Self-administered interventions: a health education strategy for improving population health

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Abstract

A case is presented for using self-administered interventions (SAIs) as a viable public health education/promotion option. SAIs are promulgated as a means to more fully participate in projected health care changes. One readily available opportunity is to incorporate SAIs into managed care organizations concerned about balancing costs and care, and responsible for the health care of the populations they serve. SAIs are both clinical and 'population-based' strategies that are viable alternatives to 'usual' care because SAIs offer a means to enhance reach, efficiency and efficacy when used independently or as part of a sequential, systematic series of interventions. SAIs also have other advantages such as being easily shared, disseminated, reusable and capable of including a valuable, inexpensive human resource, trained peer helpers or volunteers. The SAIs of minimal intervention and self-instruction have been widely used with a variety of lifestyle behaviors associated with cardiovascular disease. Research from the weight management literature is used as a heuristic illustration of the application of SAIs, and to describe the nature and potential of SAIs as public health strategies to meet health care challenges of the future related to service delivery.

Introduction

Public health may be in a golden age of opportunity. The Pew Health Professions Commission report, Critical Challenges: Revitalizing Health Professions for the 21st Century by O'Neil (1995), projects substantial reductions in the number of physicians, pharmacists and nurses, but an increase in the number public health educators. New public health education programs are advocated that bring together the traditional public health disciplines with the clinical professions. Also, there is emphasis on developing partnerships to apply population health management skills to problems confronted by managed and integrated health care systems. Conversely, the report specifies that a 'demand-driven' system that is, in part, more managed, accountable and aware will necessitate a 20–25% reduction in the number of students entering medical school by the year 2005. Pharmacy and nursing education programs also are expected to diminish by 20–25 and 10–20%, respectively.

Another Pew Health Professions Commission report by O'Neil (1993), Health Professions Education for the Future: Schools in Service to the Nation, predicts several major changes in education during the next decade. Characteristics seen as essential for survival in the emerging health care culture include the following: (1) being more oriented toward health with emphasis on disease
and injury prevention, health promotion, elimination of environmental hazards, and individual responsibility for health-related behaviors; (2) adopting a population-based perspective with greater focus on physical and social environmental risk factors, many of which deserve attention at the community rather than the individual level; (3) being more information driven by using electronic means to synthesize patient-relevant information to provide better diagnoses and treatment recommendations; (4) developing a stronger focus on the consumer with greater emphasis on patient partnerships in decisions related to treatment; and (5) acknowledging constrained resources and actively seeking ways to diminish costs of health care.

These reports underscore the importance of focusing on the health of populations and individuals within communities. A population perspective draws attention to the enormous impact on the health that can be achieved by relatively small reductions in risk in larger populations (Hovell and Black, 1989; Rose, 1992). This perspective requires a broader understanding of who is at risk (Hyner et al., 1988), the determinants of risk (Evans et al., 1994) and the strategies appropriate for reducing risks (Black and Hultsman, 1989/90; Rose, 1992). One challenge confronting public health and the health care system is to find simple, practical, non-invasive interventions for inducing widespread reduction in disease.

Ecological approaches to intervention represent potentially powerful strategies for analyzing and influencing behaviors in populations (e.g. McLeroy et al., 1988; Green et al., 1996; Stokols, 1996). Ecological approaches capitalize on the extent to which behaviors are influenced by environmental factors (e.g. Ross and Nisbitt, 1991). If environments (physical, cultural, social and political) can be altered in ways that encourage healthy behavior patterns, it is likely that widespread, sustained shifts in behaviors of populations can be attained.

The nature and potential of an ecological approach may be illustrated with reference to the obesity literature. Jeffery (1989) has contrasted the high-risk approach to obesity treatment with a population-based perspective. Brownell (1986) and Jeffery (1995) have identified simple environmental changes that would have the potential to result in substantial change in large numbers of individuals. Evaluations of such inexpensive and easy to disseminate environmental cueing strategies suggest that it is practical to influence behaviors of large numbers of people in specific situations by using environmental cues (Brownell et al., 1980; Blamey et al., 1995). A symbiosis that integrates both educational and ecological/environmental approaches (e.g. Green and Kreuter, 1991) in the service of improving population health, however, necessitates a new meaning of health education. Those previously concerned with educational interventions need to think creatively about how to design interventions to reach large numbers of people at low cost. No doubt social marketing (e.g. Black et al., 1993; Flora and Cassady, 1990; Black and Smith, 1994; Gries et al., 1995) and media advocacy (e.g. Wallack et al., 1993) approaches, which incorporate the use of mass media, will be important elements of a population-based intervention mix.

