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What Health Educators Need to Know: A Review of Strategies and Approaches in the  
Management of Obesity

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### Abstract

This paper examines educational strategies and approaches used to treat and prevent obesity. Drawing from the current literature as well as internet and televised media on the treatment and prevention of overweight and obesity, four approaches along a continuum of individualistic and participatory paradigms are identified: treatment, behavioural change, community engagement and environmental approach. Turning from the causes of obesity to possible solutions, the rest of the paper discusses the importance of the health educator's role in understanding limitations of each of these paradigms.

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## What Health Educators Need to Know: A Review of Strategies and Approaches in the Management of Obesity

The prevalence and rising rates of overweight and obesity are alarming. According to the World Health Organization (WHO), the health condition has more than doubled since 1980 worldwide. It has been estimated that 1.5 billion adults (age 20 and above) are overweight; of these, 200 million men and more than 300 million women are obese (WHO, 2010). Data from the National Health and Nutrition Examination Survey (NHANES) shows, on average, 30% of the United States population in any age or gender groups are obese (Flegal, Carroll, Ogden, & Curtin, 2010). Consistent with other developed countries, the prevalence of overweight and obesity is rising in Canada. Based on the most recent Canadian Health Measures Survey, about a quarter of Canadians, trailing behind the United States, are either overweight or obese (Shields, Carroll, & Ogden, 2011).

The discussion about excess weight should be a universal agenda for all; and, not just of concern for at-risk populations. This seemingly immediate health issue is also closely knit to factors in areas of sociology, economics and education. Almost each discipline has its own perspective on the causes of obesity. Each also offers different suggestions to reverse it and ways to evaluate these measures. In addition, the food industry, media and weight loss industry, too, have their own positions on how to tackle the “problem”. This graduating paper will describe a series of health educational strategies, interventions and programs targeting the treatment and prevention of obesity from year 2000 and onwards. A literature review will be carried out. Attempts will be made initially using search functions on three on-line databases: ERIC, MedLine and Sage Publications. Further exploration will involve the internet, television and in independent reports, Cochrane Reviews (systematic reviews of primary research in health

care) and individual academic journals. Key words entered into the search engines of the initial search included “health education”, “health programs”, “obesity”, “obesity prevention”, “health promotion”, “treatment of obesity”, “management of obesity”, “interventions for treating obesity”, “weight loss”, “health policy”, “public health”, “environment”, “diet” and “physical activity”.

In this paper, health education will be very broadly defined. It will be considered as consciously constructed opportunities for learning and involve some form of communication designed to improve health knowledge and life skills. Interventions, programs and research from academic journals will be described. Health program framework and policy studies which address the underlying social, economic and environmental conditions related to obesity or excess weight will also be selected for review. Freely available health news sites, magazines, television episodes on health will help to construct an up-to-date picture affecting health education in obesity. Lessons learnt from the review and how they can be applied to current healthcare practices will be explored and summarized.

### The Complexity of Obesity

Factors that lead to overweight and obesity affect each stage of a person’s life. The consequences are multitudinal with effects on an individual, a family unit, the community and society as a whole across the life continuum. Evidence suggests that mothers who are overweight or obese before pregnancy are likely to give birth to infants with higher birth weights (Oken, 2009). Exposure to diabetes in utero, high birth weight, rapid weight gain and shorter breastfeeding exposure in infancy have been associated with a higher risk for childhood obesity (Lamb et al., 2010). A higher body mass index (BMI) in a child or adolescent further advances the probability of obesity in adulthood (Guo, Wu, Chumlea, & Roche, 2002). Once obesity

tracks into adulthood, it increases the individual's risks for chronic illnesses, such as type 2 diabetes, cardiovascular disease, hypertension, stroke, and some forms of cancer; thus, impairs long-term health and life expectancy (WHO, 2010).

The Health Strategy Innovation Cell at the University of Toronto suggests that obesity drives 60% of chronic diseases in Canada (Fillion, 2011). Excess weight can restrict a person's mobility, activity and contributes to lost work days; thus incurring costs to the health care system and society as a whole (Vanasse, Demers, Hemiari, & Courteau, 2006). In fact, a considerable proportion of health care dollars is used for the treatment and management of obesity-related co-morbidities. "In 2005, obesity-related chronic conditions accounted for \$4.3 billion in direct (\$1.8 billion) and indirect (\$2.5 billion) costs" (Public Health Agency of Canada, 2009), which represents approximately 4% of total health care expenditure at the time.

#### *Factors Associated with Obesity*

The associations with obesity extend far beyond the damage to physical health and its related financial costs. There is evidence to suggest that obesity is related to lower academic achievements and less opportunities for higher education and earnings. Crusnoe (2007) theorized that the social stigma of obesity triggered psychological and behavioural responses which interfered and resulted in lower college enrollment in schools, particularly in young women. It is recognized that more education generally opens up more opportunities for employment and stable income, both of which are linked to better health (Haycock, 2010). To say there are education-obesity as well as earning-obesity links, whether directly or indirectly, would not be wrong. Zagorsky (2004) was able to demonstrate that a person's body mass can inversely relate to his or her net wealth. He further made an example: "if obesity affects wealth, then public health initiatives, which improve the health of individuals by lowering their weight,

would indirectly reduce the number of poor individuals. Conversely, if the amount of wealth owned affects obesity, then poverty reduction programs would indirectly improve the health and well-being of poor individuals” (Zagorsky, 2004, p. 131).

The data from the Canadian Community Health Survey also reveals strong associations between ethnicity and the prevalence of overweight and obesity even when the effects of age, socio-economic status and the amount of physical activity are taken into account. It remains that aboriginal men and women continue to have the heaviest weight in Canada. This observation may have gone beyond that of genetic disposition. Different cultural norms and body image ideals may have contributed to these statistical observations. (Tremblay, Perez, Ardern, Bryan, & Katzmarzyk, 2005). Underlying health, weight-related beliefs and assumptions determine how information is interpreted, such that unawareness of excess body weight, eating traditional foods and preference for a full-figured body can influence health outcomes.

For the Ojibway-Cree of northern Ontario, obesity and diabetes are not seen as health concerns. In fact, the elders prefer a larger body size as this symbolizes good health and strength. High fat foods are also thought to be nourishing and healthy (Willows, 2005). In examining the differences in beliefs and values surrounding obesity and weight reduction between groups of African American (AA) and Caucasian women, AA women are found to prepare large quantities of food as a way of caring for family and friends. AA women also report that the tradition of eating greasy comfort food was difficult to change. Unlike Caucasian women, AA women identify their culture and ethnicity as barriers to weight loss (Blixen, Singh, & Thacker, 2006). Similar beliefs are also held by Latino-American (LA) youths. LA women believe that their preference for a bigger body size may have been influenced by their parents and LA males. LA males have reported stereotyping “bigger women” as better communicators



and have higher self-esteem than women with normal weight (Barroso, Peters, Johnson, Kelder, & Jefferson, 2010).

### *The Origins of Obesity*

There appears to be a complex interplay of social, economic, cultural and educational factors in the discussion of overweight and obesity. While the relationships of these in between and surrounding obesity should not be reduced to simple causal effects, literature from various scientific and sociology journals offer several explanations on the etiology of obesity; number of methods to reverse it and ways to evaluate these measures. Several positions are evident in the understanding of the phenomenon.

From the biological perspective, the formula for excess weight is an imbalance of energy between an abundant food energy consumed and comparatively less energy expended during physical activity by an individual. Individual differences in the rates at which energy is burnt or converted into adipose tissue exist. Individuals with a fast metabolism can tolerate more food and exercise less while still able to maintain a lean body mass while those with a slow metabolism who eat less but exercise more still experience weight gain. Ghrelin, insulin and leptin are three hormones that regulate appetite. While how much these hormones are produced are partially dependent on one's genetic disposition, an imbalance of these hormones triggered by widely defined, physical to emotional stressors, leads to over or under eating; and eventually, produces weight disturbances.

While there is an underlying biology of metabolism, from a behavioural perspective, higher or lower energy consumption or expenditure are directed by individual choices. A person's self-esteem and self-efficacy play a part in the individual's locus of control. For example, it determines whether the person can resist high sugar or high fat foods. The choice to

eat or the inability to resist fast foods contributes to a higher daily caloric intake; hence, lead to weight gain over time. On the contrary, if there are significant gains or motivation to stop eating fast foods and the individual is taught tools to better resist the urge to have them, he or she should be able to stop this behavior.

In the sociology domain, researchers strive to find why the person is choosing the fast food in the first place. It is said that the neo-liberal economic regime has changed the pattern of work and life. Working longer hours with less pay has left people with little time for home cooking and leisure. In turn, this has forced people to choose convenience or fast foods more often. The availability of fast food chain restaurants at every street corner also enhances that choice. With less free time available, the individual is now less likely to participate in sports and active leisure activities. Although not conclusive, the poorest and the least educated were often noted to be amongst the most overweight and obese (Drewnowski & Specter 2004). Braveman (2009) also suggests that the distribution of obesity in the world mirrors the general unequal distribution of the privileged and underprivileged.

