

The Impact of Educational Materials on the Health Risk Perception of Environmental Tobacco Smoke Among Restaurant Employees in the District of Muskoka?

Abstract

While the health risks of Environmental Tobacco Smoke (ETS) have been well established in recent years, there is little information available about how people perceive these risks, particularly among those most affected by it. Several cases have demonstrated that the implementation of by-laws which ban smoking in public places has been met with some resistance by restaurant owners and employees. A main reason behind this resistance may be that restaurant owners and employees do not adequately perceive the risks of ETS to their health. Effective communication of the risks associated with ETS to this population may help to shift their perceptions of the health risks of ETS and consequently change their behaviour. This study evaluated the impact of educational materials on the health risk perception of ETS among restaurant owners and employees in the Muskoka district of Ontario using a case-control design. It was found that educational materials have a significant impact ($\text{sig}=0.001$) on the health risk perception of ETS among restaurant industry owners and employees in the Muskoka district of Ontario and this finding has implications for health policy decisions.

Introduction

According to the National Clearinghouse on Tobacco and Health (1996), “public concern about environmental tobacco smoke (ETS) has grown considerably in the last decade. Communities across Canada have developed new laws and policies that ban or restrict smoking in many workplaces and public buildings”. Many of those communities that have yet to implement such policies are working hard to assess public support for the idea and to lobby municipal councils for change. **The district of Muskoka** is one such area. A recent public opinion survey in the Muskoka-Parry Sound **Health Unit area** found that 77% of Muskoka residents supported a by-law restricting smoking in restaurants (Muskoka-Parry Sound Health Unit, 1999).

Public concern has risen, in large part, because the body of literature on the actual health risks of environmental tobacco smoke has also expanded considerably in the last 10 years. Numerous studies have confirmed that

ETS is associated with lung cancer, childhood asthma, increased respiratory tract infections, developmental defects and cardiovascular disease (National Cancer Institute, 2000). By 1993, sufficient evidence linking ETS with lung cancer had accumulated and the U.S. Environmental Protection Agency classified ETS as a “Group A” carcinogen - a category reserved only for the most dangerous cancer-causing agents in humans.

Yet, despite the increase in public concern about environmental tobacco smoke, the proposed implementation of a no-smoking by-law in restaurants in the **district of Muskoka** has been met with some resistance by those who work in the restaurant industry. This is of particular concern because it has been repeatedly shown that employees in the service sector are at increased risk of developing many of the health effects of ETS simply as a result of their increased level of exposure (Siegel, 1993; National Clearinghouse on Tobacco and Health, 1995). For this reason, it is hypothesized

that restaurant owners and employees may not adequately perceive the risks of ETS to their health. If this is indeed the case, educational materials on the health effects of ETS targeted to restaurant industry owners and employees may be an effective and necessary health policy strategy. The purpose of this study was both to assess the initial level of perception of the health risks of environmental tobacco smoke and to evaluate the impact that educational materials have on the perception of the health risks of ETS among restaurant owners and employees in the Muskoka district of Ontario.

Literature Review

The Health Effects of ETS on Service Industry Employees

Davis (1998) argues that “for a given microenvironment, the harm from passive smoking depends on time spent in that environment and the concentration of ETS in that air space”. It is clear that some occupations are more likely to spend more time exposed to higher concentrations of ETS than others. Restaurant and bar workers are affected disproportionately by ETS (Ducatman and McLellan, 2000). Siegel (1993) found that levels of ETS are 1.6 to 2.0 times higher in restaurants and 3.9 to 6.1 times higher in bars than in office workplaces of other businesses. Eisner et al. (1998) stated that “bar and tavern workers, in particular, are exposed to high ambient levels of ETS, reaching levels 4 to 6 times higher than in other workplaces”.

As a result of the increased exposure levels of restaurant employees to ETS, it is expected that they are likely to have a higher incidence of health

effects related to ETS than the general **population**. Indeed, numerous studies have found this to be the case. Siegel (1993) found that “there may be a 50% increase in lung cancer risk among food-service workers that is in part attributable to tobacco exposure in the workplace”. The Massachusetts Department of Public Health also reported a 50% increased risk of lung cancer among food service workers and attributed this increase to their increased level of exposure to environmental tobacco smoke (Brooks and Davis, 1995).