The movement toward Managed Care Organizations (MCOs) in the US may further stimulate interest in population health interventions and offer financial alternatives (as well as incentives) for incorporating these approaches. Representatives of public health agencies at the national, state and local levels, along with members of the MCO industry, concluded the following after a meeting at the Centers for Disease Control in Atlanta: (1) as the most fully developed MCOs, Health Maintenance Organization (HMOs) have been committed to implementing, monitoring and improving the quality of preventive services; (2) HMOs are motivated to incorporate clinical and population health strategies because they are responsible for the well-being of their subscribers; (3) HMOs are concerned with maximizing efficiency without compromising care; (4) HMOs are accountable for outcomes (to purchasers, individual consumers, and federal and state agencies); and (5) MCOs have found that maintaining the health of their populations is an excellent way to improve...
cost-effectiveness (Harris et al., 1995). In 1994, HMOs were responsible for the first decline in health care costs in a decade for employers with more than 500 employees. In addition, enrollment in HMOs has dramatically increased from 6 million in 1976 to 51 million (about 20% of the US population) in 1996.

MCOs have the opportunity to become active leaders and powerful role models in promoting and protecting the public’s health. Not only can the integration of cost-effective approaches be utilized, but the focus for service delivery can be on risk factors and diseases that are preventable. Important public health areas in which HMOs can be used for intervention include obesity, hypertension, tobacco, problem drinking and alcoholism, and changing the sedentary lifestyles of their members. These areas are related to preventable morbidity, mortality, and disability connected to the nation’s number 1 killer, cardiovascular diseases (USDHHS, 1992).

The purpose of this paper is to promulgate the promise of self-administered interventions (SAIs) as a potentially valuable component in the mix of approaches used to influence large numbers of people at low cost and to address lifestyle behaviors related to cardiovascular diseases. An overview of SAIs is presented first, followed by both a literature review and a discussion of the advantages of SAIs.

SAIs

Overview

SAIs provide a viable public health education/promotion service delivery option and a means to enhance and augment prevention services. Rationale is provided for using SAIs independently and in series as a part of a sequential, systematic intervention mix. A poignant statement by C. Everett Koop summarizes a striking advantage for both consumers and service providers for incorporating SAIs within health care: ‘If the patient has all of the risks laid out, as well as all of the benefits, very well-controlled studies have shown the patient tends to choose ... low-cost treatments and is satisfied with the result, no matter what it is, because [he/she] chose it’ (Koop, 1992). SAIs are defined as interventions that are relatively simple, easily disseminated and require minimal provider assistance. A brief history is provided about how the interventions developed along with empirical support for each of the strategies.

Heuristic illustration

The focus of this paper concentrates on obesity as a heuristic illustration for several reasons. First, much of the developmental work pertaining to SAIs has been conducted in the field of weight management. Second, independent of problem application (see problem areas highlighted in italic within the text below), SAIs appear to be efficacious for many individuals in clinical and community settings, and from a population health perspective. Third, a literature review of each area in which SAIs have been applied would be prohibitive because of the abundance of research studies conducted. Fourth, obesity is resistant to change and if success can be demonstrated in this area, it would seem plausible that success can be demonstrated with problems of equal likelihood of treatment success and recidivism.

History

SAIs are based, in part, on research pertaining to ‘self-cure.’ The first self-cure study was conducted by Schachter (1982) to ascertain whether the general public lost weight without professional assistance and the degree of success they achieved. Schachter (1982) concluded that self-change may be common in the population at large. Other investigators (e.g. Orme and Binik, 1987; Rzewnicki and Forgays, 1987) whose purposes were different and research designs more rigorous were not as positive about their findings. They reported that self-initiated self-help interventions resulted in very modest success rates. Jeffery et al. (1984) offered a preview of what might be the best current estimate of the efficacy of self-cure. Findings based on 5551 subjects indicated that of those who reported being overweight previously, approximately one-third successfully reduced to...
ideal weight on their own. This was an unprecedented and shocking finding for those unfamiliar with the weight loss literature.