Egger and Swinburn (1997) propose yet another paradigm, the “ecological” approach to understanding obesity. Their model recognizes the influences of the physical environment, political, economic and sociocultural context, along with genetic underpinnings and individual behaviours as mediators of energy metabolism. The ecological approach differs greatly in principal than all the other perspectives described above. It views obesity as a normal response to an abnormal environment rather than an abnormal or undesirable response resulting from the environment.

### Overview of the Strategies against Obesity

As the link between obesity and health risks; and subsequently, its social and economic consequences impact all age groups, the development of strategies against it also has to apply to all periods of a person's life. Dietary modification and physical activity are common interventions used in the management of obesity among overweight and obese individuals in both community and acute care settings. The amount of exercise and the level of dietary restriction can be prescriptive and a person can be instructed under controlled settings to achieve positive health outcomes within the short-term.

To follow a calorie reduced diet and engage in regular physical activity consistently are major challenges. Reviews have already shown that caloric restriction alone is ineffective in sustaining weight loss. Intensive health education and counseling delivered one-on-one, by phone, in group settings, as web-based self-help modules may sustain healthy behaviours. The long-term effectiveness of educational methods in producing positive health outcomes - providing information and enhancing skills to enable healthful behaviours is still found to be either unknown or less than optimal (Aronne, Nelinson and Lillo, 2009; Mann et al., 2007).

As the energy equation for weight loss or gain seems so simple yet difficult to “operate” in an effective manner, recommendations for obesity medications and surgical procedures for weight reduction are increasing (Bult, van Dalen, & Muller, 2008). With these, come yet, a host of educational needs to prepare the patient in managing the side effects of anti-absorption drugs and complications of bariatric surgeries. In taking an ‘ecological approach’, there are a number of childhood obesity prevention initiatives designed to engage whole communities on identifying their health needs and ways to achieve healthy living. Public-private partnerships to promote healthy food selection have also been observed. Incentive programs (providing gift cards, free health education sessions and fitness passes) jointly funded by public and private health

insurance agencies were able to engage individuals in behavioural therapy, fitness training and nutrition education. (Abildso, Zizzi, Gilleland, Thomas, & Bonner, 2008; Cluss, Ewing, Long, Kreiger, & Lovelace, 2010). Gift cards provided by supermarkets also enabled low-income women to purchase more fresh produce and subsequently, improved vegetable intake and reduced BMI (Weerts & Amoran, 2011).

### The Treatment Approach

The process of “treatment” usually starts with screening a pre-defined population for individuals who are at risk for a health problem. Individuals affected by overweight and obesity will need to be identified and their health profiles understood before interventions can be designed to serve them. To describe overweight and obesity in concrete terms, body mass index (BMI), a ratio of weight and height ( $\text{kg/m}^2$ ), has been used to categorized health outcomes. Following the definitions of the WHO, National Heart Lung and Blood Institute (NHLBI) and the National Institutes of Health, overweight in adults is defined as BMI of  $25 \text{ kg/m}^2$  or higher; and, obesity, at BMI of  $30 \text{ kg/m}^2$  or more. In children and adolescents (2 to 20 years of age), percentiles associated with BMI values for age on WHO growth charts are used. BMI for age at the 85<sup>th</sup> percentiles or higher are considered overweight while 95<sup>th</sup> percentiles or higher suggest childhood obesity. In 1998, the NHLBI published its clinical obesity treatment guidelines. It recommended using three components: reduced calorie diets, increased physical activity, and cognitive-behavioural therapy in obesity treatment programs for individuals with BMI of  $25 \text{ kg/m}^2$  and over.

Although the BMI is used unanimously across studies to screen individuals or to describe the severity of their health risks, debate whether it should be applied to ethnically diverse and heterogeneous populations exists. It turns out that the BMI has only been developed and

validated among people of European descent. So far, no one has been able to define appropriate obesity cut-off points using BMI ranges for South Asians, Chinese and Aboriginals. Lower BMI cut-off ranges of 22 to 23 kg/m<sup>2</sup> for being overweight and 24 to 25 kg/m<sup>2</sup> for obesity have been suggested for Asians (Razak et al., 2007). It is important to keep in mind that overall, opportunities for an individual to be “treated” for obesity are few. Trials and pilot studies with research foci are often substitutes for health services for those seeking for help. Screening using the original BMI definitions for being overweight and obese will potentially miss persons of non-European descent (such as Asians) who are otherwise at higher health risks. Conversely, obesity can be attenuated in ethnic groups who may require a higher BMI cut-off range before obesity-related diseases develop. Selection bias plagues obesity and weight-related health research. Different gender and specific ethnic minority groups will be included or excluded if the eligibility of services is based on screening using a single medical construct of obesity. It is in this context that the following research and programs are presented.

#### *Supervised Group Physical Activities*

There are both short and long term trials that describe the effectiveness of physical activity in weight loss and maintenance. In the Midwest Exercise Trial, Donnelly and his team (2003) randomized 131 young individuals age 17 to 35 to either act as controls (to remain on regular daily activities) or participate in supervised exercise sessions for 16 months. Body weight, height, BMI and body fat measurements and blood lipids were collected before the study and at 4, 9, 12 and 16 months. All participants were told to eat their regular foods. Their caloric intakes were verified by two-week food recalls at different time points and were found to remain the same throughout the study. The supervised exercise consisted of 45 minutes (from a gradual six month increase starting from 20 minutes) of walking on a treadmill at a moderate intensity.

At the end of 16 months, the women who participated in the supervised exercises were able to maintain weight while their counterparts gained weight and fat mass. The men in the intervention group achieved significant weight loss and fat mass loss compared to same-gender controls.

Instead of testing whether regular moderate-intensity physical activity facilitated weight loss, Jakicic et al. (2011) have investigated how structured physical activity of varying intensity levels could change weight and body composition at baseline, 6, 12 and 18 months in 18 to 55 year olds who are either overweight or obese. They compared differences in adults who participated in structured moderate activity for 150 minutes per week (moderate dose), intensive activity for 300 minutes per week (intensive dose) and those who only received self-help manuals on increasing activity. Those randomized into the structured activity groups were provided with initial weekly one-on-one behavioural counseling and supervised exercise training followed by weekly group sessions and phone call check-ins from their counselors. Counselors focused only on changing exercising habits. To control for and to find out if the body measurements were influenced by other factors, eating behaviours were also tracked at four time points using a validated behaviour inventory. As might be expected, individuals who did the most exercises at high intensity lost the most weight. Despite of this, they were only able to, on average, reduced 1.3% of their original weight. Those who were able to lose more than 3% of their original weight not only exercised much longer at a higher intensity but also adopted different eating behaviours.

#### *Prescribed Low Calorie Diets*

There are surprisingly few well-designed randomized controlled trials to demonstrate the weight losing effectiveness of low calorie diets. An exception was the “Diet, Obesity and Genes

(Diogenes) Dietary Study” which had their results published in 2009 and 2010. It is a multi-centre endeavor involving a large number of participants (450 to 1100 depending on the study phase) recruited from eight European countries.

The first phase of this study investigated the amount of weight lost and markers of successful weight loss after the participants has completed a low calorie diet for eight weeks. Using a number of recruitment strategies, from medical clinic referrals to advertising to the public through various media, families with at least one overweight obese parent (BMI 27 kg/m<sup>2</sup> or over) were screened. A total of 932 adults were eligible to carry on with the low calorie diet. The meal plan consisted of three meals and a snack made up of powdered drinks and soups. Participants were supported with their dietary changes by almost weekly visits with the dietitian. Body composition was measured and so were waist, hip circumference and body weight. Average weight loss by the end of eight weeks of a low calorie diet was 11 kg (Handjieva-Darlenska et al., 2010).

In the second phase of the Diogenes study, the research group took 773 adults who were able to lose 8% of their original weight in phase one and 784 children within the same families. The goal for this phase was to study the effects of different meal composition eaten ad libitum on weight changes and body measurements over 6 to 12 months. The participants were randomized to one of these diet groups: low-fat, low protein and high glycemic index, high protein and low glycemic index, high protein and high glycemic index or healthy balanced intake (control). As the diets were carried out at home, families were provided with diet instruction and free food for the first six months. Later, the families were further randomized to receive either no further diet instruction or another six months of instruction only (but without free food). In results published in November, 2010, the researchers concluded that there was better adherence to the higher

protein and lower glycemic index diet resulting in maintenance of weight loss within the first year of the study (Larsen, Dalskov, van Baak, Jebb, Papadaki, et al, 2010).

