * refers to barriers concerning vehicles

Chapter 5 - Discussion, Summary, and Conclusions

This chapter reviews the principle findings of this thesis, discusses the implications of the results for research and practice, presents the study limitations, and describes the study conclusions. The objectives of the study were: (a) to test if parents' participation in an intervention based on an empowerment ideology and participatory experiences decreases the number of cigarettes smoked in homes daily at six months follow-up, and (b) to describe factors perceived by parents as barriers to making their homes and vehicles smoke-free, and to identify facilitators used by parents to manage these barriers.

5.1 RCT Testing Empowerment Intervention

To address the first objective, we conducted a RCT to test an empowerment intervention for parents aimed at reducing ETS exposure in children. This RCT did not detect an intervention effect. However, both the intervention and control groups reported notable decreases in the number of cigarettes smoked in the home at the six month follow-up.

Our study is distinct from previous RCTs testing ETS interventions in that it was based on empowerment theory, it used a group format for the intervention, and it tested the intervention in a "hard-to-reach" population in a predominantly rural province. Many participants were disadvantaged socio-economically. The study benefited from several strengths. Partnering with 18 rural and urban community agencies across the province increased access to the target population and encouraged widespread involvement in ETS reduction. Parents enjoyed the intervention and rated evaluation questions for each session between 4 and 5 on a five point Likert scale,

with an overall mean of 4.7 for all sessions. Research assistants were carefully selected, and were trained to be respectful and accepting of participants.

There are four issues that may explain the lack of an intervention effect. First, during the 45-60 minute baseline visit, participants were interviewed about their child's ETS exposure, and they received a brochure produced in Prince Edward Island about strategies for making the transition to a smoke-free home. Equivalent although non-significant increases in empowerment scores in the intervention and control groups, and decreases in the number of cigarettes smoked in homes in both groups, suggest that the baseline visit and brochure may have contributed to, or have been responsible for, the observed changes. Second, the lack of group differences could relate to the design and/or length of the intervention, which may not have been optimal in terms of having an impact over and above the baseline visit and brochure. Third, the Hawthorne Effect, whereby people perform better on the outcome measure because of their awareness of being studied (Gillis & Jackson, 2002; Polit & Beck, 2008), may in part, explain the lack of intervention effect. Finally, participants may have reported decreased smoking in the home due to a social desirability bias rather than actual decreases (Polit & Beck).

Our results concur with those of previous RCTs testing ETS interventions. Thirteen of 19 RCTs reviewed did not report group differences. Four were robust studies; three of which tested counseling interventions (Hovell et al., 2002; Wilson et al., 2001; & Zakarian et al., 2004) and one of which tested an educational intervention (Chan & Lam, 2006). A systematic review of ETS interventions for parents and caregivers of children aged 0-12 years reported that 12 of 18 studies found reduced

ETS exposure among children regardless of the group to which participants had been assigned (Roseby et al., 2003). The authors suggest that comparison conditions can be more effective than expected, and that parents may be responding to social pressure to reduce their children's ETS exposure.

5.2 Barriers and Facilitators to Smoke-Free Homes

Parents described multiple barriers to smoke-free homes. Intrapersonal factors were identified as the greatest barriers, and the most frequently mentioned intrapersonal barrier was nicotine addiction. Interpersonal barriers included the need to supervise young children, difficulties taking children outside, and dissension with partners and other relatives about smoking in the home. Barriers related to the physical environment included inclement weather and difficulty going outside to smoke.

Parents reported that facilitators involving others were most effective in overcoming barriers, yet they most often relied on themselves to facilitate this change. Parents did not seek advice from health care providers. These data suggest that the transition process is complex and individualistic; health care providers need to tailor strategies by considering individuals' specific context.

Our study was unique in that it was conducted in a predominantly rural province, located on the East coast of Canada. Few studies have explored barriers to smoke-free homes in participants who experience harsh weather conditions. In addition, facilitators were explored from parents' perspectives.

5.3 Implications for Research

Although no intervention effect was detected, observed changes in empowerment and smoking in the home were in a beneficial direction, and represent clinically important differences from baseline. This finding warrants further investigation to determine if either a one-time home visit to complete a questionnaire on ETS, or the ETS brochure on its own, had an impact. Larger samples are needed to increase precision.

Tobacco use is higher among those with low-socioeconomic status (Louis, 2008). In the current study, 44% (n=16) of the participants reported annual household incomes of less than $15,000 which is below the 2006 low income cut-off after taxes for two-person families in both rural and small urban areas in Canada (Statistics Canada, 2007). In addition, both tobacco use and exposure to second hand smoke are higher in rural areas (Canadian Institute for Health Information, 2006). Seven of the 36 participants in this study lived in rural areas. Recent recommendations for effective tobacco prevention and control interventions for low-socioeconomic populations from the Centers for Disease Control and Prevention, Office of Smoking and Health, state that: (a) the issue for this population is much more than tobacco use, (b) a risk factor-based approach is not a viable solution, and (c) evidence is lacking to develop appropriate interventions (Louis, 2008). Recommendations include diverging from a focus on smoking prevalence to a holistic description of the population that smokes through the use of qualitative methods to gather data about beliefs, values, history, perceived barriers, perceived assets, communication, trust, and community factors. The current study addresses several of these recommendations in that it

described participants' perceptions of barriers to making their homes and vehicles smoke-free, and identified facilitators used by parents to manage these barriers.

The varied and complex barriers identified in this study suggest that interventions need to incorporate individualized approaches that address the multiple barriers frequently experienced by parents. A framework consisting of a multifaceted approach for reducing children's ETS exposure is recommended (Klerman, 2004). Previous ETS intervention studies have not always incorporated multiple and individualized strategies. Of the 18 intervention studies identified in the systematic review by Roseby and colleagues (2003), more than one quarter had a single focus such as parent education about the adverse effects of ETS. However, lack of knowledge about the effects of ETS was seldom identified as a barrier in the current study. Research indicates that individuals have a general understanding of the harmful effects of ETS (Green et al., 2003) but may lack specific details (Helgason & Lund, 2001).

Interventions would benefit from the inclusion of approaches designed to address specific barriers experienced by parents. Of the six robust ETS studies identified, five tested a counseling intervention and one tested an educational intervention. The coaching (Hovell et al., 2000) and motivational interviewing (Emmons, Hammond et al., 2001) interventions that reported statistically significant findings do not acknowledge the complexity of barriers faced by many parents. In fact, barriers were mentioned in only one study (Hovell et al., 2000). The motivational interviewing intervention stressed personal choice and responsibility. Both approaches focused on the individual and referred to the term 'counseling',

implicitly suggesting that children's ETS exposure is an issue of individual choice. Data from the current study demonstrate that barriers are not only intrapersonal in nature, but are also related to other people and environmental factors. Interventions need to reflect this reality.

Researchers can benefit from lessons learned about engaging a hard-to-reach population who moved frequently, changed or disconnected their telephone numbers often, and screened their calls. The most important factor was having non-judgmental staff with excellent communication skills. This was evident in the differences noted in the effectiveness of different research assistants to recruit participants. Other strategies that helped engage this population included having a research assistant recruit and contact parents immediately after they expressed interest in the study, conducting eligibility screening in the home rather than by telephone, and speaking with people by telephone rather then leaving messages. In an effort to reach participants in person, we called at different times of the day during week-days and week-ends, and left notes at homes where telephones had been disconnected. We also learned that having an alternate contact number (e.g. parent) was very helpful.

5.4 Implications for Practice

Health care providers need to assume a more visible and effective presence in helping parents who expose their children to ETS address this very important, and preventable child health issue. Parents in this study relied primarily on themselves to make this difficult transition. Health care providers in community settings are in an excellent position to work with parents through ongoing assessment of child exposure and development of individualized, multi-dimensional interventions for families. This

needs to be an integral part of health care for families, and is a critical aspect of promoting the health of children. Most parents want to provide the best care possible for their children, and health care providers are well positioned to help them achieve this goal.

5.5 Limitations

Limitations of this study include the small sample size. Although the target population was estimated to be adequate, public health nurses found during recruitment that most families had already made the transition to smoke-free homes, so that far fewer families were eligible than projected. Parents' reluctance to discuss their children's ETS exposure with public health nurses, their discomfort with expressing interest in the study in the presence of other parents, and the use of ETS exposure as a factor in child custody decisions in divorce cases (Emmons, Wong, 2001) may explain, in part, the lower than expected eligibility.

ETS exposure among children was measured with parent self-report data. The original protocol called for testing urinary cotinine (i.e. a biomarker of nicotine exposure) among children. However, after seven months of attempting to collect urine samples, the research team decided to exclude cotinine testing because it severely impeded recruitment (due to parental fear that illegal substances might be detected in the urine, and that this information could be used in child custody cases).

As no tool could be identified which measured empowerment in the context of smoke-free homes, we modified an existing questionnaire to increase its relevance to the RCT. Evidence of its content validity was examined by expert reviewers and in a focus group with parents. Although helpful in assessing content validity and

interpretability, high baseline scores (median 61, total possible score 70) suggest that the instrument may not have had the ability to discriminate between levels of empowerment. Testing the instrument for endorsement frequency and eliminating items with a very high or low response might increase the discriminatory potential of the scale. Further psychometric testing of the scale would be beneficial.