The Importance of Measuring Perception

While the actual health risks of ETS have been well established in the literature, owners and employees in the restaurant industry may not be adequately aware of them. The National Clearinghouse on Tobacco and Health (1995) stated a similar hypothesis when it wrote that “employees may not recognize the risks of ETS exposure, and may not identify ETS as the source of their ill health”. In other words, restaurant employees and owners may not *perceive* environmental tobacco smoke to be a major risk to their health, even though numerous studies have shown that it is.

The study of people’s perceptions of health risk is an important concept in health promotion programs and policies, whose goal is largely to modify behaviour in a “healthier” direction. This is because “people’s behaviour is based on their perception of what reality is, not on reality itself” (Robbins and Langton, 2001). According to Vertinsky and Wehrung (1990), “attempts to modify behaviour must be informed by a detailed knowledge of how a person thinks about

risks”. Studying how people perceive risks is an important first step in deciding how and where to allocate resources.

Health Risk Communication

Once perception has been assessed, effective communication strategies aimed at addressing any misperceptions is a logical next step and is the realm of Health Risk Communication. Health risk communication can take many forms. According to Covello, von Winterfeldt and Slovic (1987), “risk communication takes place in a variety of forms, ranging from product warning labels on cigarette packages and saccharin bottles to interactions between officials and members of the public on such highly charged issues as Love Canal, AIDS, and the accident at Three Mile Island”. Each form of health risk communication has its own degree of effectiveness and determining which method of communication to employ in a given circumstance is an important consideration for initiators of health promotion programs and activities.

In the context of environmental tobacco smoke, educational materials may still have an important role when applied in a proper and **focused** manner. According to Davis, education is important for two main reasons. “First, it lays the groundwork for good compliance with legislation and regulation...A second reason education is important is that some areas--such as private homes--are difficult to control through legislation, so education is the main intervention strategy that is available” (1998). In order for a health risk communication strategy to be effective, it must be made “available in an accessible form in the right place at the

right time to the right target audience and increasing the likelihood that the message’s content is interpreted correctly” (Vertinsky and Wehrung, 1990). Carefully-developed educational materials **targeted** specifically at a relatively small group of restaurant industry employees in the Muskoka district at a time when a smoke-free by-law is being considered may be such a situation where educational materials can be effective.

Methodology

Overview

The study was based on a case-control design in which half of the participants received educational materials and the other half did not. Perception of the health risks of second-hand smoke was assessed by a survey instrument. Participants in the case group received the survey both before and after the intervention, while those in the control group simply received the survey twice.

Description of Population

The Muskoka district contains over 200 establishments classified as restaurants by the fact that the majority of their revenue is generated by food sales. The district covers a large area (4,035 sq km.) and a very diverse population.

Selection of Restaurants and Participant Recruitment

A list of 70 **restaurants** within the Muskoka district was supplied by the Muskoka-Parry Sound Health Unit. The owner of each restaurant was contacted by a letter (see Appendix A) which described the nature of the study and was asked to voluntarily participate. The letter also asked each owner to inform

his or her employees about the nature of the study and ask for their voluntary participation as well. Every owner received a follow-up phone call in an effort to raise response rates.

Initially, participants were asked to make an appointment to fill out the survey at one of six available locations: Bracebridge, Huntsville, Port Carling, Gravenhurst, Dwight and Honey Harbour. Since this only yielded 5 participants, another method of participant recruitment was developed and employed. The primary investigator visited restaurants in each of the 6 communities over a 2-week period and attempted to recruit the owner or an employee who was working at the time. As a result, the majority of the sample was selected on a non-random basis. Study participation required supervision to ensure that educational materials were received and reviewed at the appropriate time. Since the study required at least 15 minutes to administer, peak business hours were avoided.

Participants were grouped as cases or controls on an alternating basis. The first participant was a case, the next a control, the next a case, the next a control and so on. A sample of 24 cases and 24 controls was attained for a total of 48 participants.

Survey

A survey instrument was used to assess the perception of the health risk of second-hand smoke within the context of other risks and hazards. A cover letter explained the purpose of the study to the participants and asked for their voluntary consent (Appendix B). For a copy of the survey, please see Appendix C. The survey was developed by the principal researcher and staff at The Muskoka-

Parry Sound Health Unit, and was based in part on the 1993 Health Canada Study on Perceptions of Health Risks Among Canadians. The main part of the survey asked participants to indicate the perceived level of health risk associated with ten different hazards on a 7-point Likert scale (for example, risks of physical inactivity, a high-fat diet, drinking and driving and second-hand smoke). Those in the case group received an initial survey followed by a set of three educational materials, one on physical activity, one on healthy eating, and a third on second-hand smoke. After reading the materials, each participant received the same survey and was asked to complete it again. Those in the control group simply filled out the survey twice.

Educational Materials

The educational materials used were: 1) Canada's Physical **Activity** Guide, published by Health Canada, 2) Canada's Food Guide, published by Health Canada and 3) Second-Hand Smoke, produced by The Muskoka-Parry Sound Health Unit. Three educational packages were used to eliminate the potential for expectation bias to influence participant responses.

The educational sheet on Second-Hand Smoke by The Muskoka-Parry Sound Health Unit (Appendix D) was targeted specifically towards restaurant industry workers. It featured a description of second-hand smoke and why it is a significant health risk as well as several facts on the health risks of environmental tobacco smoke in this population. Each fact was referenced by a reputable source.

In order to assess the level of trust that each participant had in the

information received, the survey asked them to indicate on a 7-point Likert scale how much they trust information they receive from 1) Health Canada and 2) The Muskoka-Parry Sound Health Unit.

Statistical Analysis

The general analytical framework compared the change in perception of the health risks of second-hand smoke among those who received the educational materials (cases) and those who did not (controls). The majority of statistical analysis was performed using SPSS version 10.0 and the rest using Microsoft Excel 2000.

A one-way analysis of variance (ANOVA) test was used to determine if the three educational materials had a significant impact on changing the perception of the health risks of secondhand smoke in the cases group compared to the control group. Odds ratios were calculated as well to assess the difference in effectiveness among the three educational materials. Chi-square tests were used to assess whether age group, sex, smoking status and whether the participant was an owner or employee had any impact on the initial perception of the health risks of secondhand smoke. An independent sample t-test was used to assess whether the initial level of perceived risk had an impact on the effectiveness of the educational materials. A chi-square test was used to assess whether trust in the information received had any impact on

the effectiveness of the educational materials.

Results

Participant Characteristics

Of the 48 participants, 19 were males and 29 were females for a male: female ratio of 0.66. There were 14 restaurant owners and 33 restaurant employees. The age group and sex characteristics of the participants is shown in Fig. 1 and shows a bi-modal distribution with one peak at 18-24 years and a second at 35-44 years.

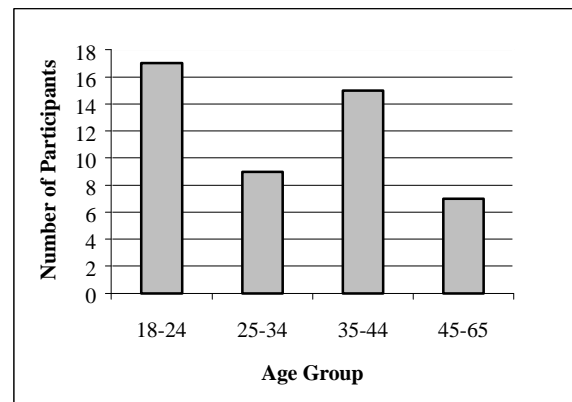


Fig 1. – Age Group and Sex Characteristics

The majority of those in the 18-24 age group were restaurant employees (94%). In the 35-44 age group, 50% were owners and 50% were employees.

The group and sex characteristics of the case and control groups are depicted in Table 1.

Table 1. – Age Group and Sex Characteristics for Case and Control Groups

Age Group	Cases		Controls	
	Males	Females	Males	Females
18 to 24	4	5	3	5
25 to 34	2	2	1	4
35 to 44	3	5	3	4
45 to 65	2	1	1	3
Totals	11	13	8	16

Initial Perception of the Health Risks of Second-Hand Smoke.

14 out of 48 participants (29%) initially indicated that they perceived the health risks of secondhand smoke to be “moderate”, while 34 out of 48 (71%) initially indicated that they perceived the health risks of secondhand smoke to be “high”. Age group, sex, smoking status, and whether the participant was an owner or employee were found to have no statistically significant impact on the initial level of perceived health risk.

Impact of Educational Materials

After having received the educational materials, there was a significant difference in the change in perception of the health risks of secondhand smoke between the case group and control group (sig=0.001). There was also a significant change in perception of the health risks of being physically inactive (sig=0.026), but there was no significant change in the perception of the health risks of a high-fat diet (sig=0.584) between the case group and the control group.

Odds ratios were calculated and yielded values 5.91 for secondhand smoke, 2.71 for physical inactivity and 1.00 for a high-fat diet, indicating that the secondhand smoke package had the greatest impact on perception of the three packages.

The secondhand smoke package had the most significant impact on a change in perception among those participants who initially indicated a “moderate” level of perceived health risk associated with secondhand smoke (sig=0.000) in comparison to those who initially perceived a “high” level of risk. Age group, sex, smoking status, and whether the participant was an owner or employee were found to have no significant association with change in perception.

Trust in the Source of the Information

16 out of 46 participants (35%) indicated a “moderate” level of trust in the information they receive from the Muskoka-Parry Sound Health Unit, while 30 out of the 46 (65%) indicated a high level of trust. Level of trust had no significant impact on the change in perception of the health risks of secondhand smoke after having received the educational materials.

Discussion

Resistance among restaurant owners in the Muskoka district to a proposed no-smoking by-law in district restaurants raised the hypothesis that restaurant industry owners and employees may not adequately perceive the risks of environmental tobacco smoke (ETS) to their health. This study showed that this was not the case. A

majority (71%) of restaurant owners and employees initially believed that secondhand smoke constituted a high risk to their health. The minority (29%) of the study sample initially perceived the health risk of ETS to be “moderate”. However, while this is a minority of participants, it still represents a significant number of people if the study sample is extensible to the study population.

It was further hypothesized that educational materials may be effective in changing the perceived health risk of ETS among restaurant industry owners and employees. The study demonstrates that this is indeed the case. Moreover, it demonstrates that the educational materials are likely to have the greatest impact on those owners and employees who **initially** perceive the health risks of second-hand smoke to be “moderate”.

The study has implications for health policy decisions. During the study design process, it was decided that the widespread distribution of educational materials to each restaurant to inform owners and employees of the actual risks of ETS to their health could be justified as a necessary intervention *if* the educational materials could be shown to be effective. There is evidence to suggest that educational materials directed at tobacco use are not effective when applied on a large, societal scale. Leiss (1999) argues that “‘rational-format’ risk messages themselves...have been shown to fail utterly in the case of tobacco use”. However, this study demonstrates that educational materials on second-hand smoke, when **targeted** to a small, specific group at an appropriate time, have a significant impact on how restaurant owners and employees perceive the risks of ETS to their health.

That being said, it may be difficult to apply the results of this study to the study population due to the non-random nature of participant recruitment. Furthermore, it was not feasible to estimate the study population size, so little information can be determined about the statistical power of the sample size. Survey administration by an unblinded investigator could have biased subject responses, although an attempt was made to maintain consistent conditions. Controversy generated by the proposed smoke-free by-law may have influenced participant responses; however, this is likely a minimal effect as the survey was concerned solely with health effects. Finally, because the survey was conducted during business hours, some participants had more time to complete the survey and read through the educational materials more closely simply as a result of not being as busy as some of the other participants. This factor may also have influenced participant responses.

It is acknowledged that education is just one part of public health policy in addressing the health risks of environmental tobacco smoke, but this study demonstrates that education can have a significant effect when applied in a **focused** and appropriate manner. In particular, it is likely to have the greatest impact on the sub-group of owners and employees who initially perceive the health risks of secondhand smoke to be “moderate”. While this group represents a minority of the study sample (29%), it still represents a significant number of people and should be the target of educational materials. Unfortunately, no criteria were **statistically** significant in further defining this sub-group. Age, sex, smoking status and whether the

participant was an owner or employee had no significant statistical bearing on how they initially perceived the risks of ETS to their health. However, since the study shows that **focused** and appropriate educational materials significantly increases the perception of the health risk of ETS among restaurant industry owners and employees, it may therefore provide the basis for widespread application of educational materials on secondhand smoke to owners and employees in the restaurant **industry in** the Muskoka district of Ontario.

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