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Consumer Incentives for Healthy Behavior*

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We focus on incentives for participation in health promotion and disease prevention activities among these various types of consumer financial incentives. A comprehensive search was conducted using a multistage process including MEDLINE, Econlit, and Google scholar. The initial search used the following keywords: incentive, preventive health services, health promotion, consumer, and combined terms. This literature search focused on the period from 1997 to 2015 and identified 38 studies. Prevention intervention programs involving financial incentives were classified as simple versus complex. Both simple and complex consumer incentives aimed to encourage participation in prevention activities showed significant short-term effects.

JEL Classification: I11, I15, L22

Keywords: incentive, preventive health services, health promotion

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1. INTRODUCTION

"Consumer financial incentives in health care" is a very broad topic addressed by a vast collection of relevant literature. Consumer financial incentives could conceivably refer to virtually any point in the health care system where consumer decisions are influenced by money. For example, a deductible or copayment could be considered a financial incentive that influences the consumer's decision to see a doctor. The method of setting employer contributions to health plan premiums in firms that offer multiple plans to employees could also be considered a financial incentive that encourages or dampens price competition among health plans. Even the tax deductibility of health plan premiums and out-of-pocket payments under Section 125 of the Internal Revenue Code could be viewed as a financial incentive that affects health plan choices and the consumption of health care services.

Among these various types of consumer financial incentives, this review focuses on incentives for participation in health promotion and disease prevention activities. Preventable illness accounts for around 70 percent of total disease (Healthy People, 2010). Some studies have estimated that half of all deaths in the US are caused by modifiable behavior risk factors and behavior patterns (McGinnis, 2001; McGinnis & Foege, 1993; Mokdad *et al*., 2004). Given the fact that modifiable health risk factors could reduce the disease burden of obesity, diabetes and other related diseases (AHRQ, 2007), understanding what types of incentives can encourage consumers to participate in health promotion and disease prevention activities and how incentives can contribute to improvements in consumer health is important for policy decisions on the implementation of consumer incentives.

Sutherland, Leatherman, and Christianson (2008) provide a classification of consumer-targeted incentives that begins with adherence to treatment and recommended care versus incentives to change lifestyle behavior. The former

category includes cancer screening and follow-up, vaccinations, tuberculosis (TB) treatment and diagnosis, pre- and post-natal care, and HIV testing and sexual health care, while the latter category includes reducing road injuries, exercise, diet and weight loss, and smoking cessation. This review covers both categories of interventions. While these interventions have received a great deal of attention in the literature, much of the literature has evaluated the effectiveness of these interventions rather than the effect of financial incentives (defined either as a reward offered to patients to influence their behaviors in particular ways or as a penalty for failing to do so) on consumer's decisions to participate in or successfully complete the activities. Nonetheless, health plans and policymakers continue to attempt to influence these health-related consumer decisions with a wide variety of financial incentives (Dudley *et al*., 2007). Therefore, this current review focuses on financial incentives which affect consumer decisions to participate in health promotion activities.

2. METHODS

2.1. Inclusion and Exclusion Criteria

A comprehensive search was conducted using a multistage process including MEDLINE, Econlit, and Google scholar. The initial search used the following keywords: incentive, preventive health services, health promotion, consumer, and combined terms. This literature search focused on the period from 1997 to 2015 and identified 38 studies. The following research design inclusion criteria were applied: quasi-experiment (pre- and post-treatment measures with a non-randomized treatment and control group); true experiment (pre- and post-treatment measures with randomized treatment and control group); and non-experimental design (pre- and post-treatment measures, but no control group). Exclusion criteria were research projects conducted outside the US and before

1997.

2.2. Summary of the Studies

Preventive care can be defined as care applicable to people who consider themselves physically at risk, but have not yet been identified with a diagnosis (Healthy People, 2010). It includes health promotion programs for changing behavior as well as preventive services. These programs cover a wide variety of activities ranging from one-time vaccinations to complex behavior change (Kane *et al*., 2004). "Behavior change" interventions target activities such as smoking cessation, weight loss, and exercise, whereas "preventive service" interventions target physiological measures such as high blood pressure, high cholesterol, and Hb1ac.