Open-ended questions about perceptions of barriers and facilitators encountered by parents in making their homes and vehicle smoke-free were incorporated into an interview guide designed to collect quantitative data. Because of its quantitative orientation, parents needed encouragement to elaborate on their perception of barriers and facilitators, even though data collectors received ongoing instruction on how to cue further discussion. Separate interviews that focused solely on gathering data regarding parents' perceptions of the barriers and facilitators to smoke-free homes and vehicles may have provided more in-depth descriptions.

5.6 Summary and Conclusions

This thesis contributes the following to the literature addressing smoke-free homes for families with young children:

1. The number of cigarettes smoked in the home declined substantially and the level of empowerment increased in both the intervention and control groups, although no intervention effect was detected.
2. Barriers to smoke-free homes are multiple and complex, and involve factors internal to individuals (intrapersonal), factors between individuals (interpersonal), and factors related to the physical environment.

3. Parents most frequently rely on themselves to address the barriers they encounter, but indicate that facilitators involving others are most helpful.
4. Strategies for accessing hard-to-reach populations are proposed.

In conclusion, families often struggle to make their homes smoke-free. Barriers to attaining a smoke-free environment are complex, involving issues such as nicotine addiction, friction with family and friends, inclement weather, and lack of access to the outdoors. Parents tend to try to address these barriers without help, even though they indicated that working with others was most effective. Health care providers are well positioned to assist parents as they make the transition to smoke-free homes, yet they were not identified as facilitators by parents in this study. Health care providers need to assume a more visible and engaged presence if they are to help families address this important child health issue.

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Appendix A

Criteria for Rating Internal Validity of Intervention Studies

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RCTs and Cohort Studies (Harris et al., 2001)

- Initial assembly of comparable groups: RCTs - adequate randomization, including concealment and whether potential confounders were distributed equally among groups; cohort studies - consideration of potential confounders with either restriction or measurement for adjustment in the analysis; consideration of inception cohorts
- Maintenance of comparable groups (includes attrition, crossovers, adherence, and contamination)
- Important differential loss to follow-up or overall high loss to follow-up
- Measurements equal, reliable, and valid (includes masking of outcome assessment)
- Clear definition of interventions
- All important outcomes considered
- Analysis: adjustment for potential confounders for cohort studies, or intention-to-treat analysis for RCTs

Good (meet all of the criteria)*

- Comparable groups are assembled initially and maintained throughout the study (follow- up at least 80%)
- Reliable and valid measurement instruments are used and applied equally to the groups

- Interventions are spelled out clearly
- Important outcomes are considered
- Appropriate attention to confounders in analysis

Fair: (If any or all of the following problems occur without the important limitations noted in the "poor" category)*

- Generally comparable groups are assembled initially but some question remains whether some (although not major) differences occurred in follow-up;
- Measurement instruments are acceptable (although not the best) and generally applied equally;
- Some but not all important outcomes are considered;
- Some but not all potential confounders are accounted for

Poor: (If any of the following major limitations exists)*

- Groups assembled initially are not close to being comparable or are not maintained throughout the study;
- Unreliable or invalid measurement instruments are used or not applied equally among groups (including not masking outcome assessment);
- Key confounders are given little or no attention

* Nygren, P. et al., (2008).

Appendix B

Assessment of Internal Validity of Environmental Tobacco Smoke Studies

Study	Adequate Randomization	Concealment	Distribution Confounders	Maintenance Comparable Groups (attrition)	Diff loss to follow-up or high loss to follow up	Equal Reliable Valid Measurements	Masking Outcome	Clear definition intervention	Impt Outcomes	Intention-to-treat	Rating
1) Chan & Lam, (2006)	x	x	x	x	x	x		x	x	x	Good
2) Chilmonczyk et al., (1992)	x		x			x		x	x		Poor
3) Conway et al., (2004)	x			x	x	x		x	x		Poor
4) Davis et al., (1992)	x	x	x	x	x		x	x	x		Fair
5) Elder et al., (1996)	x					x		x	x		Poor
6) Emmons et al., (2001)	x	x	x	x	x	x		x	x	x	Good
7) Emmons et al., (2000)			x	x	x	x			x	x	Fair
8)Eriksen et al., (1996)	x		x	x	x	x		x	x	x	Fair
9) Fossum et al., (2004)						x		x			Poor
10)Greenberg et al., (1994)	x	x	x	x	x	x		x	x		Fair
11)Groner et al, (2000)	x		x	x	x			x	x	x	Poor
12) Hovell et al., (1994)	x		x		x	x			x		Fair
13) Hovell et al., (2000)	x	x	x	x	x	x	x	x	x	x	Good
14) Hovell et al., (2002)	x	x	x	x	x	x	x	x	x	x	Good
15)Hughes et al., (1991)	x		x	x	x	x		x	x		Fair
16)Irvine et al., (1999)	x		x	x	x			x	x		Fair
17)McIntosh et al., (1994)	x		x	x	x	x		x	x		Fair
18)Meltzer et al., (1993)								x			Poor
19)Murray & Morrison, (1993)						x		x	x		Poor
20)Severson et al., (1997)			x	x	x	x		x	x		Fair
21)Stretcher	x	x	x			x		x	x		Poor

et al., (1993)												
22)Vineis et al., (1993)			x					x	x			Poor
23)Wakefield et al., (2002)			x	x	x	x		x				Fair
24)Walgren et al., (1997)	x		x	x		x			x			Fair
25)Wall et al., (1995)			x	x	x	x		x	x			Fair
26)Wilson et al6., (2001)	x		x	x	x	x		x	x	x		Good
27) Woodruff et al., (2007)						x		x	x			Poor
28)Woodward (1987)						x		x	x			Poor
29)Yilmaz et al., (2006)	x	x	x		x		x	x	x			Fair
30) Zakarian, et al., (2004)	x	x	x	x	x	x	x	x	x	x		Good
31) Zhang & Qui, (1993)								x				Poor

Appendix C

Assessment of Internal Validity of Empowerment Studies

Study	Adequate Randomization	Concealment	Distribution Confounders	Maintenance Comparable Groups (attrition)	Diff loss to follow-up or high loss to follow up (assessed non-differential loss to follow-up and 80% follow-up)	EqualReliable Valid	Masking Outcome	Clear definition intervention	Impt Outcomes	Intention-to-treat	Rating
1) Anderson et al., (1995)	x							x	x		Poor
2) Bryne et al., (1999)	x		x			x		x	x		Fair
3) Davison & Degner, (1997)	x		x	x	x	x		x	x		Fair
4) Farber & Maharaj, (2005)						x		x	x		Poor
5) Jirapaet, (2000)			x	x	x	x		x	x		Fair
6) Keers et al., (2006)						x		x	x		Poor
7) McCarthy et al., (2002)			x	x	x				x		Fair
8) Mishra et al., (1998)	x		x	x	x	x		x	x		Fair
9) Pellino et al., (1998)	x		x			x		x	x		Fair
10) Pibernik-Okanovic et al., (2004)			x			x		x	x		Poor
11) Tsay & Hung, (2004)	x	x	x	x	x	x	x	x	x		Fair
12) Viklund et al., (2007)	x		x	x	x	x		x	x	x	Good

Appendix D

Summary of Intervention Studies to Reduce Environmental Tobacco Smoke (n=31)

Study	Design	Sample	Inter-vention Type	Intervention	Outcomes	Findings
Studies Rated as Good (n=6)						
Chan & Lam, 2006	Random-ized control-ed trial	Non-smoking mothers of hospital-ized children with smoking husband n=1483	Educa-tional	Five minute nurse-led health education intervention a) standardized health advice on ETS protection, b) two resource booklets, c) no smoking sticker, d) telephone reminder 1 week later.	Mothers moving children away from exposure to father's smoking. Telephone follow-up 3, 6, 12 months.	Interven-tion mothers significant-ly more likely to move children away from exposure to fathers' smoking than control mothers at 3 months. Not sustained at 6 & 12 months.
Emmon s et al., (2001)	Random-ized control-led trial	Low income smoking parents Care-givers with children under 3 recruited from CHC's n=291	Counsel-ling	Intervention was a 30-45 minute motivational interview (MI) done in the home by health educator followed by 4 phone calls. Based on stages of change, social cognitive theory, and risk communication theory. Comparison group received	a) household nicotine levels b) parent's carbon monoxide c) smoking status d) smoking cessation attempts e) stages of change f) smoking	3 & 6 month nicotine levels significant-ly lower in MI homes. ↑ in self-help groups. Conclude that a supportive motivation style may be most effective.

a mail-out of self-help materials (cessation manual and resources re ETS).	decisional balance g) perceived vulner-ability and health impact of smoking h) self-efficacy i) depression j) hassles scale Follow-up 3,6 months	Most people not interested in cessation. No differences found in smoking cessation b/t groups

Hovell et al., (2000)	Random -ized control- led trial	Low income smoking mothers who used nutrition supple- ment program n=108	Counsel -ling	7 individual counselling sessions (3 in person; 4 by phone) by grad students. Counselling based on shaping procedures to↓ ETS exp. Mean length 12-28 mins. Mothers: a) set goals b) signed contracts c) developed objectives q 2 wks d) recorded their smoking and children's exp f) used shaping to alter smoking practices e) given 'no smoking' signs f) received praise from counsellors	a) mothers' reports of ETS exposure at baseline, 3,6,12 months b) children's urinary cotinine at baseline, 3 & 12 months c) Mothers' salivary cotinine at baseline, 3,6,12 months d) nicotine monitors	a) mothers' reports ETS exposure ↓ in counselled group at 3 & 12 months; differences between groups by time were significant b) urinary cotinine ↑ in both groups at 3 months but than ↓ in counselled group but kept rising in control gr. c) mothers' salivary cotinine increased in both groups from baseline to 3 months. Intervention group ↓ at 12 months while controls ↑.