Self-change or self-cure, although similar to SAIs differ in that SAIs capitalize on philosophies and activities inherent in self-cure, but do so in a structured and organized way. SAIs involve assistance mediated or offered directly by a trained professional. There are two types of SAIs presented in this paper, minimal interventions and self-instruction.

**Minimal intervention (MI)**

As indicated above about SAIs in general, Mis capitalize on what people are presumed capable of accomplishing on their own with minimal help or assistance from professionals. MI can consist of a simplified series of verbal instructions that emphasize specific behavior change instructions for self-implementation. (There is no manual and professional involvement may include periodic written or telephone reports, or personal contacts to verify progress.) MI is defined as the simplest and least costly intervention that works (Hultsman et al., 1987; Black and Hultsman, 1988, 1989/90; DeLucia et al. 1989; Scogin et al., 1990; Black et al., 1991a; Black and Frauenknecht, 1997). Table I provides an example of an MI to illustrate its simplicity, especially in contrast to traditional forms of intervention.

Black and colleagues have conducted a series of studies that documented the promise of MI. These authors credited Kasl (1980) with introducing the concept of MI as part of a strategy for reducing cardiovascular disease behaviors. The philosophical and conceptual foundations of MI have been described in detail elsewhere and will not be reviewed here (Hultsman et al., 1987; Black and Hultsman, 1988, 1989/90; DeLucia et al. 1989; Scogin et al., 1990; Black et al., 1991a; Black and Frauenknecht, 1997).

A series of MI studies has suggested that some people can successfully lose weight with no more than a few specific guidelines, basic behavioral principles/strategies and minimal consultation with a professional. For example, Black et al. (1984) compared MI to brief behavioral weight loss interventions: those in the MI group lost an average of 11.1 pounds at a 7-month follow-up, while the net weight loss in three behavioral conditions where participants met in groups was between 6.3 and 7.8 pounds (differences in outcome across all groups including MI were not statistically significant). In another study in the same report, 66 people were randomly assigned to MI or to one of two comprehensive interventions. Although the MI participants' weight losses were modest over 10 weeks, by 6-month follow-up, the MI group and one of the behavioral groups had yielded comparable results, both of which were significantly better than the second behavioral intervention.

MI has been successfully applied in a variety of health-related problem areas. These areas are highlighted below and references are provided for readers interested in more details. In addition to those studies reviewed above pertaining to weight management, investigators have focused on smoking cessation (Dawley and Finkel, 1981; Fisher, 1982; Pechacek et al., 1983; Stachnik and Stoffelmayr, 1983; Nepps, 1984; Horwitz et al., 1985; Fisher and Rost, 1986; Price et al., 1991), problem drinking and alcoholism (Burnum, 1974; Emrick, 1975; Vogler et al., 1975; Edwards et al., 1977; Miller and Hester, 1986; Anderson and Scott, 1992; Reynolds et al., 1995), hypertension (Takala et al., 1979; Webb, 1980; Bertera and Bertera, 1981; Jeffery et al., 1983; Hovell et al., 1984; Kleinert et al., 1984; Jacob et al., 1985; Hovell et al., 1986; Campbell et al., 1995), and exercise (Brownell et al., 1980; Rodnick, 1982; Juneau et al., 1987; Rogers et al., 1987; King et al., 1988, 1991; Lee, 1992).

