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Preliminary Examination of Adolescent Spending in a Contingency Management Based Smoking Cessation Program

Dana A. Cavallo, PhD, Charla Nich, MS, Ty S. Schepis, PhD, Anne E. Smith, PhD, Thomas B. Liss, BS, Amanda K. McFetridge, BA, and Suchitra Krishnan-Sarin, PhD

Yale University School of Medicine, Department of Psychiatry

Abstract

Contingency management (CM) utilizing monetary incentives is efficacious in enhancing abstinence in an adolescent smoking cessation program, but how adolescents spend their money has not been examined. We assessed spending habits of 38 adolescent smokers in a CM-based smoking cessation project prior to quitting and during treatment using a questionnaire about spending in a number of categories, including cigarettes, other addictive substances, durable goods, and disposable goods. Our preliminary results indicate that participation in a CM based program for smoking cessation did not lead to greater spending on cigarettes and other substances and may have produced more socially acceptable spending.

Keywords

adolescent; smoking; contingency management

Contingency management (CM) is based upon the behavioral principle that if a behavior is reinforced or rewarded, it is more likely to occur again in the future. Contingency management in substance abuse treatment utilizes a systematic approach to reinforce specific behaviors, such as abstinence or attendance, with tangible incentives, such as money, gift cards, or vouchers that can be exchanged for retail goods and services. CM procedures are efficacious in the treatment of substance use disorders, and they improve retention and enhance tobacco abstinence rates in adolescent smokers (Cavallo et al., 2007; Corby et al., 2000; Krishnan-Sarin et al., 2006; Roll et al., 2005; Weissman et al., 1987). Thus, CM is a promising intervention for adolescents interested in quitting smoking.

However, there is some evidence to suggest that adolescents who receive money from parents, jobs or other sources may have higher rates of use of unfavorable or illicit substances, such as cigarettes or drugs (Darling et al., 2006; Mohan et al., 2005; Ramchand et al., 2007). Existing evidence in adult substance users suggests that monetary incentives in a CM-based program rarely lead to increased drug use (Festinger et al., 2005) or increases in gambling behavior (Petty et al., 2006). However, this issue has never been systematically examined in adolescents participating in an incentive-based program. Furthermore, ethical issues in general have been raised in providing payments to children and adolescents participating in research studies (Iltis et al., 2008). Therefore, the aim of this preliminary study was to conduct a descriptive analysis of how adolescent smokers spent the monetary incentives they earned for smoking abstinence and/or attendance in a CM-based smoking cessation program. We hypothesized that there would be a decrease in the percentage of youth spending money they earned in the program

on cigarettes or other drugs. We also explored spending on disposable and durable goods, including savings, and examined if spending varied according to how much money the adolescents earned.

METHODS

Participants

Adolescents were recruited through local high schools for participation in a high-school based smoking cessation study. Information sheets about the study were mailed out to the parents of all students in the participating schools and parents were told to call the schools if they did not want their child to participate; active consent from parents was not required. These procedures that were used in order to protect the confidentiality of adolescents who wanted to quit smoking but whose parents did not know that they were smokers. This increased recruitment for the study and the generalizability of our results. Assent was obtained from all participants aged 14–17 years of age who were interested in participating in the smoking cessation study and adolescents who were 18 years of age or older signed separate consent forms. The Institutional Review Board of Yale University, local school boards, and high school administrators approved this study.

Individuals were included if they reported smoking at least ten cigarettes per day for the past six months and had quantitative urine cotinine levels of 350 ng/ml or higher (Graham Massey Analytical Labs, Shelton, CT). Individuals were excluded for a current diagnosis of Panic Disorder or Major Depressive Disorder, since the symptoms of these disorders can be exacerbated by smoking abstinence and our behavioral interventions address smoking cessation in the absence of pre-existing psychiatric disorders. This information was assessed using a structured clinical interview followed by an evaluation by the study psychologist. Individuals were also excluded for substance dependence (other than nicotine dependence), any significant current medical condition, regular use of a psychotropic medication, or a current suicidal/homicidal risk.

Of the 41 participants who signed assent/consent and were enrolled into the study, 38 initiated treatment (i.e., made it to quit day) and were included in these preliminary analyses.

Procedure

All participants completed baseline demographic measures describing their sources and amount of income, as well as their past week spending on a number of disposable and durable goods, including savings. The spending items were derived from open-ended responses from adolescents participating in a pilot CM trial (Krishnan-Sarin et al., 2006) and were analogous to spending items utilized by other researchers (Furnham, 1999; Warnear & Van Praag, 1997). Specifically, participants were asked “over the past week, how have you spent the money that you earned from the study?” and the responses were yes/no for the following items of spending: food, personal items (make-up, condoms), cigarettes, other substances, presents for others, gas/car/car insurance, electronics (stereo, DVD player), music, entertainment (video games, movies), clothes, magazine/books, cell phone/pager, “saved it”, and other. During the treatment period, they were asked to indicate how they spent their money during the past week at their weekly appointments using the same list of items. During the treatment period, all participants were reinforced for attendance and/or abstinence, in which we used an escalating magnitude schedule of reinforcement with a reset contingency (Higgins et al., 1991; Krishnan-Sarin et al., 2006). Participants could earn between \$224 and \$273.50 for confirmed abstinence during the first month of treatment and also receive between \$5 and \$30 weekly for attending the research appointments and completing assessments. The variability of payments is due to a change in the schedule of payments instituted during the study. Participants also received a

form of cognitive behavioral therapy (CBT) for smoking cessation provided by trained staff to help cope with cravings, avoid lapses, and manage stress during smoking abstinence. Further details regarding the study participants, CM procedures and CBT techniques are described by Cavallo et al. (2007).