Hovell et al., (2002)	Random -ized control-led trial	Latino families with children with asthma ages 3-17, who had at least 1 smoker in house n=204	Counsel -ling	After asthma education families were randomly assigned to a coaching intervention or the control group. Coaching included 7, 45 min sessions plus a booster phone call. Coaching involved shaping, goal setting, and signing contracts	a) parent report re demo-graphics and smoking exposure b) child's urinary cotinine c) air nicotine monitors d) mothers' salivary cotinine	a)Parent-report of ↓ ETS exposure at 4 months b) cotinine levels at month 4 ↓ in intervention and ↑ in controls. Inter and control groups equal at 13 months Asthma education and coaching can ↓ ETS exposure.

Wilson et al., (2001)	Random-ized control-ed trial	Parents of children ages 3-12 who had asthma and were ETS exposed. n=87	Cotinine feed-back and asthma educa-tion	3 counselling sessions over 5 wks. Included asthma education and behaviour change strategies. Cotinine feedback given to parents x 4. Usual care-medical care and basic info re asthma.	Data collected at baseline, 6 & 12 months a) health care utilization and asthma hospital-ization b) child's cotinine creatinine ratio (CCR) c) parental self report of smoking in home and child's exposure d) child's asthma symptoms e) child's pulmonary function	a) Intervention group had a significantly lower odds ratio of having more than one acute asthma medical visit during the follow-up year and a non-significant trend toward lower odds of hospital-ization. b) Non-significant differences in urinary cotinine levels between groups. c) Non-significant differences in proportion prohibiting smoking in the house.

Zakarian et al., 2004	Random -ized control- led trial	Mothers with children < 4 years.	Counsel -ling	Intervention- 7 behavioral counselling sessions	Parent report ETS exposure and children's urinary cotinine and mothers' salivary cotinine.	Children's urinary cotinine did not show significant changes in either group.

Studies Rated as Fair (n=13)

Davis, Cummings, Rimer, Sciandra & Stone (1992)	Mail out survey	mothers with young children n=630	Self-help smoking cessation	Target audience mailed one of three cessation guides, one of which was designed for women with young children	a) # subjects who reported attempting to quit smoking b) # subjects who reported being non-smokers for at least 1 week at 6 month follow-up inter	NS differences cessation rates
Emmons, Sorensen, Klar, Digianni, Barclay, Schmidt, & Hammond (2000)	Pilot study. Quasi-experimental historical comparison. First 12 months were usual care, followed by intervention phase.	women in Healthy Baby program in Boston. (usual care-62; 52-MI). .n=114	Counselling	Motivational interviewing (MI) by public health nurses during home visits. Goal to reduce ETS exp and promote cessation. Feedback given re nicotine levels in the home.	Seven day point prevalence abstinence primary outcome.	NS differences in cessation or smoking rates between groups.

Eriksen, Sorum, & Bruusgaard (1996)	Rand-omized parallel group	Families with children ages ≤ 4 yrs, who had an adult smoker and used health centres n=443 families	Educa-tional	Incorpor-ated informa-tion session (5 minutes) and ways to ↓ ETS exposure with one well-child visit and 3 brochures. Control group did not receive any info on smoking. .	Self-report of: a) daily smoking b) # cigs c) Meas-ures to reduce ETS exp	NS differences in frequency positive changes between the inter-vention and control groups

Greenberg, et al., (1994)	Solo-mon four-group design	Families with infants (n=933)	Educa-tional Home visiting	Four nurse home visits (45 minutes each) during first 6 months of life. Based on social learning theory. 1st visit, discussed ETS, sources for each infant. Worksheet completed on ways to ↓ETS exposure. Remain-ing visits assessed mother's attempts to ↓ exposure, and developed new strategies.	a) urinary cotinine, b) # cigs per day c) maternal and family character-istics d) infant respiratory symptoms Measured 18 days, 7 & 12 months	↓ ETS exposure intervene-tion group (Self-report). NS differences in urinary cotinine between groups. ↓ lower respiratory symptoms among intervene-tion infants.

Hovell et al., (1994)	Rand-omized control-led trial (3 group repeat-ed mea-sures)	Families with children 6-17 with asthma and a parent who smoked who attended allergy clinics n=91	Counsel-ling	a)interv-ention group received a 6 month series of counsel-ling sessions to ↓ ETS exp b) monitor-ing group to determine effect of monitor-ing c) control group usual care.	a) # cigarettes child exposed b) parents' smoking rates c) nicotine air monitor d) children's self-report of asthma symptoms	At 12 months, inter-vention group ↓ ETS exposure. Both the monitoring and control groups ↑ ETS exposure.
Hughes McLeod Garner, & Goldbloom (1991)	Rand-omized control-led trial	Children who had been hospital-ized at IWK for asthma n=95	Educatio nal Home visiting	Inter-vention: a) 3 month clinic visits b)asthma education c) home visits by research nurse Controls had usual care own doctor. Assessed at 6 & 12 months.	Asthma severity	NS differences in ETS exposure, medical visits, or theo-phylline levels. Inter-vention group had ↓ school absentee-ism. Asthma severity ↑ in most pts.

Irvine et al., (1999)	Rand-omized control-led trial	Families with a child 2-12 with asthma, living with a parent who smoked. n=501	Educa-tional. Home visiting	Home visits x 2 by research nurses. Parents given ETS info. and ways to quit smoking or ↓ ETS exposure. Control group received leaflet on smoking.	Salivary cotinine in children and parents	NS findings. Cotinine levels ↓ both groups. Children in interv-ention group had higher cotinine at 1 year. Parent cotinine levels ↑ both groups.

McIntosh, Clark, & Howatt (1994)	Rand-omized control-led trial	Parents/ guardian with children with asthma who attended pulmon-ary clinics n=92	Cotinine feedback and a self-help materials	Inter-vention group received usual care and a letter re child's urinary cotinine and encourage ment to smoke outside. Smoking parents received a self-help manual re smoking outside. Usual care: counsel-ling re ETS; advice to quit or smoke outside.	a) attempts to quit smoking in the home b) cessation inside smoking c)mainten-ance of outdoor smoking d) child's urinary cotinine . Data gathered at baseline & 4-6 months	NS differences in # of parents smoking outside the home at post-test.

Severson, Andrews, Lichtenste inWall & Akers (1997)	Prac-tices random -ized. Ana-lyzed by individ-ual (identi-fied as a control-led trial by Gehrm -an & Hovell, 2003)	Mothers at first pedia-trician visit (2 wks post-partum) who had smoked in the month prior to getting pregnant Included current smokers and quitters. n=2901	Advice from pedia-trician, nurse practi-tioner, or physician assistant	Extended group: brief advice during 4 well baby visits, written materials, video. Minimal group: package ETS materials.	Data obtained at 6 & 12 month follow-up with mail out question-naires a) smoking status of mother b) demo graphic data	↓smoking and relapse at 6 months but NS effect found at 12 months.
Wakefield et al., (2002)	Rand-omized control-led trial	Families with children 1-11 with asthma with at least 1 parent a smoker n=128 families	Cotinine feedback and education	Inter group: a) letter with child's CCR results & ETS restrict-tions. b) Booklets on ETS, asthma, and quitting c) phone call 1 wk after letter d) phone call 1 month later	Data collected as baseline & 6 months a) asthma symptoms b) SES c) smoking habits parents d) child's ETS exp e) urinary cotinine child f) urinary cotinine from parents who quit g) household and car bans	a)NS differences between inter-vention and control groups re household and car bans, cigarette consump-tion, child's cotinine, parental smoking status.

Walgren, Hovell, Meltzer, Hofstetter, & Zakarian, 1997 (Follow-up of Hovell's 1994 study at 20 and 30 months)	3 group repeated measures	Families with children 6-17 with asthma and a parent who smoked. n=91	Counselling	Randomly assigned to a) behavorial counseling, b) monitoring control, c) usual medical care.	a) parental self-report of child's ETS exposure and smoking cessation b) rating of child's symptoms and pulmonary function tests	Significantly greater ↓ in children's ETS exposure in counselling group. Sustained 2 years.
Wall, Severson, Andrews, Lichtenstein & Zoref, (1995) (See Severson study)	Practices randomized. Analyzed by individual. (Identified as a Controlled trial by Gehrman & Hovell, 2003).	Mothers at first pediatrician visit (2 wks post-partum) who had smoked in the month prior to getting pregnant Included current smokers & quitters. n=2901	Pediatrician advice	Extended group: brief advice during 4 well baby visits, written materials, video. Minimal group: package ETS materials.		Found significant differences 6 months in cessation, relapse, passive smoking knowledge, and attitude toward passive smoking.