In the same year, a group of researchers set out to prove the usefulness of a meal replacement program (Davies et al, 2010). They enrolled 90 adults with BMI between 30 kg/m<sup>2</sup> to 50 kg/m<sup>2</sup>. The adults were randomly assigned into one of the two food programs: the meal replacement or self-selected meal plan group for 16 weeks and then followed for another 24 weeks. Although participants in the meal replacement group lost more weight in the first 16 weeks, they also regained it much faster for the later part of the study. However, in the end, they still managed to lose more weight than those who followed self-selected meal plans.

All the above studies are typical of recent observations of how lifestyle changes can or will affect weight and other health parameters as indicators of chronic diseases. The achievement of weight reduction is usually a primary goal for all. While one can argue that even a small weight change brings health benefits, these studies as well as similar ones, illustrate weight loss from 5 to 10% of original weight at best within a year's time frame. As discussed, this rarely changes BMI by a significant amount. With time, the majority of the participants ended up returning to their original weight, usually over three to five years after the initial intervention. While many of these studies claimed to provide "long-term" help, the meal replacements, supervised exercise classes, health education seminars and the counselors' support to participants were withdrawn in less than three years.

The above studies also focus on selected age or gender groups with different health and social needs, making pragmatic comparisons impossible. It is true that energy balance can be achieved through controlled and predictable caloric intakes and outputs. However, more often than not, maintenance of lifestyle changes is the exact hurdle for which renders methods



attempting to prevent obesity unsuccessful. Given this barrier, individuals who are severely obese or have already developed complications are increasingly recommended for bariatric surgeries and drug therapies for weight loss.

### *Pharmacotherapy*

Mark (2006) predicts pharmacological therapy to be the future for obesity treatment. He believes that nutrition management for the maintenance of weight loss in obesity is a failure. According to him, obesity should be explained as a biological derangement rather than a behavioural problem. To create a more balanced point of view, one needs to look at both the positive and negative effects of obesity drugs on the market, their potential cost to consumers and other alternatives.

Before year 2000, lifestyle treatments continue to be the mainstream of published obesity research. They were not only studied as stand-alone treatments but also incorporated into most of the pharmacotherapy trials. In a meta-analysis, weight loss was substantially attributed to “placebo” effects and to lifestyle treatments rather than the weight loss medications themselves (Poston, Haddock, Dill, Thayer, & Foreyt, 2001). At present, Orlistat is the only drug approved for long-term use and is available over-the-counter. It decreases weight by inhibiting the action of an enzyme that is responsible for fat absorption; thus, is associated with oily stools and fecal incontinence. Despite of these embarrassing side effects, when used on its own without lifestyle changes, Orlistat was only able to produce 7 kg of weight loss, only 2 kg more than the use of a placebo (Greenway & Bray, 2010). There are, of course, several other medications available only by prescription which are said to be off-label use for weight loss. These include caffeine, ephedrine and thyroxine.

### *Bariatric Surgeries*

When diet, exercise and medications are not appearing to help people maintain a healthy weight range, bariatric surgeries are becoming increasingly attractive options for the long-term management of obesity. Weight loss surgeries are available in eight provinces, with the majority of procedures performed in Quebec and Ontario. According to the Canadian Institute of Health Information survey, a dramatic increase of procedures was performed in Canadian hospitals in 2009 compared to about five years ago. Interestingly, the surgeries were operated mainly on middle-aged women (Arkinson et al., 2010).

There are many types of bariatric surgeries but in summary, all of them involved manipulation of the digestive tract by either partitioning off a section of the stomach and/or intestine to slow digestion (to create the feeling of satiety early during a meal) and facilitate malabsorption. Studies showed that these surgeries, when performed on appropriate patients at experienced centres, led to minimal death and complication rates. However, some of the long-term complications as a result of these surgeries significantly impact quality of life. They include displacement of the stitches or staples, erosion of part of the stomach or intestines, and the most common, bowel obstructions. Almost all patients require micronutrient supplementation due to malabsorption. Yet, the message Dr. Lau has presented in a recent Canadian Diabetes Association newsletter article about the possibilities of bariatric surgeries is one filled with optimism, particularly for the prevention of diabetes (Lau, 2010).

The editors of the same issue warn that the medical community should consider a few issues when deciphering published data about bariatric surgeries. Dr. Pacaud and Meltzer (2010) made three critical points. First, they cautioned that individuals enrolled in bariatric surgical studies had come from a highly selected population – mostly women (gender bias), with specific BMI (severe obesity range) and with specific associated conditions (a concurrent chronic disease

for example). Only half of the individuals who completed the procedures had received long-term follow ups. Those who were lost to care might have as much weight loss as those who had continued with the follow-ups. Individuals who suffered more complications might also be less inclined to receive care from the original team who had performed the surgery. Second, few studies compared post-operative results with a group that had participated in a well-structured weight reduction program. Failure to demonstrate differences matched to more conventional ways of weight loss had made the efficacy and safety of surgeries questionable. Third, current recommendations for bariatric surgery call for an experienced multidisciplinary team that is involved both pre-operatively to prepare and screen for appropriate patients; and, post-operatively, to assess the degree of complications and to continue to motivate lifestyle changes. The authors argue that these resources, in fact, are the same required for any successful weight reduction or chronic diseases management program. The editors remind readers that surgeries should not be considered a magic solution as they do not remove the risk factors leading to obesity. They suggest that “an increase in efforts and funds toward increasing availability of state-of-the-art behavioural programs to promote lifestyle change may prove to be as cost effective and potentially safer in the long run” (Pacaud & Meltzer, 2010).

### The Behavioural Change Approach

Maintaining healthy lifestyle changes is certainly one of the most important steps in the management of obesity. Behavioural therapy has gained popular acceptance and is integrated in many weight loss programs today.

#### *Basic Theory in Behavioural Therapy*

“Behavioural modification” was first described in obesity management literature about 50 years ago. In present day, the terms “behavioural therapy” and “cognitive behavioural therapy”

refer to essentially the same approach and are based on the principles of learning. Behavioural therapy (BT) educates an individual about the relationships between his/her thoughts, feelings and behaviours. It raises the awareness of automatic thoughts that occur in response to situations, events and interactions, such that s/he becomes attuned to the stimulus that leads to negative behaviour; and rewards that reinforce positive behaviour. For example, the pleasurable qualities of food (taste, smell, feelings) can enhance eating and the experience of discomfort and fatigue during sports can decrease the desire to exercise. The thoughts of long-term consequences, such as, the possibilities of weight gain from excess eating and improved fitness from increased physical activities are less likely to influence immediate behavioral change. Self-monitoring, goal setting, developing meaningful social networks and using rewards are some of the techniques utilized in health management programs to help individuals realize long-term consequences and respond differently to immediate stimulus.

While it is understood that beliefs and assumptions are integral components of BT, much less is known about them. Beliefs and perceived norms about obesity and weight reduction and their associations with food intake, exercise and body image have been investigated, perhaps more frequently among multiethnic groups (Barroso et al, 2010; Blixen et al, 2006; DeVille-Almond, et al., 2011). Few studies have shown preferences for group programs using participatory approaches (knowledge sharing and support groups) to aid weight loss efforts among several ethnic minority groups (Blixen et al., 2006; Ferrari, Tweed, Rummens, Skinner, & McVey, 2009; Teufel-Shone, 2006).

#### *Group Programs Incorporating Behavioural Therapy*

A culturally responsive lifestyle education program to address the health needs of Latino youth who were obese was developed in 2005 (Shaibi, Greenwood-Ericksen, Chapman,

Konopken, & Ertl, 2010). The program consisted of group education sessions on topics such as the relationship between weight and health; nutrition education to identify alternative low cost alternatives to traditional high fat foods; encouragement of physical activity; coping with family stress; self-efficacy for making healthy decisions; and, personal reflection of lifestyle goals. These were grounded in values, beliefs and traditions relevant to the Latino community and were taught by bilingual and bicultural dietitians. A total of 102 youth participated in the program. The risk factors among all youth such as high blood lipids, impaired fasting glucose and obese BMI were substantial at the beginning of the program. There were significant health improvements; a 4% reduction in BMI and 5 to 9% decrease in cholesterol, seen in the 50 young adults who returned for follow-up measurements after 15 months.

Focusing also on a group of primarily Latino women (but including also Asians, Caucasian and African-American women) recruited from a vocational training centre for low income adults, the effects of an eight-week skills building course on physical activity were studied (Collins, Lee, Albright, & King, 2004). Eighty-two women completed a one-hour, physical activity preparatory group class each week that were based on educating changes and overcoming psychological barriers. The classes were designed to raise consciousness, correct misconceptions about physical activity, encourage confidence through acquiring new information about exercise, learning to set short-term goals and planning an appropriate and safe physical activity routine. In each class, bilingual health educators guided participants in small and large group activities, discussions and skill building tasks. The content was designed to address beliefs and values pertaining specifically to the Latinas' potential barriers to increase physical activity, such as family duties and self-esteem. The women completed a series of assessments before and after attending the program. They were tested on their exercise

knowledge; perceived barriers to exercise; exercise patterns; self-efficacy, motivational readiness and decision-making patterns for physical activity. Pre- and post-test comparisons showed increases in knowledge, perceived social support for exercise and the number of minutes walked per week although perceived barriers and self-efficacy for exercise did not change. A curriculum that included opportunities for women to support each other to become more active was shown to be successful in changing exercise-related knowledge, attitudes and behaviour.