Only a small number of studies link financial incentives to preventive care. Only thirty-five studies justified the design of the chosen economic incentive and tested the uptake of an incentive. The type and size of the consumer incentives offered in the studies were as follows: three lotteries, two gifts, fourteen cash incentives, seven coupons for free or reduced price goods or nonmedical services, six free or reduced price medical services, one incentive involving negative reinforcement, and one offering grade bonus points (Tables 1 and 2).

The interventions in these studies can be classified into two broad categories: simple and complex. Simple versus complex interventions differ in the time horizon of the behavior required of consumers. Simple preventive concerns are discrete situations including an endpoint for the specific targeted behavior, such as attending a smoking cessation program, while complex interventions involve behavior that must be sustained over time, such as smoking cessation (Kane *et al*., 2004).

Ten articles addressed simple preventive care and twenty-five addressed complex preventive care. Among the studies of simple interventions, there were

Table 1 Simple Classification (Discrete Situations Including an Endpoint for the Specific Targeted Behavior, such as Attending a Smoking Cessation Program)

Article	Outcomes	Research Design	Population	Prevention Target	Intervention	Outcome
Chloe, 2008	Public health	Random design	Older teenagers in schools	Condom use	Lottery	Significant Findings: * The intervention promoted six of eight measured cognitions: (1) attitude towards using condoms with a new partner, (2) attitude towards using condoms with a steady partner, (3) normative beliefs in relation to preparatory actions, (4) self-efficacy in relation to both preparatory actions and (5) condom use, (6) intention to use condoms as well as three measured preparatory actions: purchasing condoms, carrying condoms and discussing condom use

Dahl *et al*., 1999	Public health	Quasi-experimental	Sexually active young adults, age 18-30	STD prevention	Coupon	Significant Findings: * Widespread disbursement redemption rate: 0 for 10% discount coupons vs. 13 for 75% off coupons
Hutchins *et al*., 1999	Public health	Randomized, controlled trial	Children (WIC)	Immunization	Food voucher	Significant findings: * For the incentive group, a 10% and 23% coverage increase at the first and second birthday, respectively. However, 4% and 9% decline in control group
Kamb *et al*., 1998	Public health	Quasi-experimental	Patients attending five inner-city STD clinics	HIV/STD prevention	Cash/Coupon	Significant Findings: * Participation rate (coupon incentives - 46%, cash incentives - 67%)
Kerpelman *et al*., 2000	Public health	Randomized	Low-income preschool children	Immunization	Lose benefits	Significant Findings: * Group with sanctions had higher coverage (6-7% points) for all five vaccines for over five years

Simple Classification (Continued)

Article	Outcomes	Research Design	Population	Prevention Target	Intervention	Outcome
Kaplan *et al*., 2000	Long-term care and chronic care	Quasi-experimental	Low SES, majority Hispanic, female patients of Los Angeles County Department of Health Services	Follow-up after abnormal Pap	Fee bus passes & voucher	No significant difference between groups
Malotte *et al*., 1998	Public health	Random design	Active drug users from Long Beach, California, with no previous TB history	Tuberculosis screening	Cash incentive	Significant Findings: * Odds ratio for $5 incentive to control group =11.2 * Odds ratio for $10 incentive to control group =24.5 * Education was not significant

Malotte *et al*., 1999	Public health	Random design	Active drug users from Long Beach, California, with no previous TB history	Tuberculosis screening	Cash incentive, gift certificate, free bus passes or fast food coupons	Significant Findings: * Percent returned on time for reading: Control group - 49%, Cash incentive group - 95%, Grocery incentive group - 86%, Choice of bus pass or fast-food chain coupon group - 83%, 5-10 minute motivational education group - 47%
Nexoe *et al.*, 1997	Public health	Randomized	65 years or older	Immunization	Free flu shots	Significant Findings: * Increase in vaccination rate * Vaccination rate: Control group - 25%, Invitation letter group - 49%, Invitation letter + free shot group - 72%
Satterthwaite *et al*., 1997	Public health	Randomized	Patients over 65 years	Immunization	Free flu shots	Significant Findings: * Increase in vaccination rate * Vaccination rate: Control group - 17%, Invitation letter group - 27%, Invitation letter +free shot group - 45%