Yilmaz, Karacan, Yoney, & Yilmaz (2006)	Rand-omized control-led trial	Mothers with a child <16 attend-ing hospital for health care visit	Educa-tional	Three groups 1) smoking cessation inter-vention aimed at ETS risks to children's health; 2) smoking cessation aimed at ETS risks to mothers' health; and 3) control group.	a) smoking status b) smoking location change c) knowledge change	Both inter-vention groups had significant-ly ↑ rate of cessation and smoking location change. Child interven-tion group significant-ly ↑ rate of cessation and smoking location change.

Studies Rated as Poor (n=12)

Chilmonczyk, Palomaki, Knight, Williams, & Haddow (1992)	Random-ized Control-ed trial	Mothers and infants (52 int and 51 control) Attend-ing well-child visits. n=103	Cotinine feedback	Physic-ian tele-phoned mother to report cotinine results, and sent a form letter with recomm end-ations for chang-ing house-hold smoking habits	Urinary cotinine from infants at baseline and 2 months post-interven-tion	NS results
Conway, Woodruff, Edwards, Hovell, & Klein, 2004	Random-ized control-ed trial	Parent of child aged 1-9 years. n=143 parent child pairs	Problem-solving	Trained Latina lay comm-unity health advisors conduct ed six home and tele-phone visits over four months. Used contract-ing, shaping, problem-solving, social	1) Parent report of child's exposure past month. 2) Child's hair samples for nicotine and cotinine testing	NS results.

				support.		
Elder et al., (1996)	Multi-center random-ized trial with 4 centers (24 schools/ site) Schools random-ly assigned to inter-vention or control group.	96 schools at 4 sites with a cohort initially in the third grade. Conduct -ed for 3 school years n=6527	School based	Inter-vention included a) smoking preven-tion curri-culum for fifth grade students, b) a home-based program c) policy promo-tion for smoke-free schools. Based on social learning theory and organ change.	a) student smoking acquisi-tion be-haviour and smoking behav-iours of friends b) school health assess-ment to measure organiz-ational change	NS results
Fossum, Arborelius, & Bremberg (2004)	Non-random-ized inter-vention control groups	Swedish speaking smoking mothers of infants 0-4 weeks old n=41	Educa-tional	17 Child health centers-inter-vention group. 16-control group. Nurses: comp-leted smoking survey with mothers re ETS	Baseline and 2-3 months follow-up a) Mothers' salivary cotinine. b). Self-report of child's ETS exposure. c) Assess-ment of nurses'	Nurse-deliver-ed inter-vention resulted in ↓ salivary cotinine as compare-ed to control group.

				knowledge, monitoring, and exposure. Discussed cessation or changes in smoking.	counselling methods.	
Groner, Ahijevych, Grossman, & Rich (2000)	Three group Randomized controlled trial	Female care givers who accompany children under 12 for ill or well child checks n=166	Counselling	Gr 1- Smoking cessation focussed on child's health Gr 2- Smoking cessation focussed on maternal health Gr 3- control group who received safety information.	a) smoking status b) nicotine dependence quest c) stage of change d) knowledge of effects of ETS in children	N/S findings between groups in quit rate, # cigarettes smoked, or stage of change. Child Health group reported significant differences in smoking location smoking (1/3 smoking outside). Had ↑ knowledge ETS effects.
Meltzer, Hovell,	Quasi-experi-	Families with	Counselling	Five, bi-weekly	a) parent report	Children's

Meltzer, Atkins, & dePeyster, (1993)	mental design	child 5-14 years with asthma and a smoking parent n=5		30 minute. Counsel-ling sessions for parents; based on social learning theory.	child's ETS exp with diaries b) environ-mental carbon mon-oxide c) spiro-metry on children	Expo-sure ↓. Four of the parents ↓ their smoking
Murray and Morrison (1993)	Pre- and post-test assess-ment	Children with asthma aged 1-17, referred to allergy clinic .	Policy change	Tested impact of doctors advising parents not to smoke in the home.	Compar-ison of parent smoking and child-ren's asthma symp-toms pre- and post-policy.	Mean number of cigar-ettes parents smoked around children ↓. Child-ren's asthma symp-toms improve-ed.
Stretcher et al., (1993)	Random-ized control-led trial	Mothers with new borns n=585 families	Counsel-ling	Four nurse home visits, 45 mins each. Verbal rein-force-ment given. Mother used work-sheets to identify ETS sources	Data collected at 18 days of age, 7& 12 months. a) expected outcomes of ETS exposure b) Efficacy expecta-tions in maintain-ing a	Signif-icant and sustain-ed changes in outcome and efficacy expect-ations in inter-vention group

				and strategies to overcome. Based on self-efficacy.	smoke-free environment c) parental report infant's ETS exposure	
Vineis et al., (1993)	Non-randomized experimental	Parents of newborn babies n=402	Counselling Educational	Anti-smoking education – 15 min session with nurse and 3 booklets	a) smoking cessation	NS effect on smoking prevalence
Woodruff, Conway, Elder, & Hovell (2007)	Pilot study: One-group, pre-post design	Latino parent-child pairs n=50	Feedback nicotine exposure	Nicotine levels child's hair samples and counselling given to parents during two home visits plus two mail-outs alternate versions of feedback, and a telephone call.	1) Survey of ETS exposure 2) Child's hair samples 3) Preference for format of feedback	Parents' reports and children's hair nicotine levels showed significant reductions. Parents liked all feedback formats.
Woodward, Owen,	Quasi-experim	Mothers who	Educational	Participants	Measured at	NS differ-

Grgurinovich Griffith, & Linke (1987)	ental (allocate -ed to group by month of deli-very)	smoked during preg-nancy n=184		assigned to: a) ETS self-instruc-tional kit, letter from phys-ician, and tele-phone call. b) minimal contact group-mail or phone three months post-partum. c) con-trol group	baseline and three months later. a) parent smoking behave-iour b) urinary cotinine in some parents and infants c) parental-report of infant's ETS exposure.	ences in mothers' cotinine, and infants' ETS expo-sure.
Zhang & Qui, (1993)	Non-random selection of inter-vention and control schools	Students grades 1-7, in 23 schools n=10,39 5	School-based	a) tobacco use preven-tion program b) smoking control policies c) teachers as non-smoking role models d) student monitor-	a) students' know-ledge of health effects of tobacco b) self-report of smoking status by fathers c) inter-views by health educators to validate if fathers	Signific ant differ-ences for cessa-tion rate for Inter-vention group at six months follow-up

ing of father's smoking e) cessation materials to fathers f) letter from child asking father to quit smoking	had actually quit

Appendix E

Summary of Intervention Studies to Increase Empowerment (n=12)

Study	Design	Sample	Intervention Type	Intervention	Outcomes	Findings
Studies Rated as Good (n=1)						
Viklund, Ortqvist, & Wikblad, (2007)	Wait-list design	Teen-agers with Type 1 Diabetes n=32	Educa-tional group sessions	Six weekly, two hour sessions about empower-ment, coping, life satisfac-tion, and goal setting.	a) HgA1c b)empower-ment c) parental involvement	No glycemic or empower-ment effects found from intervention.
Studies Rated as Fair (n=7)						
Byrne et al., 1999	Random-ized control-ed trial	Individ-uals with chronic mental illness (n=214)	Educa-tional group sessions	1) Empower-ment intervention – Two hour, weekly sessions x 12 weeks, then weekly session x nine months. Sessions consisted of listening, dialogue, and under-standing the problem. 2) Health education intervention - 12, one hour, weekly sessions, and two hours weekly sessions x nine months.	Global life satisfaction	All 3 groups reported 5-7% increases in life satisfaction. No significant differences between groups.

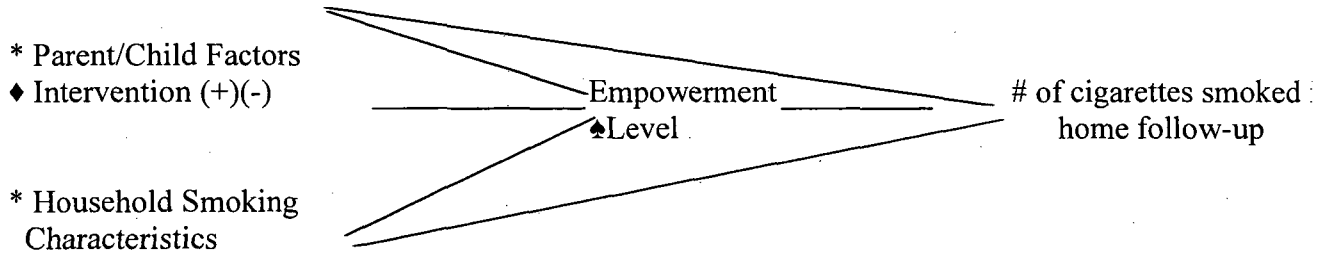
Davison & Degner (1997)	Random -ized control-led trial	Men with prostate cancer n=60	Educa-tional Individ-ual sessions	Intervention group received information package, a list of questions, and an audiotape to tape meeting with physician.	a) preferences for control over treatment decision-making-card sort technique b) anxiety-Spielberger State-Trait Anxiety Inventory c) depression CES-D d) demo-graphics	Intervention group significantly more active role in decision making and had lower state anxiety levels than control group 6 wk follow-up.
Jirapet (2000)	Non-equival-ent control group Pretest-posttest	Thai HIV-infected mothers with infants n=94	Group sessions	6 weekly 2-3 hr sessions, based on empower-ment Group leader facilitator not expert. Mothers identified needs, actions, plans, and evaluated actions.	a) Jaloweic Coping Scale b) Maternal Caregiving Question-naire c) Perceived Life Quality Index d) Program evaluation.	Mothers in empowerment group had significantly ↑ levels of coping ability, QOL, and maternal role adaptation compared to the control group.
McCarthy et al. (2001)	Non-equival-ent control group Pretest-post test	Families who had a child with asthma n=57	Educa-tional group sessions	3 weekly sessions, 2-3 hrs each	a) Asthma Facts b) Parents' Sense of Control Scale c) Ability to Make Decision and Provide Care	Intervention group scored significantly higher in sense of control, ability to make decisions, and to provide care.
Mishra et al. (1998)	Quasi-experim	Women n=108	Educa-tional	Breast cancer control	a) demo-graphics	Intervention group