The simplest of all BT is probably providing opportunities for frequent meetings with a healthcare team and like-minded peers. The Women on the Move through Activity and Nutrition Study (WOMAN) study was a continuation of a previous investigation on the health effects of individual care and group classes which lasted for two years. In the first year of WOMAN, 508 postmenopausal women were randomized into either the health education or the lifestyle change group. Women in the health education group attended seminars on women's health several times per year. Those in the lifestyle change group attended both one-on-one and group visits with a multidisciplinary team (nutritionists, exercise physiologists and psychologists) where calorie restriction and 150 minutes of moderate physical activity per week were reinforced. No supports were then provided to all women in the second year (Kuller et al., 2011).

Weight, blood lipids and coronary artery calcification were assessed at the end of the second year and compared to the findings in previous assessments. On average, the women in the health education group regained 50% of their weight lost from the previous study by the sixth month and regained all their weight by the end of WOMAN (at 48 months since the beginning of the previous study). Similarly, the lifestyle change group gained about 25% of their weight back at six months and about 50% of their initial weight at the end. Even in this more successful group, this change only represented 4% of the original weight which could hardly put the

individual at an obese weight back to a healthy weight range and BMI (Kuller et al., 2011; Foster-Schubert et al., 2011).

#### *One-on-One Structured Behavioural Therapy Programs*

A 12-week weight management program using BT principles was developed and evaluated by Abildso, Zizzi, Gilleland, Thomas and Bonner in 2008. Fifty-five participants at an average age of 45 years (75% women) with a BMI of above 25 kg/m<sup>2</sup> were enrolled in the program. Their participation was sponsored by a large public insurance company. Participants were initially assessed and later had regular meetings with their exercise physiologists and dietitians. Monthly personal fitness training was provided and periodic phone calls were used to track progress. Each participant received a behavioural counseling session ranging from 30 to 60 minutes during the first and twelfth week of the program. The sessions followed a structured format with a focus on helping participants implement processes of change, adopt and maintain physical activity and healthy eating behaviours. BT techniques used included identifying the individual's barriers to change and contingency planning to overcome these barriers as they relate to their personal health goals. In order to be funded to continue in the program (4 to 12 weeks), participants were required to keep daily food records and to exercise at a fitness facility at least twice per week.

After 12 weeks, 72% of the participants remained in the program. On average, each participant lost about 7% of his/her initial weight. All participants (both program completers and drop-outs) were invited to a program evaluation review. Sixteen people were interviewed by phone about their personal change during the experience. Four themes emerged from the information gathered. Accountability and personal attention (phone calls and frequent staff interaction) were thought to help sustain healthy behaviours for weight loss. Those who lost the

most weight were also diligent in recording their food (self-monitoring). Almost all but two participants felt they had put in good efforts for the duration of the program even when they had not completed the food records nor exercised at the gym. All of the participants felt the amount of weight and body fat losses should be used as their markers for success. They felt having immediate feedback about their body weight and fat measurements motivated them far more than many other tangible benefits (such as improved energy and sleep). The above evaluation suggests that weight management programs incorporating BT can lead to a moderate amount of weight loss. The degree of weight loss is similar to the study results described in the treatment approach. This study uncovered qualitative elements that contributed to the participants' weight loss success.

Annesi (2011) further explores how BT is able to produce desirable weight changes in study participants. He provided a 26-week weight loss program at YMCA fitness centres based on the tenets of BT to 137 adults who were severely obese. The program was structured as monthly one-on-one meeting of 45 to 60 minutes, each focused on self-regulatory methods (goal-setting, changing attitudes and relapse prevention) and increased physical activity. The participants also met with the dietitian biweekly in the first 14 weeks to learn self-regulatory skills to control eating (such as developing a plan for snacking and plan for relapse eating). Strong associations were found between participants' mood disturbances, self-regulatory skill usage in increasing activity and exercise self-efficacy compared to self-efficacy to control emotional eating, self-regulatory skill usage for and overall self-efficacy for controlled eating. In turn, changes in eating-related measures were found to be strong indicators of weight loss and reduction of waist circumference. Physical activities might have supported weight reduction



through psychological improvements as health self-efficacy and regulation rather than physiological pathways of caloric expenditure as previously sought.

### *Web-based Programs*

The internet has potential to reach and broadcast health news to millions of users in a cost and time effective way. It has certainly offered opportunities to develop behavioural change modules, and provided a platform for frequent contact between service providers and users, in place of face-to-face interaction. Many of the documented outcomes of web-based programs seem to be promising although company-sponsored studies are often flawed by high attrition rates and inadequate long-term data.

Kaiser Permanente, an integrated health care delivery organization in the United States partnered with HealthMedia to deliver a 6-week tailored on-line weight management program. A large study group of 2862 participants (83% women) were randomized to either the tailored program or received access to a website which provided only written information on weight management. The tailored program generated individualized action plans based on a participant's baseline and assessment data entered on-line. The action plans were generated at the first, third and sixth week of the program. Email were sent to inform participants of follow-up material designed to reinforce dietary and exercise improvements, address specific barriers to change, and provide support and self-monitoring resources. The information-only web site is a Kaiser Permanente health website with facts about weight loss diets and strategies amongst other popular topics, such as, diabetes and asthma.

Out of all the randomized participants, 20% dropped out within the first six months. There were as many respondents for the tailored program as the information-only web participants. At six months, the participants of the tailored program reported reading the on-line

information thoroughly, and feeling that materials were helpful, easy to understand and personally relevant. Individuals who participated in the tailored program lost 3% of original weight, more than double the weight loss seen (1.2%) in the information-only web users (Rothert et al., 2006).

In another study, Tate, Jackvony and Wing (2003) compared the effects of an internet weight loss program alone, versus the addition of behavioural counseling via email for 92 individuals with BMI between 27 kg/m<sup>2</sup> to 40 kg/m<sup>2</sup>. Half of them were assigned by randomization to the basic internet group and the other half to the internet plus e-counselling group. The participants were physically assessed at baseline, 3, 6 and 12 months. The basic internet site provided a tutorial for weight loss, tips, web links and selected internet weight loss resources each week. The basic internet group also received weekly reminders to submit their weight on-line. Participants in the e-counselling group were accessing the same basic internet site but were instructed to report daily calorie, fat intake and exercise records for the therapist via a web-based diary. The therapist emailed the participants five times each week for the first month and then communicated by weekly email for the remainder of the study. Participants who did not complete daily dairies were sent a personal follow-up email. The primary outcome measures for this study were weight and waist circumference. When these were compared at 12 months to baselines measurements, the group that received e-counselling had significantly greater decreases in weight, BMI and waist circumference; a reduction of 4.8%, 1.6 kg/m<sup>2</sup> and 7.2 cm (versus 2.2%, 0.8 kg/m<sup>2</sup>, 4.4cm in the basic internet group) respectively (Tate et al., 2003).

#### *Non-medical Commercial Weight Loss Programs*

The commercial health industry has long invested in developing programs that incorporate BT. Popular programs in Canada include Weight Watchers, Jenny Craig and Herbal Magic. Both Weight Watchers and Jenny Craig had sponsored randomized controlled trials of their programs which had been published in the reputable Journal of American Medical Association in 2003 and 2010 respectively. One article was also found to have reported the outcomes of individuals who tried an internet-only program, eDiets.com.

*Weight Watchers.* This program provides the participant with a food plan based on a diet exchange (or points) system and an exercise plan which follows current activity guidelines. Members attend group meetings of approximately an hour's duration that are led by successful program graduates. Written educational materials, weekly weigh-ins and social support were provided at these sessions.

Heshka et al. (2003) have compared weight loss and health benefits achieved and maintained through self-help program and the use of Weight Watchers over a two-year period. Two hundred and twelve participants (mostly women) aged 18 to 65 years old were randomized into one of these programs. The self-help group received two 20-minute counselling session with a nutritionist and was provided with self-help resources while the Weight Watchers group received food, exercise, and behavioural modification plan delivered via weekly group sessions as described above.

Body measurements and other biological parameters (such as blood pressure, blood glucose, lipids, insulin levels) were taken at clinic visits at six academic centres at 12, 26, 52, 78, 104 weeks. Three-quarters of participants in the Weight Watchers group and the self-help group completed the study. Weight loss in the Weight Watchers group was greater than the self-help group and so were the improvements in waist circumference and BMI in the first and second

year of the study. The number of people in the Weight Watchers group who managed to lose more than 10% of their initial weight was significant (Heshka et al., 2003).