Table 2 Complex Classification (Behaviors That Must Be Sustained Over Time, such as Smoking Cessation)

Article	Research Design	Population	Prevention Target	Intervention	Outcome
Anderson *et al*., 2001	Randomized design	Low income women (WIC & Community Action Agency)	Nutrition	Coupons: fresh produce from Farmers' markets, $20 total	Significant findings: * Consumption of fruit and vegetable increased * Education also had effective results
Aldana *et al*., 2004	Quasi-experimental pre/post design	6,246 employees in Washoe County School District	Multiple	Cash	Significant effects: * Intervention groups missed three days fewer than control group * Translated to $15.6 for every day spent on the program
Burton *et al*., 1998	Test/retest	53 employees first Chicago NBD bank	Diabetes	Glucose monitor and a box lunch with nutritional content	Significant effects: * Decrease in mean fasting blood glucose levels by 18.2% points * Decrease in mean glycol hemoglobin by 1.4% points * Decrease in mean hemoglobin A1C by 0.7% points
DeVahl *et al*., 2005	Randomized design	210 college students	Exercise	Bonus grade points	Significant findings: * Group with the course grade bonus showed better exercise adherence and lost more body fat than those who were offered a single exam bonus

Dey *et al*., 1999	Randomized design	Patients, aged 25-64, who smoked more than 15 cigarettes per day and expressed interest in quitting	Smoking cessation	Free nicotine patches for 12 weeks	No significant difference between groups
Finkelstein *et al*., 2007	Randomized design	Overweight and obese employees from one university and three community colleagues in North Carolina	Weight-loss program	Cash ($7 and $14 Per percentage point of weight lost)	Significant effects: * No incentives: lost 2 pounds * $7 incentive: lost 3 pounds * $14 incentive: lost 4.7 pounds However, no long-term impact

Complex Classification (Continued)

Article	Research Design	Population	Prevention Target	Intervention	Outcome
Harland *et al*., 1999	Randomized design	523 adults aged 40 to 64 years Patient list of GPs located in SES disadvantaged area, 40-64-year-olds not previously engaged in an exercise program	Exercise	Coupons for free use of fitness center	No significant effect of vouchers * Regression analysis showed interaction effect between vouchers and interview * No long-term effects
Hennrikus *et al*., 2002	Pre/post design	Employees	Smoking	Cash	Significant findings: * Enrollment Incentive group: 22.4% Control group: 11.9% * However, increased registration did not translate into an increased cessation rate
Jayne *et al*., 2004	Randomized design	Students in secondary schools	Nutrition	Monetary incentives ($25 to $300)	Significant findings: * Lower-fat food sales increased in the first and second year

Jeffery *et al*., 1998	Randomized design	228 men and 594 women General population at two sites, Twin Cities Minnesota, and Pittsburgh, Pennsylvania	Weight-loss program	Cash incentive	No significant findings for incentives * Self-reported exercise behavior * Body weight * Exercise session attendance
Jeffery *et al*., 1999	Randomized design	228 men and 998 women in the Twin City metro area, Also targeted women on WIC	Obesity prevention	Lottery	Significant findings: Response rate of returned postcards * Standard behavioral therapy + monthly educational newsletter - 65%, * Standard behavioral therapy + monthly educational newsletter + lottery - 71% * No significant differences in weight gain or behavior

Complex Classification (Continued)

Article	Research Design	Population	Prevention Target	Intervention	Outcome
Kevin *et al*., 2006	Randomized design	Patients in a VA hospital	Smoking	Cash	Significant findings: -Enrollment * Intervention group: 43.3% * Control group: 20.2% -Cessation rate * Intervention group: 25.8% * Control group: 12.2%
Michels *et al*., 2008	Non-randomized intervention study	Public health students, faculty, and school staff and workers from the medical campus at Harvard University	Nutrition	Discount price	Significant findings: -During the intervention: * Consumption of healthy foods: 6% increase * Less-healthy foods: 2% decline - Five-week follow-up period: * Consumption of healthy foods: 17% increase * Less-healthy foods: 2% decline
Nyman *et al*., 2008	Quasi experimental	Employees of University of Minnesota	Multiple	Cash	Significant effects: - DM significantly reduced expenditures. * Cost saving: $1,266 per year per Employee