	ental design with random-ization		group sessions	program consisting of four, two hour sessions. Based on self-efficacy and Friere's empower-ment pedagogy.	b) knowledge c) attitudes d) perceived self-efficacy e) breast self-exam skills f) breast cancer-related practices (mammo-gram use)	significantly more likely to be medically knowledge-able, have higher self-efficacy, and greater skill performing BSE.
Pellino et al., 1998	Experim ental vs. com-parison group post-test	Ortho-paedic patients schedule -ed for surgery n=83	Educa-tional Individ-ual sessions	Empowering preoperative teaching	a) empower-ment b) self-efficacy c) subjective view of ability to do pre-op and post-op activities d) chart review of pain and post-op status	Experimental group reported significantly ↑ self-efficacy scores and ↑ confidence with post-op tasks
Tsay & Hung, 2004	Random -ized Control-led trial	Patients with end-stage renal disease n= 50	Educa-tional Individ-ual sessions	Individual consultations with a CNS three times a week for four weeks. Included goals setting, social support, coping, motivation.	a) Empower-ment b) Self-care self-efficacy c) Depression	Intervention group had significantly greater improvement in empower ment, self-care self-efficacy, and depression as compared to control group.
Studies Rated as Poor (n=4)						
Anderson et al. (1995)	Randomi zed wait-listed control group trial	Adults with diabetes n=64	Educa-tional group sessions	Patient Empower-ment Program consisting of six weekly sessions on	a) glycated haemoglobin b) self-efficacy c) diabetes attitudes	Intervention group reported significant decreases in glycated haemoglobin,

				informed choices and psychosocial skills to make personal, social, and institutional changes.		significantly higher scores on 4 of 8 self-efficacy scales, and an improved attitude to living with diabetes.
Farber & Maharaj, 2005	One group pre-and post design	Parents who had children with a develop mental delay n=39	Educa-tional group sessions	Thirteen, three hour sessions-education, discussion and modelling.	a) Empower-ment b) Parent emotional outlook c)Parent-child interaction d) Parent community involvement	Statistically significant ↑ empower ment, parent emotional outlook, parent-child interaction, and parent community involvement
Keers et al., 2006	Non-random-ized program evalua-tion with compar-ison group	Adults with diabetes n=99 interven -tion and n=231 compar-ison group	Rehabil-itative group sessions	Ten days of group sessions and 1:1 support for 10 weeks.	a) HbA1c b) Health-related quality of life c) Health loci of control d) Diabetes coping	HbA1c, mental health-related quality of life significantly ↑ in program group
Pibernik-Okanovic, Prasek, Poljicani n-Filipovic, Pavlic-Renar, & Metelko, (2004)	Quasi-experi-mental with repeated measures and a control group	Adults with poorly control-led Type 2 Diabetes n=108	Educa-tional group sessions	Six weekly sessions, 60-90 minutes, focusing on goal setting, problem solving, coping, social support, motivation.	a) perceived locus of health control b) Beliefs about diabetes c) Quality of life d) HgA1c	Intervention group reported ↑ quality of life and HgA1c. Cannot draw conclusions from findings.

Appendix F

Causal Diagram



Parent/Partner Factors

1. Educational level of parent(s)/partner
2. Age of parent(s)/partner
3. Gender of parent/partner
4. Marital status
5. Parent(s)/partner occupation
6. Household income

Child Factors

1. Number and age of children residing in the home at least 50% of the time
2. Average number of hours target child spends in the home during week-days & week-ends
3. A physician diagnosis of asthma, pneumonia, ear infections, and low birth weight in one or more of the children residing in the home at least 50% of the time

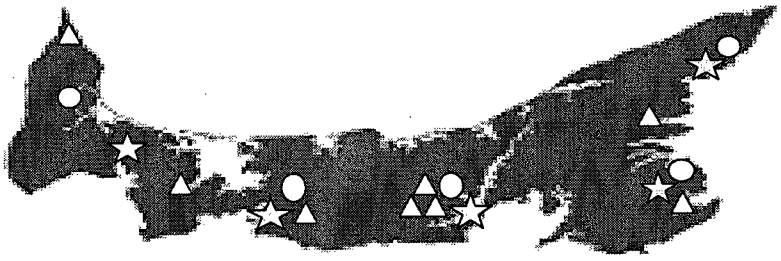
Household Smoking Characteristics

1. The number of smokers in the household
2. The number of cigarettes smoked in the household daily by residents and visitors on a daily basis for week-days and week-ends during the seven days
3. Presence of discord in family members regarding smoking in the household
4. Number of quit attempts by the smoking parent or average number of quit attempts for smoking parents, or parent/partner dyad during the past twelve months
5. Maternal smoking during pregnancy
6. Highest level of nicotine dependence in the smoking parent(s) and/or partner
7. Structural type of housing

* Potential Confounders
♦ Main Effect
♠ Intermediate variable
● Main outcome variable

Appendix G

Recruitment Sites for RCT



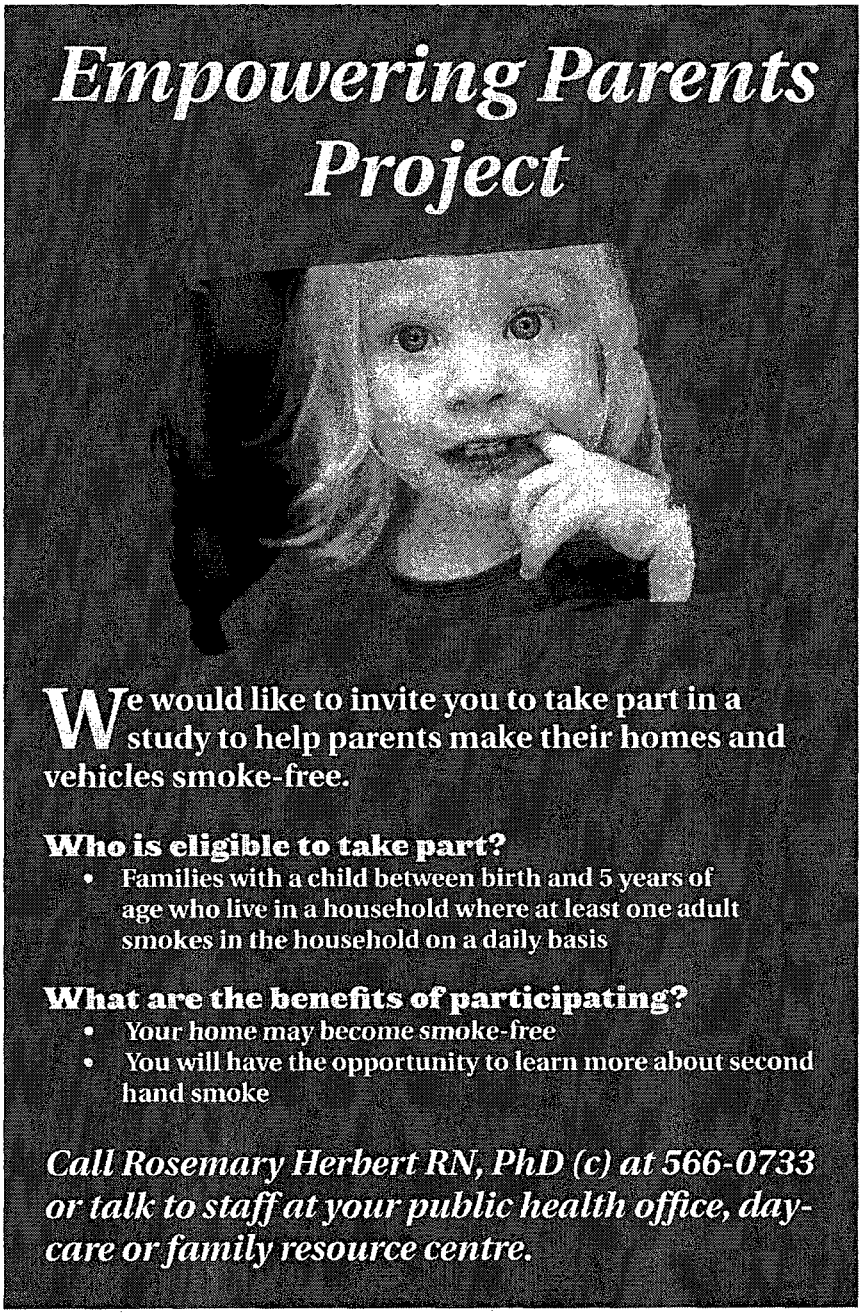
Public Health Nursing Offices ☆

Daycares/Kindergartens △

Family Resource Centres ○

Appendix H

Recruitment Poster for RCT



Appendix I

Letter of Invitation to Parents Describing RCT Participation

Empowering Parents to Make Smoke-Free Spaces Research Project

Dear Parent,
If you have a child between the ages of birth and 5 years, and live in a household where smoking occurs on a daily basis by an adult, I would like to invite you to take part in a research project. The main purpose of this project is to determine the effectiveness of a program in helping parents make their homes and vehicles smoke-free. Factors which help or hinder the process will also be examined. While shaping and coaching techniques have been found to reduce children's second hand tobacco exposure in some populations, these approaches may not apply to all populations.