Data Analysis

Means and frequencies were calculated to determine basic demographic characteristics of the sample and weekly baseline income. Baseline and treatment spending across various categories was determined using frequencies, and analysis of variance was used to look at differences between average weekly study money earned and total money earned for those who purchased durable goods, disposable goods, cigarettes or drugs with study money.

Descriptive categories of spending were developed by the research team and categorized into disposable goods (items for immediate use), durable goods (items to be used in the future), uncertain goods (those items that could not be classified as disposable or durable), other goods, savings, cigarettes, and other substances. The items were categorized as follows: disposable goods (food, personal items, and entertainment), durable goods (clothing, electronics, and cell phones), “uncertain” category (music, magazines and books), other category (presents for others, gas, car, insurance), savings, cigarettes, and other substances/drugs.

RESULTS

Participants were 55% female, with an average age of 16.9 years ($SD = 1.0$). The sample was 90% Caucasian, 3% African American, 5% Hispanic, and 2% of other racial category. At baseline, study participants reported an average weekly income from employment and family of \$23.70 per week, ($SD = \28.70), with incomes ranging from \$0 to \$135 in the week prior to starting the research program. On average, subjects earned \$53 ($SD = \23) per week in CM payments for tobacco abstinence and for completing research assessments, ranging from 0–\$118, and \$209 ($SD = \$106$) total in CM payments, ranging from \$16–\$349, for tobacco abstinence and for completing research assessments. Figure 1 illustrates the spending categories at baseline and during treatment. As shown, the percentage of adolescents who spend money on cigarettes was reduced during the treatment phase and spending on other substances did not increase.

There was no significant difference in the weekly average of study money earned, ($F(1, 36) = 1.03, p = .32, es = .17$), or the total study money earned ($F(1, 36) = 1.06, p = .31, es = .17$) for those who purchased cigarettes or drugs compared to those who never purchased cigarettes or drugs with study money. In contrast, subjects who spent study money on disposable goods earned significantly more money weekly ($F(1, 36) = 9.45, p < .01, es = .46$) and in total ($F(1, 36) = 3.95, p = .05, es = .31$) than those who did not spend study money on disposable goods. Similarly, subjects who spent study money on durable goods earned significantly more money weekly ($F(1, 36) = 4.58, p < .05, es = .34$) and in total ($F(1, 36) = 5.41, p = .03, es = .36$) than those who did not spend study money on durable goods.

DISCUSSION

The preliminary results of this study suggest that most adolescents who participate in a CM based smoking cessation program are not spending the money they earn on cigarettes or drugs. At baseline, while still smoking, adolescents reported spending money on cigarettes, but during the treatment phase of the program, the number of adolescents who report spending money on cigarettes was reduced. From baseline to treatment, all areas of spending increased, except for cigarettes and other substances. Interestingly, spending on cigarettes and drugs was not influenced by amount of money earned in the treatment phase. In contrast, the more study

money earned weekly, the more likely it was that the adolescent purchased durable or disposable goods. Thus, adolescents did not report spending their money on drugs or cigarettes, but rather on items such as music, clothing and gifts for others.

A limitation of this study is the small sample size, which did not allow us to assess time-related changes in spending as well as whether abstinence predicted differences in spending. However, to the best of our knowledge this the first study to conduct a preliminary assessment of how monetary incentives contingent on abstinence and attendance affects adolescent spending habits. Another limitation of this study is the self-report aspect of the assessment. We asked participants how they spent their money in retrospect without verification of receipts or proof of purchase. However, adolescents were willing to indicate how they spent their money at baseline, including the endorsement of drugs and cigarettes, so it is likely that they were honest about how they spent their money during treatment. Furthermore, they were informed that indicating that they spent their money on cigarettes or drugs would not result in any negative consequences, so there was little to no reason to give false responses. However, there is still a potential for expectancy effects and socially desirable reporting during treatment.

Another limitation of this study was the categorical nature of the data. The categories of spending were not mutually exclusive, making it difficult to categorize some of the purchases as disposable or durable goods, which is why we included an “uncertain” category. For example, entertainment could be considered a disposable good if a movie theater ticket was purchased or a durable good, if a video was purchased in a store. We are currently modifying our spending assessment to reflect more specific categories. We also did not identify the independent influence of money earned from other sources. Finally, participants were asked to report on how they spent the money they earned from the research study, but it is quite possible that their responses were influenced by monies received from other sources. Future studies will include a revised assessment of spending with the raw dollar amount spent to address changes in spending habits over time.

It is also worth noting that study participants were receiving CBT in addition to CM to address cravings, high-risk situations, and how to avoid lapses. It is possible that the outcome data could have been influenced by the CBT or a combination of the two behavioral interventions.

In conclusion, it appears that providing monetary incentives to high school adolescents through a CM-based smoking cessation program does not lead to greater spending on cigarettes and other substances and may in fact produce an increase in socially acceptable spending. Considering the accruing evidence for the efficacy of CM approaches, this preliminary information may help reduce perceived concerns about providing monetary incentives to adolescents.

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Figure 1.
Percent of adolescents who report spending in various categories at baseline and during treatment