O'Connor *et al*., 2006	Non-experimental, no control group	Smokers in NY	Smoking	Lottery	Significant findings: * 9 of 10 reported attempting to quit smoking * Quit smoking for the full month: between 53% and 72%
Ozminkowski *et al*., 1999	Quasi experimental, pre/post	22,838 Citibank employees	Multiple	$10 credit medical benefit	Significant effect: * ROI: between $4.56 and $4.73 saved per dollar spent on the program
Ozminkowski *et al*., 2000	Quasi experimental, pre/post	9,234 Citibank employees	Multiple	$10 credit medical benefit	Significant effects: * Health risk assessment: significant improvement in seatbelt use, exercise habits, fiber intake, stress levels, fat intake, salt intake, cigarette use, and diastolic blood pressure * High risk program: the net impact of exercise pattern, seatbelt use, stress levels and body mass index was a 4.3% reduction

Complex Classification (Continued)

Article	Research Design	Population	Prevention Target	Intervention	Outcome
Ozminkowski *et al*., 2002	Retrospective pre/post, no control group	18,331 domestic US employees at Johnson & Johnson	Multiple	$500 benefit credits	Significant effects: * Decline in inpatient use, mental health visits, and outpatient visits * Savings of medical care expenditures up to $224.66 per employee per year over the 4-year program period
Goetzel *et al*., 2002	Pre- and post-test cohort design, no control group	4,586 Johnson & Johnson employees	Multiple	$500 benefit credits	Significant effects: * Health risk assessment: significant improvement in serum cholesterol, dietary fiber intake, exercise habits, cigarette smoking, blood pressure, seat belt use, drinking and driving, and snuff use *High risk program: significant effect on fat intake, body weight, aerobic exercise, diabetes risk, total cholesterol, and blood pressure
Poole *et al*., 2001	Quasi experimental, prospective cohort design	2,540 employees of Salt Lake County in Utah	Multiple	Cash based on points	Significant effects: * Improvements in body fat, cholesterol, systolic and diastolic blood pressure, seat belt use, and overall physical health

Serxner *et al*., 2001	Quasi-experimental, multi time-series design	1,628 employees at a large telecommunications company	Short-term disability	Cash	Significant effects: * Intervention group: average net days lost decreased by 1.4 days from 29.2 * Cost savings: $1,371,600 over a 2-year period
Shepich *et al*., 2007	Randomized design	132 participants suffering from a variety of medical conditions	Exercise	Subsidized fees	Significant findings: Increase in number of workouts * Fully subsidized patients: 21.41 workouts * Partially subsidized patients: 16.67 workouts * Researcher-monitored participants: 22.14 * Self-monitored participants: 15.96
Stave *et al*., 2003	Quasi experimental, pre/post	6,049 GlaxoSmithKline employees	Multiple	Cash based on points	Significant effect: * Total benefit cost saving: $613 per participant on average

Complex Classification (Continued)

Article	Research Design	Population	Prevention Target	Intervention	Outcome
Yancey *et al*., 2006	Randomized design	366 obese African American women	Exercise	Cash	Significant effects: * Between-group: Weight stability in the intervention group at 2 months compared with controls, but this trend disappeared at 12 months. * Within-group: Control group: 1.9 min workout increase Intervention group: 2.3 min workout increase No long-term incentive impact
Sutherland *et al*., 2008	A review of economic incentives for patient adherence to treatment and recommended care and changes in lifestyle behaviors				* Financial incentives can work to bring about discrete, one-off changes in patient behavior * There is insufficient evidence to say that financial incentives can affect complex behavior change
Kevin *et al*., 2009	Randomized, controlled trial	878 employees of a multinational company	Smoking cessation	Cash	* Incentive group had significantly higher rates of smoking cessation than did the information-only group * Incentive-group participants also had significantly higher rates of enrollment in a smoking cessation program, completion of a smoking cessation program, and smoking cessation within the first 6 months after enrollment