A process similar to flipping a coin will be used to assign parents to one of two groups. One group will attend three, weekly two-hour group sessions followed by three weekly telephone calls, while the second group will receive a brochure about smoke-free homes. A research assistant will visit your home twice, when a parent is present to complete questionnaires. Three questionnaires will be completed at the first visit, and two questionnaires will be completed during the second visit. You have the right not to answer questions you do not want to. The questionnaires contain questions regarding basic information about your family, smoking practices in the household, and the child's exposure to tobacco smoke. Each visit will take about 30-45 minutes. You will also be mailed a copy of one questionnaire two weeks after the second visit, and asked to complete this questionnaire for the third time and return it in a prepaid envelope to the researcher. To cover the costs of taking part in the study, **all families will receive $65.00 for childcare and $35.00 for travel**. In the event of drop-out, this amount will be prorated.

Benefits of Participating:
We don't know what the benefits of participation are, but

1 Children's homes may become smoke-free.
2 Parents may learn more about the effects of second hand smoke in children.

Risks of Participating:

1 Participation in the study presents minimal or no risk to participants.

Participation in the study is voluntary. If you choose to take part, you have the right to ask questions at any time and to withdraw from the study at any time. Withdrawal from the study or deciding not to join the study will not affect your health care in any way.

Confidentiality of all information collected during the study will be maintained by keeping the information in a secure and locked location. Only the principal investigator, supervisor, and research team will have access to the data. Each family will be assigned a code, which will be used to identify questionnaires rather than the

family's or child's name. The code will link families to the questionnaires, however only the research team will be knowledgeable of the coding system.

This is a very important child health issue. Your participation would be greatly appreciated. If you have any questions, I can be reached at 902 566-0733 or by email at **rherbert@upei.ca**.

Sincerely,

Rosemary Herbert RN, PhD(c)

Please tear off and place in the special box in the public health office, family resource centre, kindergarten, or daycare where you received this letter.

I wish to be contacted to learn more about the Empowering Parents to Make Smoke-Free Spaces research project.

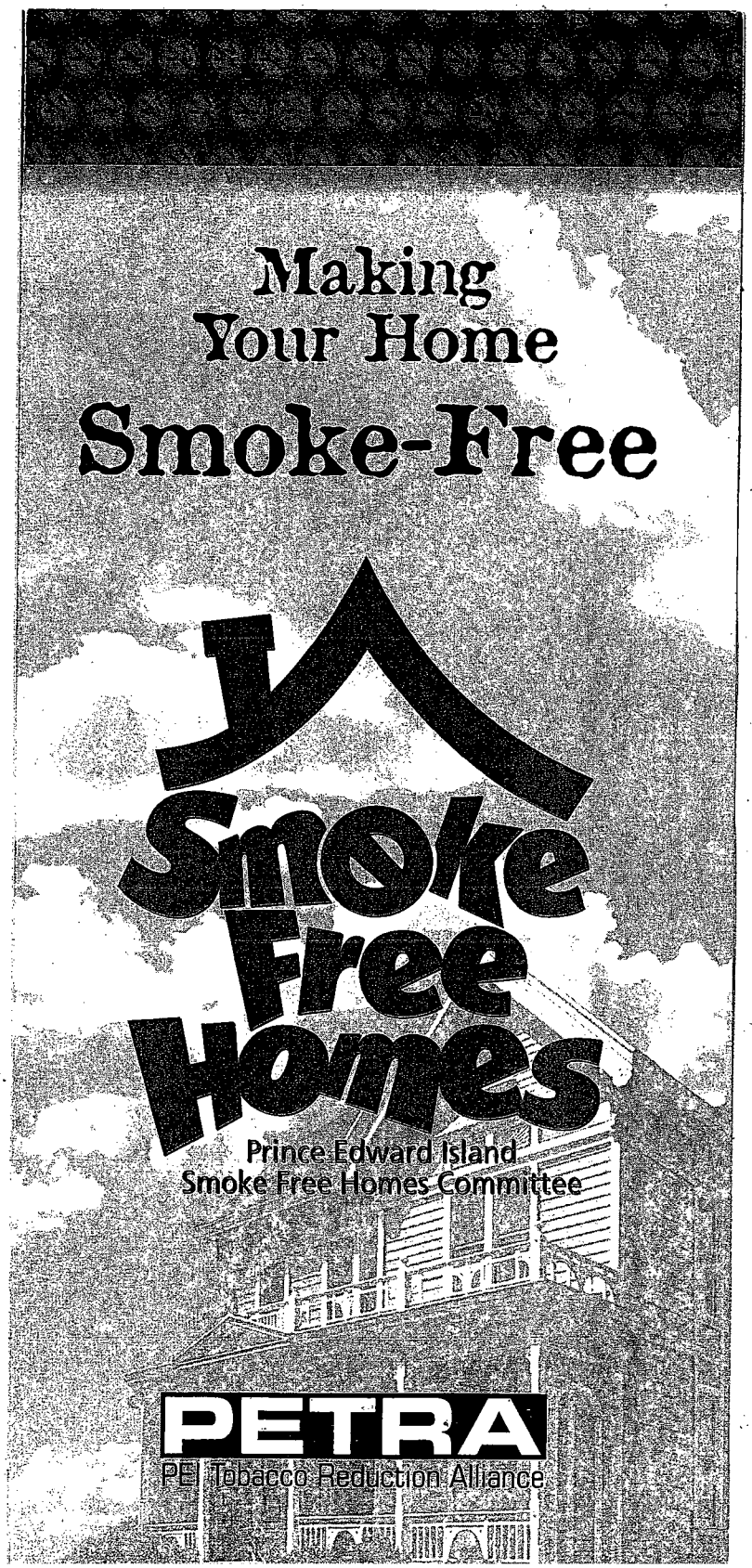
Name of Parent_____

Telephone Number _____ Home

_____ Cell

Appendix J

Environmental Tobacco Smoke Brochure



Appendix K

Consent Form for RCT Participants

Empowering Parents to Make Smoke-Free Spaces Research Project
McGill University and the University of Prince Edward Island

Supervisor: Dr. Anita Gagnon, McGill University School of Nursing
Investigator: Rosemary Herbert, UPEI School of Nursing

Purpose: The main purpose of the research project "Empowering Parents to Make Smoke-Free Spaces" is to determine the effectiveness of a program designed to help parents make their homes and vehicles smoke-free. Factors which help or hinder the process will also be examined. While shaping and coaching techniques have been found to reduce children's second hand tobacco exposure in some populations, these approaches may not apply to all populations.

Procedures: Parents will have an equal chance of being assigned to either a group which takes part in three weekly, two hour group sessions followed by three weekly telephone calls, or a group which receives a brochure about the effects of second hand smoke. A research assistant will also visit each family at home when the family enters the study and approximately eight months later to collect information. A parent in each family will be asked to complete three questionnaires during the first visit, and two questionnaires during the second visit. The questions ask basic information about the family, smoking practices in the household, and the child's exposure to tobacco smoke. Participants have the right not to answer any questions they do not want to. Each visit will take about 30-45 minutes. Parents will also be mailed a copy of one questionnaire two weeks after the second visit, and asked to complete this questionnaire for the third time and return it in a prepaid envelope to the researcher.

Participation in the study is voluntary. If you choose to take part, you have the right to ask questions at any time and to withdraw from the study at any time. Withdrawal from the study or non-participation will not affect your health care in any way. To cover the costs of taking part in the study, all families will receive $65.00 for childcare and $35.00 for travel. In the event of drop-out, this amount will be prorated.

Confidentiality: Confidentiality of information collected during the study will be maintained at all times by keeping the information in a secure and locked location. Only the principal investigator, supervisor, and research team will have access to the data. Participants will remain anonymous and will not be identifiable in the data.

Benefits: We don't know what the benefits are, but parents who participate in the study may learn more information about the effects of second hand smoke in children, and children's homes may become smoke-free.

Risks: Participation in the study presents minimal or no risk to participants.

Contact Information: Questions, comments, or concerns about participation in this research study, can be directed to Rosemary Herbert at 902-566-0733 (email address rherbert@upei.ca) or the secretary of the UPEI Research Ethics Board Lynn MacPhee, at 902-566-0637 (email address lmacphee@upei.ca).

The study has been approved by the McGill University Faculty of Medicine Institutional Review Board and the University of Prince Edward Island Research Ethics Board.

The study has been explained to me and my questions have been answered to my satisfaction. The following rights have been explained to me.