*Jenny Craig.* The company sponsored a two-year trial in collaboration with four university medical health centres in 2007 (Rock, Flatt, Sherwood, Pakiz, & Thomson, 2010). A large sample of 442 women who were overweight and obese was enrolled into either one of these three groups: Jenny Craig (JC) in-person or JC telephone-based program or the usual care group. The participants who were assigned to the JC programs were provided with free prepackaged prepared meals tailored to customized caloric levels. They were to meet with corporate trained counselors or staff in person or over the phone. Email, phone and web site bulletin boards were also ways staff could communicate with clients in between weekly meetings. Counselors were instructed to provide the program as designed for regular paying clients although they were not blinded to the study participants. Participants assigned to the usual care group were provided with the services of a research staff dietitian. A one-hour meeting was scheduled at baseline and at six months. At the baseline visit, energy intake to achieve weight loss of 10% over a six-month period was prescribed. Sample meal plans, written materials and resources to enable label reading, tools to estimate portion sizes and eating out tips were provided. Participants also received monthly follow-up via email and phone. Progress was discussed at the six-month visit. Body measurements (weight, height and waist circumference), depression inventory, quality of life measures and fitness testing were assessed at baseline and every six months by the research staff at the participating medical institutions.

Attrition rates were low and 407 women completed the study. Of all measures, the weight loss effects were the most dramatic, a 10% weight reduction in the first year and about 7% in the second year on average in both the in-centre and telephone JC groups. Comparatively,

the usual care group lost little weight, only 2.6% and 2% in the first and second study year respectively. All groups showed improvements in cardiopulmonary fitness. No other significant differences in the other outcome measures were seen between groups.

*eDiets.com*. Womble et al. (2004) have monitored the body weights of 47 women who have been randomly assigned to receive a subscription to *eDiets.com* or a weight loss manual. The *eDiets.com* group received a virtual visit with a dietitian and a customized food plan accompanied by recipes and grocery lists. Social and BT support were accessed through unlimited on-line meetings, bulletin board support groups, an animated exercise instructor, customer service, email reminders about health goals and biweekly informational e-newsletters about diet and fitness. The other group received a 243-page book that provided 16 lessons to guide eating behaviour and physical activity. The manual instructed a low calorie diet using self-selected list of common foods. The participants in both groups were encouraged to record their food intake and to increase physical activity. They all met with a psychologist five times within the year. During these visits, quality of life measures, weight, height, blood sugars, lipids, blood pressure were also taken.

The high attrition rate of 34% by week 16 in both groups greatly impacted the significance of the study results. Those who belonged to the *eDiets.com* group made little use of the unlimited on-line support available as demonstrated by the infrequent log-on times. They managed to lose a small amount of weight, only a 1.1% reduction in contrast to 4% observed in the weight loss manual group over the course of one year (Womble et al., 2004). It was predicted that the higher weight reduction achieved by the weight loss manual group was due to the step-by-step structure of the manual. On the *eDiets.com* website, there was no clear guide as to which sections the participants should navigate first. Individuals who completed more food

records not only lost more weight but also reported better moods and vitality. The importance of self-monitoring and program structure was again observed.

*Herbal Magic.* This program claims to help individuals lose weight by providing customized meal plans based on conventional foods, herbal and vitamin supplements and personal coaching services. According to its website, the participant will be provided with a customized meal plan and will be taught how to plan meals at home using usual foods (Herbal Magic Weight Loss and Nutrition Centres, unknown date). Self-monitoring of both diet and exercise seems to be the key BT strategy to motivate and reinforce healthy behaviours at regular face-to-face meeting with trained staff. Subscribing to the program will likely involve heavy supplementation of the company's own manufactured herbal products. Success stories and information endorsed by a naturopathic doctor grace its web page; yet, no evidence-based rationale was provided as to how and why the recommended herbal supplements can sustain weight loss.

#### *Non-profit Self-help Groups*

Take Off Pounds Sensibly (TOPS) is a non-profit network of weight loss support and health education groups. Although recent reports about TOPS have not been found, the program is the largest of its kind, with over 10,000 chapters in North America since its establishment in 1948 (TOPS, Inc., unknown date). The program's philosophy of weight loss is built on group support, accountability and recognition. Participants attend weekly group meetings and weigh-ins led by a leader elected by members of the local chapter. Members receive emotional and practical reinforcement and motivation to make a healthy change to their lifestyle or environment at the weekly meetings. An individual's goal weight is determined by his/her healthcare provider and TOPS recommends a program of controlled calories through a food group exchange

system, increase in physical activities and BT taught through a written healthy lifestyle guide. The program offers a system of competition, rewards and recognition to motivate members in achieving and maintaining weight loss. Rallies, retreats and recognition events are regularly held. Members can also stay connected with TOPS through regular publications and newsletters in print and on-line.

#### *Novel Ways of Delivering Health Education and BT*

New technology has opened up opportunities for health messages to be delivered to individuals when and where they are most needed. The ability to reach people outside the confines of a health institution setting promotes patient engagement and has potential to reinforce messages provided at clinic appointments. The following two studies tested the possibilities of using cellular phones, smart phones and portable music players for these purposes.

*Phone text messages.* A group of pediatric clinicians has investigated the feasibility of sending tailored text messages and images to mobile phones to a group of 20 adolescents who are obese and receiving care at the Michigan Pediatric Outpatient Weight Evaluation and Reduction Program (Woolford, Clark, Strecher, & Resnicow, 2010). A total of 90 tailored text messages were developed around five topics: breakfast consumption, increase vegetables and fruit intakes, decreased consumption of sugar-containing beverages and fast food; and, decreased screen time. The messages were positively framed and are constructed as open-ended questions to enable the adolescents to create their own solutions rather than to suggest a course of action. A teenager who indicated frequent fast food intakes might receive this message: “Hi DJ, you said your parents want you to lose weight, and your dad will support you. How can he help? How can you work together to cut back on fast food?” (Woolford et al., 2010, p. 459). A library of

images was also created to appeal to both males and females in six categories: family life, food and beverages, sports, peers, fashion, outdoor settings. Participants were able to select two images from each category that they wished to receive occasionally with their text messages. The text messages were tailored to the teenager's self-report of the above five behaviours and a computer software automatically sent text and images from the library to the teenagers' mobile phones every day during the 90-day trial. The messages cycled through the five topics and messages with images were sent weekly. The teenagers also received reminders about exercising three times per week on the days prior to their program's exercise sessions.

This study only reported the feasibility of developing and implementing the text messages and not the effects on dietary or exercise adherence or change in BMI. The researchers reported some technical challenges developing the images but encountered no other problems with the tailored text messages and their deliveries to mobile phones. There were no reports of increased phone calls to the clinic or to individual clinicians. The care providers thought the program was well received by participants. To explore the teenagers' perception of this text message function, the 20 participants completed brief surveys monthly and were also interviewed at the end of the study. All teenagers reported that the daily messages were sufficient and receiving them after school was useful. Overall, participants liked the messages and could recall the topics well. Most of them thought the messages were relevant to their weight-related issues, and indicated that the information was helpful. They reported that the messages reminded them of making healthy choices and kept them focused on their weight management efforts.

*Podcast.* Podcasts are audio files that can be downloaded on to portable music players or computers. Although this technology is gaining popularity, little is known about its use in



promoting health. It can present another opportunity for providing weight-loss information to people with internet access who may not want to participate in face-to-face meetings. In 2008, the response of participants who were overweight and obese to a series of newly developed podcasts was studied (Turner-McGrievy et al., 2009). Ninety-four participants were randomly assigned to receive 24 episodes of an existing weight-loss podcast (control) and one that was developed by the researchers (the enhanced podcast) for 12 weeks. The control podcasts used stimulus control, positive thinking and self-image to limit snacking. The enhanced podcasts were based on social cognitive theory. Nutrition and exercise information of each episode stressed the importance of achieving healthy weight, informed the participants what to expect during weight loss, encouraged participants to achieve goals and provided knowledge about how to lose weight using dietary changes and exercises. The participants' weights, demographic data, food intake and physical activity were assessed at baseline and 12 weeks. The participants receiving the enhanced podcasts had greater weight loss-related knowledge, showed improved eating and exercising behaviours (ate more fruits and vegetables, less high fat foods, engaged in more vigorous activities); and, lost significantly more weight than the control group.

### The Community Engagement Approach

As the link between obesity and health risks; and subsequently, its social and economic consequences impact all age groups, the development of strategies to address it also have to apply to all periods of a person's life. Given the persistent nature of obesity once it is established, proactive education that embraces the broad-based approach of health promotion and obesity prevention are taking hold. Schools provide a prime environment in which health knowledge can be presented and healthy behaviours can be modeled and observed by children and youth. Various initiatives, from fusing behavioural skills learning and nutrition education

into the school curriculum to capturing students in after-school activity programs have been piloted.

### *School-based Initiatives*

In one school-based program, a nutrition and physical activity curriculum for five to seven year olds was delivered during “lunch time clubs” for 20 weeks over four school terms (14 months). Significant improvements in nutrition knowledge were seen in all children between baseline and post-intervention. Although the education provided did not relate to the weight changes in the school-aged children, overall fruit and vegetable consumption had increased significantly. The authors in this initiative demonstrated that health education incorporated into the school curriculum early in life was feasible and might have promising potential if it could be extended, sustained and involved a multi-faceted team of parents, youth, teachers and the community (Warren, Henry, Lightowler, Bradshaw & Perwaiz, 2003).

Caballero et al. (2003) have explored the above concept further. They developed a program with four components and delivered it for a consecutive three years to a population of third to five graders of American Indian ancestry. The first component was a classroom curriculum of two 45-minute lessons designed to promote healthy eating and physical activity. Lessons were taught by teachers each week for 12 weeks. The second component involved training food service staff to plan, purchase and prepare lower-fat school meals. The third component was a physical activity program with a minimum of three 30-minute sessions of moderate to vigorous activity implemented within school hours each week. The fourth was a family component which involved sending kids home with family action packs and healthier snack samples; and promoting parental involvement by launching family events featuring cooking and nutrition oriented demonstrations at schools. The program took three years to

develop and validate before the implementation in schools even took place. After another three years of implementation and observation, the researchers found significant positive changes in fat intake, food and health-related knowledge in the elementary school students. Reductions in body fat and BMI were not observed.

On the other hand, Kids Living Fit (KLF), an after-school nutrition education and exercise program implemented by school nurses was found to be effective in decreasing BMI and waist circumference in elementary-aged children (Speroni, Earley, & Atherton, 2007). Participation in KLF was voluntary and the program was opened to kids from grades two to five in four schools. A total of 194 kids were enrolled into the program. Each school formed its own KLF group who met right after school once a week for 12 consecutive weeks. For these 12 weeks, the students participated in fun physical activities led by a fitness trainer and short 30-minute nutrition sessions presented by a dietitian. Examples of physical fitness activities included aerobic dance, yoga and relaxation techniques. Active behaviors such as running, walking and biking were promoted in replacement of screen time on television, video games and computers. The nutrition education session helped students identify healthy lunch and snack choices, introduced the use of the food pyramid in healthy food selection and taught appropriate portion sizes. One hundred and eighty-five kids completed the program and attendance rate was 82% over the 12 weeks. Participants reported to be very satisfied with KLF. In comparison of BMI percentiles and waist circumferences at baseline to measurements made during follow-up at 12 weeks and 24 weeks, the school nurses found a marked decrease of BMI and waist circumferences in the kids who completed KLF (Speroni et al., 2007).

*Engaging Whole Communities*

Broad-based obesity initiatives that incorporate community involvement are limited and community-based participatory research is even rarer. Shape Up Somerville (SUS) and Healthy Living Cambridge Kids (HLCK) are two community obesity prevention programs that engage community partners continuously to take action on addressing obesity through supporting healthy eating and active living. They represent a grassroots obesity prevention movement in which actions are community-initiated, implemented and evaluated. Through participatory research, the programs illustrate how communities and their partners can be mobilized to collect data that influence policy decision-making.

*Shape Up Somerville.* Shape up Somerville is a strategy based out of Tufts University in the United States that changed the environment to prevent obesity in a culturally diverse group of elementary school-aged children from Somerville, Massachusetts (Tufts University, 2011). The SUS team facilitated a partnership with Somerville school department, school's food services, restaurants, parents, recreational facilities, pediatricians, school nurses and four major ethnic communities. Understanding between partners was developed through town hall meetings, focus groups and one-on-one interviews which eventually led to the creation of a SUS advisory council. Collaboratively, they identified health challenges, designed and implemented action plans; and, collected data that would inform further strategies to improve health within the community. This collaboration led to the development and implementation of strategies designed to create increased physical activity options and improved healthy food selections in first to third grade elementary students.

The activities were developed to influence every part of a child's school day (Economos et al, 2007). Breakfast programs and walk-to-school initiatives were implemented to enhance students' well-being before classes. Within the school, a healthy eating and active living

curriculum and school wellness policy were adopted; school cafeteria with healthier menu options were developed; routine weight and height checks done by school nurses was initiated; and, professional development days on nutrition and physical activity for staff were carried out. An after-school curriculum was also implemented which included farm trips, cooking lessons and fun activity programs. Parents were kept abreast of their children's health progress through health report cards mailed out every year. Family-school events, parent nutrition forums and bi-monthly newsletters kept parents and families involved. Local clinicians held regular staff meeting to keep up-to-date on SUS initiatives so that they could promote these activities further in their practices. Broadening the scope, the Somerville city began coordinating walk and bike routes. Names of restaurants that volunteered to offer a healthy menu were posted on the SUS website.

The participatory research lasted three years, from 2003 to 2005 (Economos et al, 2007). Monitoring of weight was still the main outcome measure and on average, SUS as a strategy, was able to reduce a pound of weight gain over eight months for an eight year old child. In Somerville where almost half of the first to third graders were overweight, the small percentage of BMI decreases translate significantly to minimizing the number of children who will move to the obese categories. More excitingly, many of the initiatives remain active until today. This is made possible by community participation and secured funds from the federal government.

*Healthy Living Cambridge Kids.* A team of researchers, educators, clinicians and public health professionals continued in the spirit of CBPR principles and brought together a plan to affect change in an even broader scale. Funded by the Cambridge Health Department and Cambridge Health Alliance, the strategy aimed to help all children eat better and become more

active through programs supported by the Health Department and community partners in the city of Cambridge, Massachusetts (Promising Practices, unknown date).

Similar to the structure of SUS, Healthy Living Cambridge Kids (HLCK) involved engaging the community, school, family and individuals to form a Healthy Children Task Force. Through this Task Force, a number of programs that included city policies, community awareness campaigns, physical education enhancements in schools, food service reformation, farm-to-school programs, family outreach and health report cards were initiated. HLCK started in year 2000 and continued to run until present day. The strategy has been continuously monitored using CBPR in four distinct phases. In the formative phase, teachers were trained to record weight, height, BMI and fitness scores in schools. The Task Force partners created a public healthy eating and physical activity campaign called the 5-2-1 initiative (5 fruits and vegetables per day, less than 2 hours of screen time and 1 hour of moderate to vigorous activity). During the program development and pilot testing phase, the Task Force trialed health report cards and worked with teachers, parents and school nurses to improve its structure, language and readability.

After receiving more funding, a pilot-program in four elementary schools tested the feasibility of school gardens, healthy cafeteria and family education to promote fruits and vegetables. An additional grant also offered physical education teachers professional development opportunities and new gym equipment in schools. The implementation phase occurred between years 2005 to 2007 when HLCK rolled out all the above programs at the school level. This was made possible by numerous policy changes at the school level as well as strong support by local farmers, food industries and families.

In 2007, the Task Force compared children's weight and fitness status to the 2004 baseline data. The BMI of 1858 school children were modestly reduced with a dramatic reduction on the proportion of children who were severely obese (reduced by 10% for BMI over 95<sup>th</sup> percentiles). Obesity among all races and ethnicity groups declined compared to data at baseline (Chomitz et al., 2010). HCLK represents an effective community intervention for modest improvements in obesity and fitness. Evidence shows that it can be sustained over 10 years through affecting policy changes in a diverse community.

#### The Ecological/Environmental Approach

According to the ecological models of behavior, the “environment” refers to anything outside of the human body that can influence behaviours and eventually impact health (Egger & Swinburn, 1997; Sallis & Owen, 2002). This can mean anything from the physical environment within which one lives (a neighbourhood, building, highways), economic environment (food costs and pricing), political environment (policies), and technological context (mass media such as advertising, health news, television programs). It is prudent for health educators to understand how behaviours are affected by the “environment” and include this as one of the constructs of obesity. Having adequate knowledge about environmental-behavioural linkages helps the educator locate the client or patient in his or her context. Only then, can the educator provide relevant assessment of immediate barriers and available supports to enable the client a better chance for healthy living.

#### *Physical Environment*

Neighbourhood design and urban planning have long been thought to influence physical activity and health (Ewing, Schmid, Killingsworth, Zlot, & Raudenbush, 2003). In a study of approximately 7000 adults living in European cities, residents who lived in areas with the largest

amount of green spaces (parks and tree-lined streets) were three times more likely to be physically active and had 40% less chance of being overweight and obese than those living in cities with the least green spaces (Ellaway, Macintyre, & Bonnefoy, 2005). Interests in these environmental aspects are slowly gaining momentum.

Brown, Werner, Amburgey and Szalay (2007) have summarized the environmental correlates of walking. These authors have provided evidence that walking is more likely to occur when pedestrian areas provide easy access to desired destinations. Desired destinations may include shopping areas and malls, parks, open spaces and public transportation. On the contrary, perceived safety fears triggered by the presence of litter, vacant lots, graffiti and the absence of people hinder the desire to walk.

Walking is also found to be a popular activity among older adults. Senior residents in three retirement communities were surveyed by Joseph and Zimring (2007). The questionnaires examined the relationship between physical environmental features of pathways and their use for recreational purposes by older adults. Again, walking routes that were most often used were related to their well-connectedness with desired destinations. Pathways that were most likely to be used for recreation were longer, did not have steps and provided an attractive view of the community.

Walking is a convenient and inexpensive way to get around. Inclusion of this daily yet seemingly invisible form of lifestyle activity helps many individuals reach accumulative daily activity goals as encouraged by the National Heart, Lung, and Blood Institute (NHLBI). An increase in overall physical activity can infer multiple health benefits that can also combat obesity. However, the recommendation to walk offered by health educators has to be made in recognition of the context where the patient lives. The educator's perception that an individual



lacks personal desire to carry out lifestyle activities may, in fact, be attributed to unsafe pathways and the lack of desirable walking routes rather than lack of adherence to recommendations.

The concept of “mindless eating” as explored by Wansink (2004) describes conditions of food consumption that people are not aware of or do not monitor. The author suggests that the eating environment (the ambience and social conditions in which eating occurs); and, the food environment (related to how the food is provided, presented, packaged and portioned) invisibly dictate food decisions – what foods and how much. Wansink’s literature review raises some interesting points. He has characterized five food environmental factors that can promote eating as the five S’s: salient, structure, size of packages or portions, stockpiled or bulk foods and serving utensils. Saliency is referred to the presence and smell of food as constant temptations and reminders to eat. The assortment of flavours (the structure) of a product, such as different variety of flavoured yogurts, has been shown to promote larger quantities of the yogurt to be eaten and improved sales of the product. Food that comes in larger packaging suggests that larger amounts are appropriate; thus, promotes higher consumption. Stockpiled foods or bulk purchases once made into the home can encourage frequent eating until they are depleted. Wider bowls, cups and larger spoons also act as perceptual cues that influence the quantities of food to be eaten. Generally, people are more focused on the height rather than the width of serving bowls and cups. The wider the utensils, the more food are consumed. Even more interestingly, when people ate 31% more food as a result of being served food in larger bowls, 21% continued to deny to have eaten more, 75% attributed their eating to hunger and only 4% attributed their appetites to the larger bowl (Wansink, & Sobal, 2007).

Health professionals should be aware how these small elements in a person’s environment will affect eating behavior and translate directly to the amounts consumed. Factors

that drive food decisions are complex and they influence food consumption by either inhibiting self-monitoring or presenting alternative norms of food portions. It is also important to recognize that many individuals are either unaware of these influences or are unwilling to acknowledge them.

### *Food Advertising*

The food industry has probably long realized these influences. Food products are marketed to children who are often developmentally least able to decide appropriate food options presented to them. Investigations done by the Institute of Medicine (as cited in Batada & Wootan, 2009) concluded that food marketing influences children's food preferences, requests, diet and health. Since then, the Council of Better Business Bureaus oversees a self-regulatory children's advertising initiative formed by the food industry. Major companies pledged to become more responsible with their food advertising to children.

By June 2007, Coca-Cola, Hershey's Mars and Cadbury stated that they would not advertise their products to children. Other food companies claimed that they apply nutrition standards for foods that are marketed by television, print, radio, internet and use of licensed characters in advertising. The Centre for Science in the Public Interest (CSPI) conducted a study to analyze the nutritional quality of foods and beverages that companies had pledge-approved for marketing to children (Batada & Wootan, 2009). Four hundred and fifty two products were analyzed and their nutritional values were compared against recommendations from the Dietary Guidelines for Americans. About 60% of food products and 65% of beverages did not meet these nutrition standards and unhealthy foods containing poor dietary fats and added sugars continued to be marketed to children. The CSPI reported that 80% of advertised foods on Nickelodeon, a popular children's television station, were of poor nutritional quality.

*Reality Television*

Reality television has been theorized as a form of public pedagogy through which the issues of health and the ideology of beauty and “ideal” weight are addressed. In Rich’s exploration of the reality based media, she found that the complexities of obesity were often portrayed as “individualized and simple readings of health” (Rich, 2011, p. 17). The ideals of thinness, parenting roles and food choices are promoted by celebrities who played roles of lifestyle experts. Often, the working class is stereotyped to a category that needs to manage, control and be taught how to live, eat and exercise better in order to live better lives. Evidently, “the complexities of health disparities which so strongly come to bear upon health, are often obfuscated in this discourse” (Rich, 2011, p. 17).

Similarly, four popular reality television program about weight-loss: *The Biggest Loser* (Braun, 2011), *The Last 10 Pounds Bootcamp* (Fingold, 2011), *X-Weighted* (Mardirossian & Schmidt, 2011), and *Extreme Makeover: Weight Loss Edition* (Roth, 2011), also promote ideologies of beauty. These televisions series document a family’s or individual’s journey to an “ideal” body weight. They emphasized a heightened drama of metamorphosis through sweat and tears. Attractive-looking celebrity trainers and nutritionists are featured who endorse a particular diet or exercise regimen. More often than not, they are also spokespersons of their own businesses and weight-loss related products. Through case studies and excerpts from Canadian reality weight loss shows, Blaszkiewicz (2009) illustrates the desire participants have for a set weight so that they can fit in certain dress sizes or to prepare for special events. Not only do the shows sold a certain technique of weight loss, one that used intense exercise drills and relentless monitoring and criticizing of foods consumed, they also delineated narrow views and individualistic solutions to obesity.

### *Economic Environment*

In an experiment carried out by Just, Wansink, Mancino and Guthrie (2008), 191 college students were provided with three types of payment options to purchase their cafeteria foods. They were given either: cash only, cash plus debit card with unrestricted access to all foods and cash plus a debit card that only allowed designated healthy foods to be purchased (the restricted card). Students in the restricted card with cash group purchased twice as many healthy foods and few unhealthy items compared to the unrestricted card group even in the face of free cash available. The restricted card group also consumed significantly less calories, less added sugars, total and saturated fat than those with unrestricted cards.

Another study (French et al., 2001) also examined how pricing and food promotion strategies could impact selection of snacks in adults and adolescents. It demonstrated that price reductions on low-fat snacks in vending machines were associated with significant increases in the sales of these snacks. Whereas, when signs were used to highlight low fat snacks, sales of these snacks were not significantly increased. A small cost reduction by as low as 10% appeared to be effective in facilitating healthier purchases.

### *Political Environment*

Bombarded by food advertising and popular television shows, subjected by food prices dictated by the economic markets and changed physical activity patterns related to city design, no one appears to escape the “obesogenic” environment. Unknowingly, these powerful factors manipulate day-to-day practices and health behaviours although as individuals, little can be done to reverse them. The government’s role as policy maker and enforcer, thus, is an important one. It serves to create an environment that guides people to develop healthful behaviour. The concept of policy level strategies to ensure population health outcomes is nothing new and is

essential in preventing chronic illnesses (Brescoll, Kersh, & Brownell, 2008; Pappas & Karaouli, 2010; Penny, 2008; Priest, Armstrong, Doyle, & Waters, 2008).

In a systematic review of healthy policy strategies for the treatment of obesity, Pappas and Karaouli (2010) illustrate the importance of adequate health education and development of preventative measures for front-line health care personnel and the wider population alike. Establishing a clear agenda and dedicating efforts to equip coordinated primary health care structures to support healthy living are strongly advocated. In an earlier mention of the CSPI report on food marketing to children, the writers conclude that the small efforts made to improving the nutritional quality of foods for children since the initiation of a four-year industry self-regulated program is unacceptable. They urge that if the industry cannot further their efforts in improving food quality and adopting more responsible food advertising, the country will need to rely on government regulation rather than the industry as means to address food marketing to children and youth (Batada & Wootan, 2009).

There is also a keen interest in the study of childhood obesity policies. An investigation to assess the perception of political feasibility and potential public health impact of a list of childhood obesity policies between two different groups of experts was developed (Brescoll et al., 2008). The first group of experts comprised of scientists in the nutrition and physical activity fields while the second group included respected experts in federal obesity and public health policies. Each group reviewed 51 federal obesity, nutrition and physical activity policies in the United States and both groups were asked to rate each policy's political feasibility. The science experts were also asked to rate the likely impact of each policy on improving nutrition and/or physical activity. Thirty-three science and 28 policy experts completed the survey.

Both the nutrition and policy expert groups agreed that funding for research on obesity prevention strategies and their impacts in health outcomes were important. Policies that ban certain activities, such as certain methods of advertising in schools and using cartoon characters, celebrities to endorse junk food; and barring sales of unhealthy snacks in lunch programs and vending machines were viewed to have the greatest impact on childhood obesity but were deemed politically infeasible by politicians. Mandating minimum physical education in schools and limiting television time in daycares were generally opposed by policy experts. On the contrary, health education and information dissemination policies such as nutrition information for parents and funding to develop skills in healthy cooking while viewed as having little public health impact by nutrition experts, were actually considered favourable among policy makers. Despite of some successes in using the community engagement approach to obesity management, large scale environmental interventions were less popular among politicians as compared to individual-based education policies that emphasized personal responsibilities.

### Discussion

The process of formulating an educational philosophy within any educational practices and area of study is important, and so it should be for the practicing health educators (healthcare personnel, primary care and acute care clinicians, allied health professionals, physicians alike). A teaching philosophy shapes the way one teaches, defines who the learner is, and describes how the learner learns. Similarly, how obesity is understood sets the foundation of a health educator's teaching philosophy. The particular way one constructs obesity determines how s/he translates it into practice through patient education, program design, clinical teaching and research. Likewise, the health literature will also reflect those approaches. More importantly,

the educator will also need to consider how authority is delineated and which specific groups of people are disadvantaged in whichever approach that s/he eventually adopts.

### *Framing Obesity – Roles and Responsibilities*

The ecological/environmental and community engagement approaches frame obesity as a systemic problem and broadens the scope of the issue, assigning responsibilities to the individual, community, government, industries and larger social pressures. To regard individual behavior as a primary cause of obesity blames the problem on particular individuals, often those who are already overweight or obese. In other words, it suggests that the individual has sole responsibility of afflicting the condition on him/herself. When individualistic approaches are adopted, it may be difficult to see past how health behavior is a product of traditional and cultural beliefs, values and assumptions. What may seem to be culturally appropriate interventions, often modifications of mainstream obesity prevention practices targeted at specific ethnic groups, may have stigmatizing effects.

Further along the continuum of this discourse, the surgical and pharmacotherapy point of view defines obesity strictly as a medical problem. In this light, individuals or systems within which they live are not considered, thus freeing most parties of their responsibilities. These approaches position scientists, researchers and medical professionals in the forefront to tackle the issue, find solutions, and fix the problem. Defining obesity from each of these frames assigns power, responsibility, blame and burden on particular groups. It will be useful for health educators to think of medical, individual and systemic frames along a continuum of discourse, with arguments to be drawn from one or more of these elements (Lawrence, 2004). A summary of the various approaches and their limitations described in this paper can be found in the Appendix.

So does the development of health education initiatives and strategies pertain to one or more paradigms within the obesity phenomenon? In the making of this review, where does the bulk of literature rest on the continuum of this discourse? There is a clear distinction between approaches pertaining to the individualistic and participatory paradigms in the treatment and prevention of obesity. The following provides a quick illustration of how the current thinking in the medical community has continued to frame obesity within the individualist paradigm.

A follow-up search on Medline using common words found in research pertaining to the individualistic approaches, such as “exercise”, “physical activity”, “low calorie diet”, “behavioural therapy”, “weight loss”, “overweight” and “obesity”, reveals some of the methods most studied within the last 10 years. The role of physical activity appears to be most researched (a total of 2114 papers), encompassing 82% of all articles found. There are almost as many reports on low calorie diets (242) as there are on behavioural therapies (230 papers). Of note, the majority of these studies demonstrating the roles of physical activity and behavioural therapies in weight management were published in the last decade. Significant interests in these areas are evident. Meanwhile, the roughly 200 articles found to identify obesity within community-based, grass-root initiatives and environmental impacts pale in comparison. Furthermore, authentic research on how obesity prevention policies impact population health scores the least number of hits. The same can be confirmed by the fact that “the portfolio of obesity-related grants funded by the National Institute of Health is dominated by biological and treatment research with a heavy emphasis on pharmacology and surgery. Relatively little work is being funded on economic and other social drivers of the obesity problem or on prevention” (Brescoll et al., 2008, p.190).

*Implications for the Health Educator*



The purpose of this paper is not to criticize or argue that the individualistic and biological approaches to obesity are bad. However, the dominant approach most often described by literature and reinforced by the media may portray that only one approach is viable; thereby, convincing the educator to adopt a certain belief along the continuum of the obesity discourse. Until the educator reads and understands more about the “other” perspectives can s/he come up with a balanced picture of such a complex issue. After understanding has occurred, it is then useful to locate one’s belief along the continuum of the obesity discourse. Furthermore, the educator could appraise how this belief affects the way she communicates with patients and through language in health documentation and professional correspondence.

Should the educator’s belief lean towards the ecological end of the spectrum, then, s/he should be critically aware of the competing frames as presented in media, the industry and communicated through upcoming health policies. The majority of information reaching the general public about what to eat, exercise, and ideals in weight and weight loss strategies come from the media and industry. An interesting aspect is that the food industry (as a collective) spends about \$45 per person in advertising while the government spends less than \$2 per person on promoting healthy living (Jeffery, 2001). The counter-argument to an ecological approach or strategies for community engagement can be strong and appealing.

To contribute significantly to improving population health, educators engaged in clinical practice, particularly those in acute care settings, should regard patient education is as important as the role of advocacy. Submitting critical arguments for and against certain aspects of obesity to newspapers, providing comments to editors of scientific journals, and speaking with politicians about the importance of disease prevention are just a few ways to exercise this role. Advocacy can also be exercised through fostering debates in professional education and clinical

teaching. Clinicians can also address arguments on both ends of the discourse in patient education materials. Furthermore, exposing patients to the various approaches to obesity can further common understanding so that the individuals too, can become advocates for themselves.

In the making of this literature review, the writer has become convinced that health is both a social and personal responsibility. The clear recognition that obesity reduction requires committed efforts from all levels of society has revived the writer's enthusiasm in her dietetic practice of motivating change in families who are obese. As the result of learning about the participatory work of other researchers, the writer has now focused on change in three areas of clinical practice: assessment, patient education and structural change. During nutrition assessments, emphasis is placed on investigating the level of food security/insecurity experienced by families and gathering information about the family members' work hours, transportation time and physical proximity to supermarkets and recreational spaces. In addition to educating families about the benefits of eating fruits and vegetables, the writer is also linking families to practical resources during clinic visits. For example, the writer will register the individual in a fruits and vegetables purchasing program (such as, the Good Food Box in British Columbia), community kitchen, cooking class or walking group ran by the school board or community centre. Nutrition follow-ups are offered more regularly over the phone or by email in replacement of face-to-face visits. This structural change saves patients' time, money and energy, allowing these to be used potentially in improving health behaviour instead.

### *Future Directions*

Going forward, the advocate's voice should grow gradually stronger. When new doctors are taught ways to discuss health behavior with their patients at the same time a public dissemination plan of key health promotion messages is implemented, the health of a community

is improved (Stahl, Necheles, Mayefsky, Wright, & Rankin, 2011). The Together Let's Prevent Childhood Obesity (EPODE), a framework for integrated and concrete obesity prevention programs that involve relevant local stakeholders is taking hold. Programs developed under this methodology are sustainable and target at changing the environment; thereby, modifying behaviours. The approach is said to be a "positive, concrete and stepwise process with no stigmatization of any culture, food habits, overweight and obesity" (European Public Health Alliance, 2010). Started in France in 2003, 167 cities in France, 20 in Spain and 8 in Belgium have adopted this framework in their management of childhood obesity. It will be soon be rolled out in Greece, Quebec (Canada) and Australia. Closer to home, the Sustainable Childhood Obesity Prevention through Community Engagement (SCOPE, 2010) project mimics strategies used in Healthy Living Cambridge Kids and Shape Up Somerville. It is gaining support in pilot towns of Prince George and Abbotsford, British Columbia.

### Conclusion

The complexity of the obesity phenomenon has been presented. A series of research studies and ongoing strategies targeting at the treatment, prevention of obesity and promotion of healthy living have been described. This review found that individualistic solutions were presented as the predominant approach to obesity in peer-reviewed medical literature, although competing participatory methods - community engagement and use of environmental changes to impact social change were also found. While scientists are incorporating community-based and participatory approaches to obesity prevention and reduction beyond investigations within the individualistic paradigm (treatments and behavioural therapies focused on individual changes), the media, industry and policy-makers have not yet made this inclusion. The media and food industries continue to portray short-term solutions that rest on a narrow vision of individualistic

changes - promoting a particular technique of weight loss and an “ideal” body weight. This approach often strips the individual, who has already been afflicted by overweight/obesity, of the power to change. At the same time, politicians indirectly endorse these solutions by addressing obesity as an individual challenge rather than a state responsibility, as evidenced by the lack of food marketing and taxation regulations; and, inadequate commitment to long-term funding of participatory and community-based healthy living initiatives. From the treatment perspective of prescribed calorie restriction and exercise treatments, behavioural therapies and broader community-based approaches to an even wider focus on political influences, this paper serves to remind health educators of the challenges and often conflicting orientations in obesity prevention and treatment. Broad-based approaches which involve whole communities and invest in bringing about political, economic and physical environmental changes should be much more discussed among clinical educators. An emphasis on the role of advocacy of the clinical educators through patient education, clinical teaching and campaign for policy change is warranted.

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