Merrill *et al*., 2011	Retrospective	45 employees	Multiple	Free screening and cash	* Healthy Lifestyle Incentive Program (HLIP) resulted in substantial health care cost savings for the Salt Lake County Government
Nyman *et al*., 2012	Retrospective	6,146 unique individuals	Multiple	Discount price	* 1.76 return on investment occurred in the third year of operation generated solely by disease management program participation for reducing health care expenditures

four studies on immunizations, three studies on cancer and TB screening, and three studies examined HIV and sexually transmitted diseases (STDs), including condom use (Table 1). Among the studies of complex interventions, there were four studies on smoking cessation, seven on exercise, obesity and weight loss, three on nutrition/food, nine on multiple targets, one on diabetes and one review of reviews (Table 2).

Interestingly, studies of simple interventions were more likely to focus on low socioeconomic status populations (five of ten) and target only one outcome, such as immunization, cancer or TB screening, or HIV/STD testing. Studies of complex interventions were more likely to recruit subjects from work sites or the general population and to focus on multiple health-related behaviors.

Six policy areas were identified as special topics of concern for these reviews: long-term and chronic care, public health, social services, private non-profit agencies, mental health, and oral health. Out of thirty-four articles, three articles were related to long-term care (Kaplan *et al*., 2000; Jeffery *et al*., 1999; Burton *et al*., 1998). The other thirty-one articles dealt with public health issues such as smoking cessation, vaccination, nutrition, exercise or a combination of these issues. Only two articles (Ozminkowski *et al*., 2000; Ozminkowski *et al*., 2002) included mental health as one of their utilization outcomes.

2.3. Do Incentives Work?

2.3.1. Simple interventions

Of the ten studies of simple interventions, nine found significant effects for financial incentives (Table 1). Four immunization studies focused on a vulnerable population, such as children or the elderly. Three studies (Hutchins *et al*., 1999; Satterthwaite *et al*., 1997; Nexoe *et al*., 1997) used financial incentives to encourage vaccination, but one study used a monetary penalty (Kerpelman *et*

al., 2000). Financial incentives (food voucher and free flu shots) resulted in a significant increase in vaccination rates for the intervention group compared to the control group. Two studies found that interventions with incentives were more effective compared to interventions without incentives (Satterthwaite *et al*., 1997; Nexoe *et al*., 1997). Both of the latter studies demonstrated that the vaccination rate was higher when subjects received both an invitation letter and a free flu shot as opposed to an invitation letter alone. Kerpelman *et al*. (2000) found that a monetary penalty in a population receiving welfare benefits also stimulated a significant increase in childhood immunization rates.

Three studies (Chloe, 2008; Kamb *et al*., 1998; Dahl *et al*., 1999) assessed whether incentives motivate a change in risky behaviors related to HIV/STDs. Cash and coupons were used as incentives for young adults and teenagers to participate in and complete counseling and other public health interventions programs. The authors found that large monetary incentives had a greater effect on enrollment and participation compared to non-monetary incentives of similar value or lower monetary incentives. None of the incentives adversely affected the subjects' motivation to change behavior.

Three studies examined the effect of incentives on screening such as TB skin and Pap smear testing (Malotte *et al*., 1998; Malotte *et al*., 1999; Kaplan *et al*., 2000). The study populations were drug users and Hispanic females. Monetary incentives dramatically increased the return rate for TB skin test reading among drug users who were at high risk of TB infection (Malotte *et al*., 1998; Malotte *et al*., 1999). Like previous HIV and STD studies, nonmonetary incentives were somewhat less effective than monetary incentives. For example, an educational intervention was not effective in a study by Malotte *et al*. (1998) with a sample size of 1,004. On the other hand, Kaplan *et al*. (2000) found that incentives did not affect compliance with follow-up visits, but concluded that the results might be due to greater difficulties with measurement.

Thus, in simple preventive interventions, financial incentives, including

penalties, were effective in encouraging participation in prevention programs. Monetary incentives were more effective compared to non-monetary incentives of similar amounts. The results were less encouraging for other interventions (mail or education) with monetary incentives.