1) I have the right to ask questions at any time.
2) My participation is voluntary. Refusal to participate will not affect my healthcare or my family's health care in any way.
3) I have the freedom to withdraw from the study at any time, and it will not affect my health care or my family's health care in any way.
4) I will not be required to answer any questions I am uncomfortable with.
5) The information my family shares will be kept confidential.
6) I will be given a copy of the signed and dated consent form.

Signature _____ Witness _____

Date _____

Would you like a summary of the findings when they are completed? ☐ yes ☐ no

Mailing address to send results:

_____

Appendix L

Baseline Data Collection Questionnaire

Date _____ Family Code Number _____

Parent Participating in Data Collection: Mother □ Father □

Instructions: The following information provides us with some basic information about your family. The research assistant will take approximately 30 minutes to complete the form with you.

1. What is your gender?
   □ Male □ Female

2. How old are you? _____

3. What is your marital status?

   □ Married
   □ Common law
   □ Separated
   □ Divorced
   □ Widowed
   □ Single, never married
   □ Refused

4. What is the highest level of education you have completed?

   □ Grade 9 or lower
   □ Some high school (grades 10-13)
   □ High school graduate
   □ Trade certificate or diploma from vocational school or apprenticeship training
   □ Non-university certificate or diploma from a community college, CEGEP, School of Nursing etc.
   □ University certificate below bachelor's level
   □ Bachelor's degree
   □ Graduate degree
   □ Other (please specify) _____

5. What is the highest level of education your spouse or partner has completed?
   - □ Grade 9 or lower
   - □ Some high school (grades 10-13)
   - □ High school graduate
   - □ Trade certificate or diploma from vocational school or apprenticeship training
   - □ Non-university certificate or diploma from a community college, CEGEP, School of Nursing etc.
   - □ University certificate below bachelor's level
   - □ Bachelor's degree
   - □ Graduate degree
   - □ Other (please specify) _____

6. Which of the following best describe your occupation?
   - □ Management
   - □ Professional (including accountants)
   - □ Technologist, technician, or technical occupation
   - □ Administrative, financial or clerical
   - □ Sales or service
   - □ Trades, transport or equipment operator
   - □ Occupation in farming, forestry, fishing or mining
   - □ Occupation in processing, manufacturing or utilizes
   - □ Other

7. Which of the following best describe your spouse or partner's occupation?
   - □ Management
   - □ Professional (including accountants)
   - □ Technologist, technician, or technical occupation
   - □ Administrative, financial or clerical
   - □ Sales or service
   - □ Trades, transport or equipment operator
   - □ Occupation in farming, forestry, fishing or mining
   - □ Occupation in processing, manufacturing or utilizes
   - □ Other

8 What is your best estimate of the total household income for the last twelve months before taxes and deductions?
   - □ Less than $15,000.
   - □ $15,000 to under $30,000
   - □ $30,000 to under $45,000
   - □ $45,000 to under $60,000
   - □ $60,000 to under $80,000
   - □ $80,000 to under $100,000
   - □ $100,000 or more
   - □ Don't know
   - □ Refused

9. How many children live in your household at least 50% of the year?

□ one
□ two
□ three
□ four
□ five or more

10. What are the ages of the children who live in your household at least 50% of the time? _____

11. Have any of the children in the household ever (at or since birth) been diagnosed by a doctor as having:

asthma □ yes □ no
pneumonia □ yes □ no
ear infections □ yes □ no
low birth weight □ yes □ no

12. How many smokers live in your household at the current time?

□ one □ two or more

13. Who are the smokers who live in your household?

□ mother □ children
□ father □ other relatives
□ partner □ others

14. What is the average number of cigarettes smoked in the household on a daily basis for residents and visitors during week-days and week-ends during the past seven days?

week-days _____ week-ends _____

Daily average number of cigarettes (household): # cigarettes smoked /week-day x 5 + # cigarettes smoked per week-end day x 2 /7 = _____

15. What is the average number of cigarettes smoked on a daily basis in the vehicle(s) in which the child travels by household members and others during week-days and week-ends for the past seven days?

week-days _____ week-ends _____

Daily average number of cigarettes (vehicle): # cigarettes smoked /week-day x 5 + # cigarettes smoked per week-end day x 2 /7 = _____

16. How many quit attempts has there been over the past twelve months by:

. smoking father? _____

. smoking mother? _____

. smoking partner? _____

. other smoker in home? ____

17. Did mom smoke during any of her pregnancies? □ yes □ no

18 Does smoking in the household cause arguments or conflict among household members?

□ yes □ no

19. Which of the following best describes your housing?

□ Single-detached house

□ Semi-detached house

□ Row house

□ Apartment

□ Other

Appendix M

Date **Six Month Follow-Up Questionnaire** Family Code

Date _____ Family Code Number _____

Parent Participating in Data Collection: Mother □ Father □

1. How many smokers live in your household at the current time?
   - □ one
   - □ two or more

2. Who are the smokers who live in your household
   - □ mother
   - □ father
   - □ partner
   - □ children
   - □ other relatives
   - □ others

3. What is the average number of cigarettes smoked in the household on a daily basis for residents and visitors during the weekdays and weekends during the past seven days?

   weekdays _____ weekends _____

   Daily average number of cigarettes (household): # of cigarettes smoked/weekday x 5 + # cigarettes smoked per weekend day x 2/7 =_____

4. What is the average number of cigarettes smoked on a daily basis in the vehicle(s) in which the child travels by household members and others during weekdays and weekends for the past seven days?

   weekdays _____ weekends _____

   Daily average number of cigarettes (vehicle): # cigarettes smoked/weekday x 5 + # cigarettes smoked per weekend day x 2/7 = _____

5. How many quit attempts have there been over the past twelve months by:

   smoking mother _____

   smoking father _____

   smoking partner _____

6. Does smoking in the household cause arguments or conflict among household members?

☐ yes ☐ no

7. Which of the following best describes your housing?

☐ Single-detached house
☐ Semi-detached house
☐ Row house
☐ Apartment
☐ Other

Appendix N

Fagerstrom Test for Nicotine Dependence

1. How soon after you wake up do you smoke your first cigarette?

   - ♦ Within 5 minutes (3)
   - ♦ 6-30 minutes (2)
   - ♦ 31-60 minutes (1)
   - ♦ After 60 minutes (0)

2. Do you find it difficult to refrain from smoking in places where it is forbidden e.g. in church, at the library, in the cinema, etc?

   - ♦ Yes (1)
   - ♦ No (0)

3. Which cigarette would you hate most to give up?

   - ♦ The first one in the morning (1)
   - ♦ All others (0)

4. How many cigarettes/day do you smoke?

   - ♦ 10 or less (0)
   - ♦ 11-20 (1)
   - ♦ 21-30 (2)
   - ♦ 31 or more (3)

5. Do you smoke more frequently during the first hours after waking than during the rest of the day?

   - ♦Yes (1)
   - ♦No (0)

6. Do you smoke if you are so ill that you are in bed most of the day?

   - ♦Yes (1)
   - ♦No (0)

Appendix O

Letter of Invitation to Parents Describing Focus Group Participation
Empowering Parents to Make Smoke-Free Spaces Research Project

Dear Parent,
If you have a child between the ages of 15 months and five years, and live in a household where smoking occurs on a daily basis by an adult, I would like to invite you to take part in one aspect of a research project. The main purpose of the overall project is to determine the effectiveness of a program designed to help parents make their homes and vehicles smoke-free. Factors which help or hinder the process will also be examined. While shaping and coaching techniques have been found to reduce children's second hand tobacco exposure in some populations, these approaches may not apply to all populations. You are invited to take part in the section of the study which evaluates a questionnaire called the "Revised Personal Assessment of Parent Empowerment Scale for Smoke-Free Homes/Vehicles".

A group of 8-10 parents who have a child between the ages of 15 months and five years, and who live in a household where smoking occurs on a daily basis by an adult, will attend a maximum of two group discussions (focus groups) to give feedback about items on the "Revised Personal Assessment of Parent Empowerment Scale for Smoke-Free Homes/Vehicles." Parents will be asked to complete a form indicating whether they think the items are clearly stated and understandable. Each focus group will last 1.5-2 hours. All families will receive $20.00 to assist with costs associated with taking part in the study such as babysitting and travel. Participation in the study is voluntary. Parents who choose to take part will have the right to ask questions at any time; the right to start, stop, and withdraw from the discussion at any time; and the right to withdraw from the study at any time. Withdrawal from the study or non-participation will not affect their health care in any way.

Confidentiality of all information collected during the focus groups will be maintained by keeping the information in a secure and locked location. Only the principal investigator, supervisor, and research team will have access to the data. The response sheets will not identify or be linked to individuals. Participants will be instructed at the beginning of each focus group that all information which is shared during the group is to be kept confidential, however confidentiality and anonymity in group discussions cannot be guaranteed.

Benefits of Participating:

- Participants may benefit from knowing they are contributing to a study evaluating an intervention designed to help parents make smoke-free homes and vehicles for children.

Risks of Participating:

- Participation in the focus group presents minimal or no risk.

Participation in the study is voluntary. If you choose to take part, you have the right to ask questions at any time and to withdraw from the study at any time. Withdrawal from the study or deciding not to join the study will not affect your health care in any way.

This is a very important child health issue. Your participation would be greatly appreciated. If you have any questions, I can be reached at 902 566-0733 or by email at rherbert@upei.ca.