**Self-instruction (SI)**

SI refers to any intervention that includes formal materials, but does not require regular contact with a health professional. The program may be delivered through print, video tape, computer, audio tape, etc. Scogin et al. (1990) conducted a meta-analysis and concluded that with many types of presenting problems, SI may yield results comparable to face-to-face interventions. SI also
Self-administered interventions

Table 1. A community health example of the application of SAJs to moderate obesity

<table>
<thead>
<tr>
<th>Program</th>
<th>Components/health education specialist’s actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal intervention (MI)</td>
<td>Advertise/announce programs start.</td>
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<tr>
<td></td>
<td>Invite interested individuals to return a postcard to program sponsor in order to:</td>
</tr>
<tr>
<td></td>
<td>Signify interest.</td>
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<td></td>
<td>Permit inclusion on a mailing list/data base.</td>
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<td></td>
<td>Provide information about losing weight safely:</td>
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<td></td>
<td>Lose weight slowly and gradually, about 1% of total body mass per week.</td>
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<td></td>
<td>Eat a nutritious, well-balanced diet that complies with the Food Pyramid (USDAHNIS, 1992).</td>
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<td></td>
<td>Increase physical activity without necessarily engaging in strenuous exercise and reduce caloric intake, but not to less than 1000–1200 calories a day.</td>
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<tr>
<td></td>
<td>Adhere to the adage when selecting a diet, ‘If you can’t live with it, don’t start it.’</td>
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<td></td>
<td>Purchase and use a calorie counter, but above all else, practice reasonableness and safety in losing weight.</td>
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<td></td>
<td>Initiate daily self-monitoring of:</td>
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<td></td>
<td>Body weight.</td>
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<td></td>
<td>Caloric intake and expenditure.</td>
</tr>
<tr>
<td></td>
<td>Initiate graphing and note relationships among caloric intake, energy expenditure, weight regulation, and health parameters.</td>
</tr>
<tr>
<td></td>
<td>Secure monetary deposit to enhance commitment to complete intervention.</td>
</tr>
<tr>
<td>Self-instructional intervention (SI)</td>
<td>Supply weight loss educational materials for home use (printed or electronic) that emphasize problem solving and a behavioral approach.</td>
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<tr>
<td></td>
<td>Provide:</td>
</tr>
<tr>
<td></td>
<td>Assignments and quizzes.</td>
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<tr>
<td></td>
<td>Problem-solving forms.</td>
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<tr>
<td></td>
<td>Cognitive-restructuring exercise forms.</td>
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<tr>
<td></td>
<td>Continue daily self-monitoring of:</td>
</tr>
<tr>
<td></td>
<td>Body weight.</td>
</tr>
<tr>
<td></td>
<td>Caloric intake and expenditure.</td>
</tr>
<tr>
<td></td>
<td>Continue graphing and note relationships among caloric intake, energy expenditure, weight regulation and health parameters.</td>
</tr>
<tr>
<td></td>
<td>Secure another monetary deposit to enhance commitment to complete intervention.</td>
</tr>
</tbody>
</table>

has been used to support many types of behavior change (cf. Glasgow and Rosen, 1978, 1982; Rosen, 1987).

Clinical trials
Hagen (1974) was the first to demonstrate that SI could successfully promote weight loss. In Hagen’s (1974) pioneering study, female university students used a correspondence approach which required the completion of 10-weekly lessons and homework assignments. Those receiving this intervention lost more than controls and virtually the same amount of weight as participants who were enrolled in a provider-led group intervention. Three other studies (Hanson et al., 1976; Jeffery et al., 1982; Pezzot-Pearce et al., 1982) involved direct comparisons of face-to-face interventions with SI interventions. These studies were all small randomized controlled trials which noted considerable weight losses for SI, but none equivalent to amounts lost in traditional therapist-led groups. Subsequent research, however, demonstrated that SIs can be successfully used in community and clinical settings (Rozenisky and Bellack, 1976; Marston et al., 1977; Jeffery and Gerber, 1982; Baanders-Van Halewijn et al., 1984; Black and Threlfall, 1986; Schmid et al., 1989; Cameron et al., 1990; Dennison et al., 1996).
Jeffery (1995), Jeffery et al. (1990) and Schmid et al. (1989) reported results from a large-scale SI project. Invitations to participate in a weight loss correspondence program were mailed to 31,400 households in Bloomington, MN. A total of 1304 subjects participated in the study. The average measured weight change after 6 months was about 4 pounds in the first experimental condition and 8 pounds in a second. The SI approach yielded modest, but meaningful weight losses. These small changes in body weight are medically important for several reasons: (1) modest weight loss can produce significant positive changes in health parameters (e.g. Miller et al., 1993), even though body weight remains well above ideal (Abernathy and Black, 1996, 1997), (2) optimal health may occur at body mass indexes \([w(kg)/ht(m)^2]\) well above ideal (cf. Black et al., 1994), and (3) new hypotheses about the role and influence of body fat may change the focus that body weight alone is a major contributor to morbidity and mortality (Abernathy and Black, 1994).

SI interventions have been successfully applied in several problem areas. These areas are highlighted below in italic and, again, references are provided for interested readers. In addition to weight management (Hagen, 1974; Hanson et al., 1976; Rozensky and Bellack, 1976; Marston et al., 1977; Jeffery and Gerber, 1982; Jeffery, 1995; Jeffery et al., 1982, 1990; Pezzot-Pearce et al., 1982; Baanders-Van Halewijn et al., 1984; Black and Threlfall, 1986; Schmid et al., 1989; Cameron et al., 1990; Miller et al., 1993; Dennison et al., 1996), investigators have focused on smoking cessation (Winett, 1973; Sallis et al., 1985; Windsor et al., 1985; Daughton et al., 1986; Owen et al., 1989; Gruder et al., 1990; Jason et al., 1990, 1995; Orleans et al., 1991; Price et al., 1991; Gritz et al., 1992; Warnecke et al., 1992; Powell, 1993; Prochaska et al., 1993; Kviz et al., 1994; Rimer et al., 1994; Curry et al., 1995; Lillington et al., 1995; Stevens et al., 1995), problem drinking and alcoholism (Miller and Taylor, 1980; Miller et al., 1981; Miller, 1982; Miller and Baca, 1983; Harris and Miller, 1990; Heather et al., 1990; McMurrant and Boyle, 1990; Savage et al., 1990; Spivak et al., 1994; Burton and Williamson, 1995; Sanchez-Craig et al., 1996), and hypertension (Burnett et al., 1985).

MI and SI in sequence

Black (1987) used a clinical replication design with seven modestly obese women to investigate the potential of an MI and SI program in combination and separately. Subjects on average lost a modest amount of weight (2.92 pounds) on the MI program and there was great intersubject variability. All subjects continued with the SI program and on average lost an additional 14.79 pounds. At the end of 1-year follow-up, clinically significant weight losses were achieved; three subjects (43%) reached their calculated ideal weight and the average weight loss was 25.31 pounds. The study was one of the first to demonstrate in a clinical setting that subjects could achieve and maintain ideal weight following an intervention (in this case both MI and SI in sequence).

Using a different investigative strategy, Black and Threlfall (1986) provided 35 people with a MI for weight loss until their self-reported weight showed no or limited progress for three consecutive weeks or until they reported they could no longer make progress without assistance. At this point, participants received self-instructional problem-solving materials. Of the 35 people, 26 completed the program; four (15.4%), however, needed nothing more than MI: these four individuals lost an average of 30 pounds and all reached ideal weight by the end of the year. Twenty-two subjects needed both the MI and SI in sequence; 11 of them complied well with the SI program and lost an average of 30 pounds and all reached ideal weight by the end of the year. Twenty-two subjects needed both the MI and SI in sequence; 11 of them complied well with the SI program and lost 24.8 pounds, whereas 11 complied poorly and lost 15.7 pounds. High compliers lost significantly more weight than low compliers, and at the end of treatment and follow-up were significantly lower in percentage overweight.

Predicting success

After presenting MI and SI in sequence to obese participants, Black and Threlfall (1986) reported
that successful subjects who needed only MI tended to be middle-aged, initially less overweight and initially lost weight at a faster rate. Successful SI subjects were generally heavier, more overweight and younger than average. All but one of them were women and all were high compliers with intervention requirements.

Black (1989) also investigated predictive models for success in both the MI and SI phases, and during follow-up. The models for pounds lost and percentage overweight lost accounted for 33–62% of the variance. Previous success in losing weight predicted positive body weight changes during the two interventions and at follow-up. In addition, greater rate of weight loss in the first 5 weeks contributed to the model for MI and follow-up, and total number of calories expended in non-routine physical activity added to the model for MI. Marital dissatisfaction of subjects was a positive predictor for SI and follow-up.

These studies suggest many venues for future research. For example, what other intervention components/activities or specific behaviors predict success (e.g. completion and return of self-monitoring forms, dietary content, weighing daily)? Also, what attributional processes result in clients developing more internal locus of control, enhanced self-efficacy or perceived freedom, and how do these attributes lead to improved generalization and maintenance of behavior? Are SAIs additive in their effect and are certain procedures more effective for cumulative progress than others?

**Monetary deposit**

A monetary deposit was found to be an important motivational factor in MI and to result in more weight loss than if no deposit was paid. In a study by Black and Friesen (1983), deposit money was collected and returned contingent upon attendance at follow-up meetings. The amount of the deposit was relatively inconsequential (i.e. $25.00) and seemed less important than the payment itself. Requirement of payment may stimulate or increase a person’s intrinsic motivation to change behaviors (Lepper and Gilovich, 1981) and expectations of positive benefit may be enhanced because payment is usually associated with product or service of value (Stanton, 1976).

**Partners**

Involving a partner in both forms of SAIs, MI and SI, may be an advantage. Black et al. (1990) completed a meta-analysis of 12 studies that formally involved partners (spouses or significant others) in treatment. Based on tests of effect sizes, ‘couples’ interventions were significantly superior to those for subjects alone at post-intervention and approached statistical superiority \( P = 0.06 \) at 2–3-month follow-up, but not thereafter. The authors found that the type of support provided by a partner may be an important key. Spousal behaviors that provided esteem support (e.g. being proud, complimenting and encouraging) and instrumental support (e.g. helping with food preparation and other tasks, dieting with spouse, being involved, and buying clothes) were perceived by subjects as being most helpful in reducing weight. Informational support (e.g. giving information, thinking of things to do instead of eating, observing and confronting) had no effect.

**Integrating other theories and recruitment**

Any framework of service delivery that incorporates SAIs should demonstrate integration of other theoretical models and application to a variety of health problems. Central to provision of services is attracting subjects to participate in interventions, especially those individuals who are the least likely to do so, but are at the greatest risk.

Several studies that incorporate SAIs have been conducted related to recruitment of subjects, design of appealing programs and interventions offered in sequence for smoking cessation. A study by Babrow et al. (1990) was the first to integrate Ajzen’s (1985) Theory of Planned Behavior and SAIs along with more intensive interventions. Results of the study indicated that the most powerful predictor of intention to participate was attitude, followed by perceived normative expectation and...
control belief. Analysis of attitude-relevant beliefs indicated that interventions must target both expectancies for healthful outcomes of participation and evaluation of these outcomes. Further elaboration and refinements of these analyses were reported by Black and Babrow (1991). These authors focused on the introduction of both SAIs as well as more time-consuming and costly interventions. Interest in SAIs was significantly higher than interest in any other intervention including those representing traditional methods of health care service delivery (i.e. groups and individual meetings). Black et al. (1993) also conducted another study to identify audience variables with social marketing implications to attract university students to smoking cessation interventions. Results indicated that the best publicity options for SAIs were campus newspapers as well as grocery stores and gas station notices, where most cigarettes were purchased. Intervention design implications suggested that accessibility, affordability, convenience, flexibility, social support and behavioral prompts/cues were important factors to consider.

Black and Coster (1996) who analyzed the responses of university student drinkers found similar results to those for smokers. Again, there was more interest in SAIs than in more intensive interventions, although there was an overall lack of interest in all alcohol interventions, especially among heavy drinkers.

Black and Smith (1994) found similar social marketing results when examining recruitment variables for a MI alcohol abuse prevention intervention. Subsequently, Gries et al. (1995) utilized this information to design and implement interventions for university students. These investigators reported that social marketing theory strategies significantly increased the number of students recruited to MI programs.

Jeffery et al. (1990) and Schmid et al. (1989) used two different strategies to recruit subjects to a community trial SI program for weight loss. Recruitment occurred primarily by direct mail which included a 2-page enclosure describing the program and encouraging enrollment. The enclosures highlighted the benefits of the SI program: convenience, self-help and prior success. The major difference in the two recruitment approaches was the cost of the program. The same program was offered for $5 or $60. The $5 program fee was non-refundable, but the second program was essentially free, if the person met a self-determined weight loss goal that could not exceed 4 pounds a month. The non-refundable fee program was almost six times as popular as the totally refundable fee program. Again, it appears that a small fee is better than the risk of not meeting weight loss goals and ultimately paying more for the program.

**Advantages of SAIs from a health education/public health perspective**

As discussed by Rogers (1983), there are a number of factors that affect the rate of diffusion of innovations. Each of these characteristics are discussed below in relation to SAIs which meet Roger’s (1983) criteria for successful diffusion.

**Cost**

Cost is an important consideration in determining the value of an intervention and may result in a Type III error, especially if too high. Type III errors equate to the feasibility of an intervention (Windsor et al., 1994). For example, cost either enables or prohibits participation. Cost is an especially important issue if it is essential to reach lower socio-economic groups who tend to have high rates of health risk behaviors and low rates of program participation (cf. USDHHS, 1992). Costs are potentially reduced for participants in SAIs.

Health care providers are concerned about costs as well, but perhaps for a different reason. Professionals worry about time and the use of their time. The objective of SAIs is to use professional time sparingly and in an efficient, effective manner compared to more intensive interventions because the demand is less on the provider (Hultsman et al., 1987; Black and Hultsman, 1988, 1989/90; DeLucia et al., 1989; Black et al., 1991a). SAIs can incorporate trained volunteers or peer helpers as a viable way to provide ongoing services at reduced or minimal costs. Black and Scott (1996)
have developed a framework that addresses collaboration between peer helpers and health professionals, and levels of interventions. Utilizing trained volunteers and low-cost interventions also is emerging as a method to address many problems confronting society including responsiveness to the needs of the increasing numbers of senescent members (Wicks et al., 1996).

Efficiency
Efficiency translates into providing the minimal amount of intervention necessary to produce a positive health outcome. It is wasteful to offer an intervention to someone who could succeed with a much simpler, less intrusive and cheaper one which is not the practice in today’s health care system. Only when a simpler intervention is ineffective should a more intensive intervention be considered. SAIs are less intensive and can be used before and often in place of more elaborate interventions.

Convenience
Convenience means minimal disruption or interference with activities perceived to be important to meet daily demands. Didactic health education often requires adjusting schedules and sacrificing the time necessary to meet other obligations. SAIs require a smaller time demand and offer more scheduling flexibility.

Convenience is related to the ease of dissemination or diffusion of an intervention. According to Rogers (1983), diffusion is the process of transmitting innovations through certain communication channels to members of a social system. Diffusion also can be increased through simplicity, compatibility, relative advantage, observability and trialability; all of which are satisfied by SAIs.

Transferability
Another important criterion for evaluation of an intervention is the ability to pass an intervention along to others. This feature has several potential advantages. Materials may be given to associates who wish to use them to modify their behavior. Shared use may have a ‘multiplier effect’ in that the potential exits to increase the number of people served. For example, Black and Threlfall (1989) included subjects and partners in an obesity intervention where two SAIs were offered in sequence. The authors found that both overweight and normal weight partners lost weight incidentally, which was surprising because partners were not enrolled or expected to lose weight. A shared intervention to lose weight also may be motivational because two people can share the experience to include the trials, tribulations and successes of behavior change (cf. Black and Threlfall, 1989; Black et al., 1990).

Technology
Advanced technology involves a combination of computer and communication strategies that will make it possible to reach citizens in their homes using highly engaging, low-cost delivery systems (Black and Scott, 1997). Today, over 50 million personal computers along with thousands of varieties of software are available to meet the challenges of daily living. Computer networks now link millions of users together for exchanges of scientific and technological data as well as to share information about topics from entertainment and travel to complex computational modeling.

SAIs combined with computer and communication technology offer enormous potential for the development and delivery of health education. Technological methods incorporating SAIs could be used to reach under-served populations such as those in rural locations, culturally and linguistically diverse individuals, and those with special needs due to physical or mental impairment. Another benefit of combining technology and SAIs is that the content of interventions can be modified and upgraded quickly to reflect the latest changes in philosophy and research findings.

Preference
Preference is providing what consumers want. Formative research indicates that among people wishing to lose weight, 50% preferred to do so independently, 33% expressed interest in assistance through print media, 10% wanted consultations with health professionals, 5% preferred weight
loss classes and 2% indicated interest in other approaches (Rogers, 1980). Approximately 60% of those applying for a correspondence program to quit smoking or to lose weight indicated they preferred SAIs (Jeffery et al., 1982). Jeffery et al. (1984) also found in a large cross-sectional study that slightly more than 60% preferred SAIs and used simple low calorie regimens to lose weight. In addition, 75.7% of the overweight female respondents in a breast cancer screening program who were offered weight loss options favored SAIs (Baanders-Van Halewijn et al., 1984).

Reapplication

Another important feature is the capability to reapply or repeat an intervention, if needed. Multiple use of any intervention including SAIs or clinician-guided interventions may be important options in improving health. For example, repeated attempts at self-dieting exclusively or intermixed with formal interventions produced less cumulative weight gain over two extensive time series than if weight loss attempts had not been initiated (Black et al., 1991b).

There are two additional factors important to diffusion of innovations. Each of these characteristics is presented below.

Reach

From a population health perspective, reach or the number of people impacted is fundamental to an intervention’s potential efficacy. An intervention with a high success rate, but low reach is of limited value compared to an intervention with a more modest success rate but a much broader reach (cf. Browner et al., 1988; Hovell and Black, 1989; Gries et al., 1995). For example, imagine an obesity intervention for Type II diabetics who are hypertensive that yields a success rate of 40%. Suppose that a professional was able to work with 100 patients per year, and of these patients, 40 were no longer diabetic and their blood pressure became normotensive. Contrast this with a situation where the provider makes the same investment in a SAI that reaches 1000 high-risk individuals per year. The success rate would only need to be 4% in order to match the outcome of the more intensive intervention.

Health

It is important to select an intervention that will produce sufficient change to improve health. As suggested earlier, often if improved health (versus esthetics) is the objective, only a modicum of change is necessary. Several studies have shown that a modest weight loss (usually about 10% of total body mass) will return weight-related indicators of health risk (e.g. blood pressure, cholesterol and insulin) to normal, even among obese people who remain well above their desired weight and percent body fat levels (e.g. Eliahou et al., 1992; Goldstein, 1992). SAIs have been shown to produce weight losses sufficient enough to positively change health parameters (e.g. Black and Threlfall, 1986; Black, 1987). In addition, reduced food intake, especially saturated fat, increased physical activity and a modest weight loss may improve the functional status of fat cells and lower health risk. Health benefits may occur because fat cells regain buffering capacity by again being able to store excess levels of glucose and lipids circulating in the blood that cause damage (Abernathy and Black, 1994).

Summary

Each of the factors presented in the prior section can be satisfied by incorporating self-administered interventions within a comprehensive health education/promotion armamentarium of service delivery. The studies reviewed along with justification provided from a public health perspective suggest that SAIs have a vital place in health promotion and disease prevention, address issues identified related to the emerging health care system presented in the Pew reports, and may be a prudent consideration for MCOs interested in prevention and the delicate balance between cost and quality of care. SAIs are both clinical and ‘population-based’ strategies, and are viable alternatives to ‘usual care’ because they offer a means to enhance reach, efficiency and efficacy when used independently or as part of
a sequential, systematic intervention mix. These interventions are preferred by the public, tap into the natural inclination of individuals to administer to their own needs and to act as independent health care agents until it is necessary for more assistance or the application of more intensive interventions. Research has demonstrated that the public has made an informed choice in selecting SAIs because their efficacy is satisfactory and, in some cases, equivalent and even superior to more intensive interventions. From a research perspective, SAIs also address important theoretical/philosophical issues and can easily accommodate other theoretical models. SAIs are well positioned to help achieve a new level of health competence and equity in America, and to reinforce the shared responsibility for the production of individualized health care as well as its consumption at the clinical and community level.

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Self-administered interventions


Self-administered interventions