2.3.2. Complex interventions

Complex preventive interventions target both short-term actions by participants as well as longer term changes in behavior. Four smoking studies (Dey *et al*., 1999; Hennrikus *et al*., 2002; Kevin *et al*., 2006; O'Connor *et al*., 2006) examined both participation in a smoking cessation program and actual smoking cessation. Two studies (Hennrikus *et al*., 2002; Kevin *et al*., 2006) found a significant effect of incentives on program enrollment, but only Kevin *et al*. (2006) found that increased enrollment translated into increased cessation. O'Connor *et al*. (2006) found that smoking cessation increased with financial incentives, but unfortunately the study did not have a control group. Dey *et al*. (1999) did not show any significant effect of incentives, but that study may have been subject to sample selection bias, because only subjects who had expressed interest in smoking cessation were included.

Two weight loss/obesity studies (Jeffery *et al*., 1998; Jeffery *et al*., 1999) did not show significant effects of financial incentives. Jeffery *et al*. (1998) coupled financial incentives with exercise supervisors and personal trainers, while Jeffery *et al*. (1999) had only an educational newsletter as an incentive. The failure of incentives to produce significant results in these studies may be a problem of sample selection, since the study samples were recruited through newspapers and flyers and were likely to have consisted of motivated subjects who did not require further financial incentives. In a similar study, however, Finkelstein *et al*. (2007) confirmed that larger financial incentives led to greater weight loss in the short term. There were no long-term impacts in their study.

Four studies on exercise (Shepich *et al*., 2007; DeVahl *et al*., 2005; Harland *et al*., 1999; Yancey *et al*., 2006) compared the intensity of financial incentives with behavior change. However, only three studies (Shepich *et al*., 2007; DeVahl *et al*., 2005; Harland *et al*., 1999) found that greater financial incentives led to greater adherence to exercise regimens, and again, the effects were short-term. Yancey *et al*. (2006) found mixed effects of incentives. They studied the effect of a targeted nutrition and physical activity intervention on body composition and found that the intervention group showed a decline in body weight at 2 months, while the control group's exercise time increased by 0.4 minutes compared to the intervention group. Also, the authors found a significant effect of intervention on exercise time at 2 months, but the trend changed and showed a significant advantage in the control group by 12 months.

Three nutrition studies (Anderson *et al*., 2001; Jayne *et al*., 2004; Michels *et al*., 2008) showed a significant effect of financial incentives on the consumption of healthy food, but only one study (Michels *et al*., 2008) addressed long-term effects. Michels *et al*. (2008) studied the consumption of healthy food after subsidization. The consumption of healthy food increased to seventeen percent with a persistent two percent decline in the consumption of less healthy foods. Unlike the results of Malotte *et al*. (1998), which found no significant effects of health education materials on screening, Anderson *et al*. (2001) demonstrated that health education materials supplemented with a coupon improved attitudes and beliefs regarding fruit and vegetable consumption.

Due to rapidly growing health care costs among their employees, employers have become more interested in health promotion programs and workplaces have become an attractive setting for the evaluation of complex interventions. Since company productivity can be improved by keeping the workers in good health, the goals of health promotion are congruent with the objectives of organizations. The indirect cost of poor health in terms of lost worker productivity represents billions of dollars a year (*Harvard Business Review*, 2004), much higher than the

direct costs of medical care. Workplace health promotion and disease prevention programs have targeted multiple outcomes such as tobacco use, nutrition, management of diabetes, high cholesterol, and high blood pressure. In most cases, health assessment surveys are conducted to assess the current status of employees. Respondents with high levels of risk factors are then referred to a high risk group. Nine studies addressed work site health promotion programs in the current review.

Burton *et al*. (1998) focused on diabetes control among employees of the First Chicago NBD bank. Free glucose monitoring and a nutritional box lunch were offered to employees to encourage participation. Participants then received three months of educational programs. They demonstrated that an education program significantly improved control of the disease. The means of fasting blood glucose, glycol hemoglobin and hemoglobin A1C level were all decreased. Although the results from this study were encouraging, only forty-five employees were included.

One study of short-term disability (Serxner *et al*., 2001) showed that the average net days lost from work decreased by twenty percent after the introduction of a health promotion program that provided reimbursement of up to $450 per year for fitness and wellness activities. The decrease in lost days translated into a savings of $1,371,600 over a 2-year period.

Seven workplace health promotion programs (Aldana *et al*., 2001; Goetzel *et al*., 2002; Ozminkowski *et al*., 1999; Ozminkowski *et al*., 2000; Ozminkowski *et al*., 2002; Stave *et al*., 2003; Poole *et al*., 2001; Kevin *et al.*, 2009; Merrill *et al*., 2011; Nyman *et al.*, 2012) had multiple outcome targets. Their interventions targeted several behaviors simultaneously, including exercise, weight loss, smoking cessation, nutrition, high fat intake, high body weight, diabetes, high total cholesterol, and high blood pressure. These studies examined the effects of health risk assessment programs and high risk behavior interventions on the health outcomes of employees, and all showed the significant behavior change

effects for both health risk assessments and high risk interventions.

Generally, the complex interventions were effective, at least in the short term. Sutherland, Leatherman, and Christianson (2008) also observed similar findings in their review of intervention reviews. They focused on improving patient adherence to treatment and recommended care, as well as changing lifestyle behaviors. They looked at financial incentives such as prizes, payments and vouchers and asked whether these incentives were effective across diverse clinical and public health outcomes. Fifteen systematic reviews and ten individual studies focused on patient adherence to treatment and recommended care including vaccinations, cancer screening, tuberculosis diagnosis and treatment, prenatal and postnatal care and HIV and sexual health interventions. Among studies of lifestyle behaviors, seventeen systematic reviews and nine individual examined outcomes that included exercise, diet and weight loss, smoking cessation and reduction of road injuries. Their review indicated that financial incentives designed to increase compliance with recommended preventive care may be an effective and relatively inexpensive way to achieve desired goals in simple interventions. There was also evidence that complex interventions could produce temporary improvements, but not sustained changes in behavior.

The authors also concluded that the design of incentives should incorporate a broad understanding of the motivations and circumstances of the patients. Finally, they found that removing perceived economic barriers like transportation costs could encourage behavior change in those who were motivated to change, but discouraged by cost concerns.

2.4. What Exactly Did the Financial Incentives Reward?

Some studies offered financial incentives merely for participating in a program, while others required consumers to show progress such as completing an

education program or achieving the targeted outcome. While some studies used one incentive, others applied two incentives such as monetary and non-monetary incentives or two monetary incentives.

Among studies offering only one incentive, nine studies provided incentives for participation, six for program completion, and five for achieving the targeted goals. Only one study of each type of incentive found no effective results (Dey *et al*., 1999; Jeffery *et al*., 1998; Harland *et al*., 1999).

In the studies offering two incentives, Hennrikus *et al*. (2002) designed two monetary incentives. Participants received ten dollars for joining a cessation program and twenty dollars for completing three-fourths of the program. As noted earlier, the authors found that the incentives nearly doubled the rate of enrollment in the smoking cessation program compared to the no-incentives group, but increased enrollment did not translate into an increased cessation rate. In other words, the first incentive was effective, but the second incentive was not.

Kevin *et al*. (2006) also offered two monetary incentives, but at different points of participation. Twenty dollars was offered for each class attended and $100 if participants had quit smoking thirty days after completion of the program. They showed that the incentive group had higher rates of program enrollment (43.3 percent versus 20.2 percent) and completion (25.8 percent versus 12.2 percent). On the other hand, Burton *et al*. (1998) applied monetary incentives to encourage people to participate in a program and other non-monetary incentives (education) to modify targeted behaviors. Both incentives were effective even though the second incentive was not financial.

Thus, the literature suggests that, in complex interventions, the point at which incentives are applied is important. Since few studies have focused on variation in the application point, there is insufficient evidence to provide clear guidance. Studies offering one incentive showed mixed results regarding the point at which the incentive was offered, but only one study offering two financial incentive studies found that a second level of incentives helped participants achieve their

goal. Additional evidence is needed and, currently, the best advice might be to replicate the strategies of successful studies.

2.5. Cost-effectiveness of Economic Incentive Interventions

Cost-effectiveness in prevention is defined either as achieving a given preventive target at a lower cost through one intervention versus another, or achieving a greater improvement in health for the same cost (Kane *et al*., 2004). Only seven of the thirty-four studies included cost-effectiveness calculations and most of those articles used the first definition. Only one of the seven studies compared the cost-effectiveness of interventions with and without an incentive. Nexoe *et al*. (1997) found that the cost per prevented influenza-related death was $3,990 for those receiving an invitation letter, which reminded patients of the upcoming flu season, but $17,860 for those who received the letter with free flu shots. Hutchins *et al*. (1999) found that off-site referral with an incentive was more cost-effective compared to other interventions such as on-site clinic referral with a financial incentive and on-site nurse referral with a financial incentive during the first year and the entire two-year period. Cost per additional up-to-date child was $51 (off-site), $111 (on-site) and $164 (nurse) in the first year and $13 (off-site), $7 (on-site) and $21 (nurse) in the second year (Hutchins *et al*., 1999).

Several studies showed that health promotion programs led to cost savings, but they did not take into account the program cost. Nyman *et al*. (2008) found that a disease management (DM) program with a financial incentive significantly reduced health care expenditures by $1,266 per year. However, when the cost of the program was taken into account, the program generated a total loss of about $612,623. That study did not attempt to estimate savings in indirect costs, such as productivity increases from a decline in absenteeism. The program evaluated by Ozminkowski (2002) saved $224.66 per employee per year. Stave (2003) concluded that the average annual savings associated with the intervention were

$613 per participant. Serxner (2001) demonstrated the combined actual and potential savings would be $1,371,600 in short-term disability costs in the 2-year health promotion program, including costs related to STDs, such as direct medical expenses, replacement workers, and project delays.

Ozminkowski (1999) compared dollar savings from a health promotion program with program costs to estimate the economic return on the company's investment in the program. The author concluded that the return on investment was between $4.56 and $4.73 per dollar spent on the program. However, these studies were relatively limited since they did not try to generalize cost-effectiveness over time for the estimated morbidity or mortality of the potential population, which could be influenced by policy decisions regarding implementation of consumer incentives (Kane *et al*., 2004).

3. CONCLUSION

Prevention intervention programs involving financial incentives were classified as simple versus complex. Both simple and complex consumer incentives aimed to encourage participation in prevention activities showed significant short-term effects. Rewards included cash, coupons, and gifts. Generally, monetary incentives were more effective than non-monetary incentives. Unfortunately, the effects on long-term health behaviors were not as encouraging.

Economic incentives may have unintended consequences that add to the difficulty of reliable evaluation (Kane *et al*., 2004). For example, one study found that cash incentives to encourage people to participate in group exercise sessions were effective (Jeffery *et al*., 1998), but their overall exercise effort was no different than the control group. It appeared that the program participants overstated their levels of exercise due either to social pressure or to maximize

their cash incentives.

Many studies have investigated the effectiveness of financial incentives. However, there is less evidence concerning the effectiveness of mixed financial and non-financial incentives. Two studies offered financial incentives for attending an education program, but they showed contrasting results; one (Burton, 1998) was effective, but the other (Malotte *et al*., 1998) was not. The point at which incentives are paid appears to be important, but this requires further study. Incentives may be offered following participation in a program, completion of program or achievement of a goal. Different payment points may lead to different results. Finally, cost effectiveness analyses should be emphasized more, since cost may play an important role in the decision to launch an incentive program.

Although many questions remain to be answered regarding non-financial incentives, the timing of incentives and the cost effectiveness of incentives, consumer financial incentives, when coupled with effective health promotion and disease prevention interventions, appear to be a promising area for further research.

This study has some limitations. Studies related only to US have been paid attention because US is one of the highest healthcare expenditure country; their health care spending reached $3.6 trillion or $11,172 per person and accounted for 17.7 percent as a share of the nation’s Gross Domestic Product in 2018. However, South Koreans spent approximately $3,200 per capita on health and national healthcare expenditure is 7.7% of GDP in same year.

Thus, US has great incentive to save healthcare cost by promoting participation of healthcare program and disease prevention activities. However, any Korean study did not be included because researches related to health promotion and disease prevention in Korea are still in its infancy during study periods. Results of US studies could give us some policy implications and be applied to Korea.

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