Sincerely,

Rosemary Herbert RN, PhD(c)

Appendix P

Consent Form for Focus Group Participants

Empowering Parents to Make Smoke-Free Spaces Research Project
McGill University and the University of Prince Edward Island

Supervisor: Dr. Anita Gagnon, McGill University School of Nursing
Investigator: Rosemary Herbert, UPEI School of Nursing

Purpose: The main purpose of the research project "Empowering Parents to Make Smoke-Free Spaces" is to determine the effectiveness of a program designed to help parents make their homes and vehicles smoke-free. Factors which help or hinder the process will also be examined. While shaping and coaching techniques have been found to reduce children's second hand tobacco exposure in some populations, these approaches may not apply to all populations. This part of the study involves only one aspect of the research project which is evaluating a questionnaire called the "Revised Personal Assessment of Parent Empowerment Scale for Smoke-Free Homes/Vehicles".

Procedures: A group of 8-10 parents who have a child between the ages of 15 months and five years, and who live in a household where smoking occurs on a daily basis by an adult, will attend a maximum of two group discussions (focus groups) to give feedback about items on the "Revised Personal Assessment of Parent Empowerment Scale for Smoke-Free Homes/Vehicles." Parents will be asked to complete a form indicating whether they think the items are clearly stated and understandable. Each focus group will last 1.5-2 hours. All families will receive $20.00 to assist with costs associated with taking part in the study such as babysitting and travel. Participation in the study is voluntary. Parents who choose to take part will have the right to ask questions at any time; the right to start, stop, and withdraw from the discussion at any time; and the right to withdraw from the study at any time. Withdrawal from the study or non-participation will not affect their health care in any way.

Confidentiality: Confidentiality of all information collected during the focus groups will be maintained by keeping the information in a secure and locked location. Only the principal investigator, supervisor, and research team will have access to the data. The response sheets will not identify or be linked to individuals. Participants will be instructed at the beginning of each focus group that all information which is shared is to be kept confidential however confidentiality and anonymity in group discussions cannot be guaranteed.

Benefits: Participants may benefit from knowing they are contributing to a study exploring an intervention designed to help parents make smoke-free homes and vehicles for children.

Risks: Participation in the focus group presents minimal or no risk.

Contact Information: Questions, comments, or concerns about participation in this research study, can be directed to Rosemary Herbert at 902-566-0733 (email address rherbert@upei.ca) or the secretary of the UPEI Research Ethics Board, Lynn MacPhee, at 902-566-0637 (email address lmacphee@upei.ca).

The study has been approved by the McGill University Faculty of Medicine Institutional Review Board and the University of Prince Edward Island Research Ethics Board.

The study has been explained to me and my questions have been answered to my satisfaction.

The following rights have been explained to me.

1) I have the right to ask questions at any time.
2) My participation is voluntary. Refusal to participate will not affect my health care or my family's health care in any way.
3) I have the freedom to withdraw from the study at any time, and it will not affect my health care or my family's health care in any way.
4) I will not be required to answer any questions I am uncomfortable with.
5) The information I share will be kept confidential.
6) I will be given a copy of the signed and dated consent form.

Signature _____ Witness _____

Date _____

Would you like a summary of the findings when they are completed? □ yes □ no

Mailing Address to send summary of findings:

_____

Appendix Q

Parent Empowerment Scale for Smoke-Free Homes/Vehicles

Directions: These items describe different ways parents feel about smoke-free homes and vehicles for their children. Smoke-free means no smoking by anyone, at any time, anywhere in the home or vehicle(s) in which the child travels. Please read each item and circle the answer that best describes whether the item is true for you and your child. The child is the child who is taking part in this study. Please answer all questions. There is no right or wrong answers.

	Strongly Disagree	Disagree a Little	Neither Agree or Disagree	Agree a Little	Strongly Agree
1. When I make plans to make my home and vehicle(s) smoke-free, I am sure the plans will work out.	1	2	3	4	5
2. The time and energy I will use to make my home and vehicle(s) smoke-free will be well worth the effort.	1	2	3	4	5
3. I will have no trouble making my home and vehicle(s) smoke-free.	1	2	3	4	5
4. Taking the time to find the best way to make my home and vehicle(s) smoke-free for my child gives (will give) me a real sense of achievement.	1	2	3	4	5
5. My successes at making my home and vehicle(s) smoke-free will be mostly due to my own efforts.	1	2	3	4	5
6. I am able to make my home and vehicle(s) smoke-free all of the time.	1	2	3	4	5
7. If I was to make my home and vehicle(s) smoke-free tomorrow, I would know which of my friends and family would support me in this.	1	2	3	4	5
8. If I put my mind to it, I know I can make my home and vehicle(s) smoke-free.	1	2	3	4	5

9. The more I know about the effects of second-hand smoke on children's health, the easier it is for me to make a smoke-free home and vehicle(s).	1	2	3	4	5
10. When plans for a smoke-free home and vehicle(s) are worked out, it will be because I made them happen.	1	2	3	4	5
11. My past efforts at making my home safe for my children have been mostly positive.	1	2	3	4	5
12. I am good at affecting the quality of my home setting for my child.	1	2	3	4	5
14. I have "good feelings" about myself whenever I arrange for a safe setting for my child.	1	2	3	4	5
15. My past experiences at making my home safe for my child have been successful.	1	2	3	4	5

Original scale "Personal Assessment of Parent Empowerment Scale" developed by Dr. Carl Dunst, 1989, includes statement *May be reproduced or modified for research purposes*.
Modified by Dr. Carol Trivette and Rosemary Herbert, July 17, 2004.
Revised March, 2004, based on expert review.
Revised June 10 based on data from parents, PEI Literacy Alliance, and thesis committee.

Appendix R

Interview Guide: *Barriers and Facilitators to Smoke-Free Homes and Vehicles

*Barriers are things that stand in the way

Making your home and vehicle smoke-free is a big job. Knowing more about things that have gotten in the way of making your home and vehicle smoke-free would be very useful to other people. Please feel free to share as much as you can.

1. What have you found has worked best in working towards making your home smoke-free?

2. What barriers have you encountered in working towards making your home smoke-free?

3. What have you found has worked best in working towards making your vehicle smoke-free?

4. What barriers have you encountered in working towards making your vehicle smoke-free?

5. What has been the biggest barrier in working towards making your home smoke-free?

6. What has been the biggest barrier in working towards making your vehicle smoke-free?

7. What have you done to overcome the barriers?

8. What would you recommend to others who want to make their homes and vehicles smoke- free?

Any Additional Comments:

Thanks so much for your participation!
Revised November 2006

Kings Health Region
OFFICE OF THE FOIPP COORDINATOR

409 MacIntyre Avenue
Montague
Prince Edward Island
Canada
C0A 1R0

Telephone
902 838 0747
Facsimile
902 838 0770

Appendix U

Prince Edward Island Health and Community Services System

January 29, 2005

Dr. Rosemary Herbert
Associate Professor of Nursing
550 University Avenue
Charlottetown, PE
C1A 7N8

RE: Research Project - Empowering Parents to Make Smoke-Free Spaces

Dear Dr. Herbert:

On behalf of the provincial FOIPP Committee, I am replying to your letter dated January 5th, 2005 in relation to the above research project.

On January 19th, 2005, you presented a brief overview of your project to the provincial FOIPP Committee. From this presentation, it is our understanding that you will in no manner, be accessing any personal information held by the Public Health programs of the regional health authorities. Based on this understanding, there are no compliance issues related to this project that would need to be reviewed through our Committee nor is there a requirement for the completion of a Research Agreement between yourself and the individual regional authorities as requested earlier.

Upon my receipt of both Certificates of Approval, copies of both certificates and this letter will be forwarded to the applicable regional health authorities and your project work can begin.

Thank you for your patience in this process.

Sincerely,

Sylvia Melnyk
Chairperson
FOIPP Committee of the PEI Health System

cc: Phil Jost, Chairperson, CEO Committee
Susan Howard, CEO, Queen's Health Region
Katherine Kelly, CEO, East Prince Health Region
Betty Fraser, CEO, Kings Health Region

Appendix V

Program Evaluation for Empowerment Group Participants

Session _____ Code Number_____

Participant: mother □
father □

We are very interested in receiving your feedback and comments. Please rate each of the following items by circling the appropriate number.

	Not Applicable	1 Poor	2 Fair	3 Average	4 Good	5 Excellent
1. Did the session meet your need for information regarding smoke-free homes?	N/A	1	2	3	4	5
2. Did you have enough opportunities to participate?	N/A	1	2	3	4	5
3. Did the group leader make you feel your knowledge and experiences were valuable?	N/A	1	2	3	4	5
4. Did the group leader encourage you to participate?	N/A	1	2	3	4	5
5. Did you feel comfortable sharing with the group?	N/A	1	2	3	4	5
6. Did the discussion help you feel supported in making your home and vehicle(s) smoke-free?	N/A	1	2	3	4	5
7. Was the session organized?	N/A	1	2	3	4	5
8. Was the pace appropriate for you?	N/A	1	2	3	4	5
9. Was the length of the session appropriate?	N/A	1	2	3	4	5
10. What overall rating would you give tonight's session?	N/A	1	2	3	4	5

Suggestions for improvement: