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ORIGINAL ARTICLE

Preventing Prescription Drug Misuse: Field Test of the SmartRx Web Program

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Purpose of the project was to test a Web-based program designed to prevent prescription drug misuse. Study sample consisted of 346 working women randomized into either an experimental or wait-list control condition. Analysis of covariance and logistic regression were used to compare responses. Women receiving the intervention had greater knowledge of drug facts and greater self-efficacy in medication adherence and ability to manage problems with medications compared with controls. Women receiving the intervention also had reduced symptoms reported on the CAGE for prescription medications. Findings suggest that multimedia Web-based programs can be a beneficial addition to substance misuse prevention services. The study's limitations are noted.

Keywords   prescription drug abuse, prevention, self-efficacy, Web-based intervention, Web-based training, women

INTRODUCTION

According to the 2008 National Survey on Drug Use and Health (NSDUH), there have been significant and noteworthy increases in first-time nonmedical use of psychotropic prescription medications during the last decade (Substance Abuse and Mental Health Services Administration [SAMHSA], 2009). While prescription drug use affects many Americans, the National Institute on Drug Abuse (NIDA) noted that there appears to be increased concern for older adults, adolescents, and women. Research on prescription drugs with abuse potential has consistently noted that women face greater medical exposure to psychotropic medications compared with men (Deitz, 2001; Parran, 1997; Roeloffs, Fink, Unutzer, Tans, & Wells, 2001; Simoni-Wastila, 2000; Simoni-Wastila, Strickler, & Ritter, 2004).

While psychotropic prescription medications are an effective way to bring improvements in the health and quality of life for millions of individuals, many patients fail to receive proper screening, diagnosis, and counseling prior to the initiation of treatment for these types of drugs. In a study of prescribing practices associated with antidepressant therapy only 22.5% of patients had a diagnosis consistent with antidepressant drug therapy and only 34% of these patients were seen by a physician trained in psychiatric medicine (Deitz, 2001). Another study found that problematic substance use was common among primary care patients who had depressive symptoms, but few patients—particularly women—received counseling about substance use from their primary care provider (Roeloffs et al., 2001). Overall, it appears that patients need to be better educated about psychoactive prescription drug use and more efforts made to prevent the incidence of future problems (NIDA, 2001).

Computer-based interventions, including CD-ROM and website programs, offer unique opportunities for disseminating behavioral health education materials (Rothert et al., 2006; Ritterband et al., 2003). These programs offer several advantages over traditional methods of health promotion, especially in medical environments where competing demands and time constraints have make it difficult for practitioners to spend as much time as needed for health education and counseling (Glasglow, Klesges, Dzewaltowski, Bull, & Estabrooks, 2004). Web-based programs greatly reduce time issues faced by health promotion practitioners, decrease the stigma felt by some users, and can accommodate personal needs and interests (Christensen, Griffiths, & Korten, 2002; Evers, 2006). Workplaces have recognized the potential of Web-based programs and are increasingly offering them to employees to address behavioral health issues such as stress, mental health, and substance use (Billings, Cook, Hendrickson, & Dove, 2008; Cook, Billings, Hersch, Back, & Hendrickson, 2007). The topic of substance misuse prevention holds particular appeal to workplaces hoping to reduce health care costs, absenteeism, injuries, turnover, and other complications associated with drug-use-related

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problems (Goetzel et al., 2002; Trudeau, Deitz, & Cook, 2002).

PURPOSE AND HYPOTHESES

The purpose of this project was to test the effectiveness of a Web-based program designed to prevent the misuse of psychoactive prescription drugs in a population of working women. The content of the program focused on information about the chemical properties of medications with abuse potential, proper administration of these medications, avoidance of drug abuse and dependence, and nondrug options for managing health issues.

In 1990, Cook and Youngblood developed a conceptual model to guide the development of workplace substance use and misuse prevention interventions. This social cognitive model drew on existing health behavior theories and constructs, including the work of Bandura (1977, 1986), Abrams and Follick (1983), Rosenstock, Strecher, and Becker (1988), and Cook's (1985) biopsychological model of healthful alternatives to drug use and misuse. This model views substance use and misuse as a type of unhealthful behavior, and that by raising one's level of awareness, motivation and knowledge about the risks of substance use and the benefits of healthful behavior, the individual is less likely to engage in substance use and misuse. Moreover, Cook and his colleagues have found that addressing stigmatized behavioral health topics by imbedding them in nonthreatening programs can be a powerful strategy for exposing individuals to needed education and referral mechanisms (Cook, Back, Trudeau, & McPherson, 2003; Cook et al., 2007). The SmartRx program follows these tenets and is constructed in a fashion that encourages users to engage in multimedia learning-related activities.

It was hypothesized that women receiving the Web-based program would have greater knowledge of proper psychotropic prescription drug use, positive changes in self-reported administration of, or attitudes toward, prescription drug use, greater self-efficacy in their ability to manage and adhere to pharmaceutical treatment indices, and more positive attitudes toward patient–physician communication about prescription medications compared with the control group.

Methods

SmartRx: Your Prescription for Good Health was field tested with women working in two hospitals in West Virginia and Ohio in the spring of 2007. The study was funded from a NIDA grant. The design was a randomized controlled study in which participants were randomly assigned to either an experimental group that received access to the SmartRx Web site or to a wait-list control group. All female employees of the participating hospitals ($n = 1518$) were invited to participate in the study. Recruitment was coordinated through the wellness department of the participating hospitals. Announcements were placed on the hospital intranet, in the wellness departments, and in the employee cafeteria. Women interested in participating in the study were told about the nature of the study and were asked to read and sign a consent document describing requirements of participation. Those volunteering to participate in the study were first assessed on a pretest online questionnaire, then randomly assigned to either an experimental group that received the URL to the SmartRx Web site or to a wait-list control group. Following the intervention, all participants were again assessed on the same survey questionnaire. Employees who completed the pretest survey received $25 and were given a chance to win $500 in a random drawing. The same incentives were used for the posttest survey. All participants were given access to the Web-based program following completion of the posttest questionnaires.

A total of 362 employees signed the consent document and completed the pretest survey. Employees were given 2 weeks to complete the survey and were sent reminders every few days with information about the deadline and answers to questions raised. The intervention began after the pretest and lasted for 4 weeks. Program users were encouraged to view the program over multiple sessions and to view the program in its entirety, if possible. A total of four email reminders were sent out during the program review period. The last reminder was sent to individuals who had not entered the program, had spent less than 20 minutes in the program (utilization information was collected from a program tracker), or had viewed a large number of pages in a short period of time (i.e., paging through without reading).

After the program review period, all participants (experimental and control conditions) were asked to complete the posttest survey.

THE WEB-BASED INTERVENTION

The SmartRx program focuses on five classes of medications: analgesics, sedative-hypnotics, stimulants, antidepressants, and tranquilizers. It contains information on the pharmaceutical properties of these medications, facts about safe administration, and a discussion of self-management strategies. The program consists of three main sections, which are summarized below. The program is multimedia rich—fully narrated, with many video, graphic, and interactive segments. The program was constructed in accordance with the principles of social cognitive theory, including increasing self-efficacy and behavioral improvement through observational learning and mastery of skills (Bandura, 1986; Eng & Gustafson, 1999). The use of a multimedia approach (as opposed to the usual "click and read" programs) was designed to make the program more appealing and engaging, while providing opportunities for behavioral modeling and raising self-efficacy, with the intent of leading users to adopt new attitudes, beliefs, and behaviors.

- Medication Facts focuses on providing information about the pharmaceutical properties of medications, including therapeutic action, potential side effects, and recommended guidelines for self-administration. A description on how medications work and common

concerns is presented with interesting graphics and animation. A "Concerns" section contains lists of commonly asked questions with video segments of pharmacists answering each question.

- Smart Use instructs users on the safe administration of prescription medications, provides guidelines on responsible use of medications, a tutorial on how to read a label, scripted scenarios on assertiveness and enhancing communication when meeting with one's physician, and information on what to do if one suspects that one is having a problem with one's prescription medication. This section contains information on drug tolerance, abuse, and dependence and the warning signs of each. Real-life video testimonials are provided of women who have experienced problems with prescription medications, and there is a self-assessment on how to determine if one needs help with one's use of prescription medication.
- Managing Your Health focuses on alternatives to medications and provides users with suggestions on ways to enhance their health and well-being. There are "printable" pages listing exercises for progressive muscle relaxation, yoga, and deep breathing exercises as well as interactive segments on evaluating one's fitness level and tips for getting an exercise regimen started.

The SmartRx program contains self-assessments on current or anticipated prescription drug use and self-reported interest in learning about safe use of medications. Answers to the assessment were used to make suggestions for segments of the program that are most applicable to the user. The suggestions were categorized as highly recommended, recommended, and suggested. A device was embedded into the program that tracks pages visited by each user and the amount of time spent on each page.

SMARTRX QUESTIONNAIRE

Copies of the instruments can be obtained upon request. The SmartRx questionnaire included the following measures:

- Purdue Pharmacist Directive Guidance Scale. This measure tests participants perceived beliefs regarding their ability to properly take medications as directed by their pharmacist (Gupchup, Wolfgang, & Thomas, 1996). It contains questions that directly assess personal and informational-based factors related to medication compliance. Questions were amended to a large extent to ask about physician interaction as well as pharmacist interaction. Cronbach's alpha for this scale was .89.
- Patient Feedback Survey. This measure is one of the components of the Patient Feedback System, developed for the National Drug Abuse Treatment Clinical Trials Network (Forman et al., 2003). The survey is designed to measure the therapeutic alliance between a care giver and patient and the degree of satisfaction with treatment. Cronbach's alpha for this scale was .95.
- Knowledge of Prescription Drug Abuse and Dependency. A series of true/false and multiple choice items were constructed to assess women's knowledge of facts as they are presented in the program. There are three subscales, each corresponding to separate areas covered in the program: Medication Facts (measuring knowledge of the pharmaceutical properties of medications), Smart Use (measuring knowledge of the proper administration of medications), and Managing one's Health (measuring knowledge of nonpharmaceutical alternatives to medications). The scales have high face validity and are based on actual content provided in the program.
- National Survey on Drug Use and Health (NSDUH). Sections of the NSDUH were used to test respondents' self-reported use of pharmaceutical medications for nonmedical purposes (SAMHSA, 2010). The sections of the survey used included those addressing the use administration of pain relievers, tranquilizers, stimulants, and sedatives, as well as consumption of alcohol.
- Treatment Seeking Self-Efficacy and Confidence in Ability to Address Drug Problems. We constructed an attitude scale of items with a 4- to 5-point response scale, assessing the extent of the participants' confidence and ability (self-efficacy) to effectively handle problems arising from the administration of prescription medications. It was designed to assess whether individuals feel that they have the information, personal knowledge, and skills necessary to adequately address problems with the administration of prescriptions when they arise. Cronbach's alpha for the treatment seeking self-efficacy scale was .94 and for the confidence in ability to address drug problems was .78.
- Perceived Efficacy in Patient–Physician Interactions (PEPPI 5-Item Version). The PEPPI was developed to measure patient's confidence in their ability to elicit and understand information from, and communicate information to their physicians as well as confidence in their ability to get their physicians to address and act on their medical concerns (Maly, Bourque, & Engelhardt, 1999). Cronbach's alpha for this scale was .94.
- CAGE for Prescription Medications. The CAGE was used to measure respondents' perceptions about their current drug use and whether they perceive problems with their current level of use (Ewing, 1984). Cronbach's alpha for this scale was .63.
- Reactions to the Program. This measure contained items assessing the degree to which the program was clear, informative, interesting, useful, accurate, comprehensive, etc., and was administered only to participants in the experimental condition. It also contains a section on general utilization of computers for information acquisition and communication.

Sample Characteristics

Participants were female and ranged in age from 21 to 75, with a mean age of 44. Seventy-two percent of participants were married and 83% had at least some college experience. Thirty-seven percent of participants were employed as a nurse, physician, or psychologist; 24% were employed as a medical assistant or medical technician; and 22% were employed as a clerical worker. The sample had some baseline exposure to health-related information, but it was not specific to pharmaceutical issues or substance use prevention.

Women participating in the program were required to have access to a computer with Internet at work and/or home; however, only a minimal level of computer

proficiency was required. The vast majority of participants reported that they used the Internet at least once or twice a week. Thirty-three percent of participants reported almost daily or daily utilization of the Internet. A small percentage (2%) reported that they never used the Internet.

The program was designed to be applicable for women who were currently using medications with abuse potential as well as those anticipating use of these medications. At baseline 28% of participants reported current use of antidepressants, 22% reported current use of analgesics, 16% reported use of tranquilizer medications, 9% reported use of sedatives, and 3% reported use of stimulants. Nonmedical use of analgesics was reported in 7% of the sample, while 5% of the sample reported nonmedical use of sedatives, 1% reported nonmedical use of stimulants, and 1% reported nonmedical use of tranquilizers.

ANALYSIS

Analysis of covariance (ANCOVA) was used to test differences between the two groups. Of the 362 individuals enrolled in the study 346 completed the posttest. In addition to the ANCOVAs, we conducted logistic regression analysis to look for predictors of nonmedical drug use. Finally, we conducted descriptive analyses of program utilization and reactions to the Web-based program to supplement our findings related to the intervention. Intent to treat analyses were conducted on all experimental participants, including individuals who did not view the online program ($n = 3$) and individuals who viewed the program for less than 10 minutes ($n = 7$). Utilization ranged from a low of 5 minutes or less ($n = 4$) to a high of over 4 hours ($n = 17$). The average utilization was 1 hour and 53 minutes.

RESULTS

Tables 1 through 3 display the results of the ANCOVAs testing differential change between the experimental (Web program) and control (wait-list) groups on the measures of knowledge, physician–patient interaction, and self-efficacy for pharmaceutical adherence and managing medication-related problems. The data in Table 1 show the differences between the experimental and control groups on areas of knowledge contained in the program. There was a significant difference between the two groups on the measure of drug facts but not on the measures of smart

TABLE 1. Web-based intervention vs. wait-list control knowledge questions

Measure	Web posttest X (SD)	Usual care posttest X (SD)	F	p
Drug facts	13.23(2.40)	12.84(2.33)	3.75	.025
Smart use	13.1(1.63)	12.90(1.43)	0.79	.457
Manage health (non-pharmaceutical)	6.48(0.96)	6.40(0.89)	2.08	.127

Note: SD, standard deviation.
X denotes mean value.

TABLE 2. Web-based intervention vs. wait-list control measures of physician–patient interaction

Measure	Web posttest X (SD)	Usual care posttest X (SD)	F	p
Efficacy in doctor interaction (PEPPI)	17.85(4.33)	17.70(4.30)	0.38	.687
Take prescriptions as directed (Perdue survey)	17.27(4.40)	17.01(4.07)	0.29	.749
Patient feedback survey	30.20(5.81)	30.19(5.05)	0.30	.744

Note: PEPPI, Perceived efficacy in patient–physician interactions. X denotes mean value.

use or alternatives to medications. These results are based on a sample of 329 participants that had complete data for these items. We applied an 80% completion rule for calculation of scaled scores. If a respondent had a missing item (and at least 80% of the items in that scale completed), an average score (based on within subject responses) was calculated for the missing item.

The data in Table 2 show the differences between the experimental and control groups on measures of physician–patient interaction indices. Questions contained in this section addressed issues such as "I avoid asking questions of my doctor for fear of sounding stupid" or "I am confident that I can get a doctor to take my chief concern seriously." Results are based on 344 subjects completing the Perdue survey and 345 completing the Patient Feedback Survey and PEPPI. Results indicated that there were no significant differences between groups on these measures.

The data in Table 3 show the differences between the experimental and control groups on measures of self-efficacy in pharmaceutical adherence and the ability to manage drug-related problems. Questions contained in this section addressed issues such as "I am confident that I can take my medication exactly as my doctor prescribed" or "If I started having a problem with pain, insomnia, depression, or anxiety I could recognize my symptoms." Results are based on 343 subjects completing the Medication Adherence survey and 342 completing the Ability to

TABLE 3. Web-based intervention vs. wait-list control self-efficacy in pharmaceutical adherence and ability to manage problems

Measure	Web posttest X (SD)	Usual care posttest X (SD)	F	p
Medication adherence	58.82(11.88)	56.88(11.72)	4.73	.013
Manage medication problems	28.05(3.99)	27.34(3.83)	3.71	.026

X denotes mean value.

TABLE 4. Web-based intervention vs. wait-list control CAGE questions

Measure	Web posttest X (SD)	Usual care posttest X (SD)	F	p
CAGE score	.485(0.83)	.861(1.19)	3.30	.038

X denotes mean value.

Manage Problems Survey. Results indicated that there were significant differences between the two groups on both measures, with the experimental group displayed greater improvement on both measures than the control group.

We conducted additional analyses on the items measuring drug problems (CAGE) and reports of nonmedical prescription drug use. ANCOVA was used for the CAGE data and logistic regression analysis for the NSDUH reports of nonmedical prescription medication taking. The data in Table 4 show the differences on ANCOVA between the experimental and control groups on the CAGE for prescription drug use. Questions contained in this survey are the following "Have you ever felt the need to cut down on your use of prescription drugs?" "Have you ever felt annoyed by remarks your friends or loved ones made about your use of prescription drugs?" "Have you ever felt guilty or remorseful about your use of prescription drugs?" and "Have you ever used prescription drugs as a way to get going or calm down?" Results are based on a total of 329 subjects answering all questions. Results indicated that there were significant changes between groups from the pretesting to posttesting period, with lower scores for the group completing the SmartRx program.

The data in Table 5 show the differences on logistic regression analyses between the experimental and control groups on reports of problematic prescription drug use. Questions were from the NSDUH. Sections of the NSDUH were used to test respondents' self-reported use of pharmaceutical medications for nonmedical purposes. The survey addressed administration of pain relievers, tranquilizers, stimulants, and sedatives. Results are based on a total of 344 subjects. Results indicated that group status did not predict nonmedical drug use in the postintervention reporting period with preintervention nonmedical use entered as a control variable. It should be noted that nonmedical use of tranquilizers and stimulants were ex-

TABLE 5. Nonmedical drug taking postintervention by Group Status Logistic Regression

Group effects	Exp(B) odds ratio	Lower CI	Upper CI	p
Nonmed analgesics	.656	.147	2.92	.579
Nonmed sedative	1.41	.500	3.97	.517
Nonmed tranquilizers	2.09	.923	33.03	.132
Nonmed stimulants	6.47	.426	98.13	.179

Note: CI, confidence interval.

TABLE 6. Summary statistics-program utilization

Program indicator	Number	Percentage
Logins		
1	22	12
2	42	24
3–4	58	32.5
5–6	33	18.6
7 or more	23	13
Time in Program		
Less than 20 minutes	14	8
20 minutes to 1 hour	57	32
1–2 hours	51	28.5
Over 2 hours	56	31.5
Pages Viewed		
Less than 25	34	18.5
25–50	39	21.9
51–99	58	32.6
100–110 (max. pages)	48	27

tremely low and results indicate a wide range of error. A larger sample (and higher reports of nonmedical use) are necessary to adequately test this issue.

We also collected data on program utilization. Each time a participant logged into the program using their unique identifier data were collected on the time that they were active in the program (a time-out happened after 10 minutes of no paging) and on the pages that were accessed. Data on reactions to the program were collected on the postintervention survey and indicated that 90% of users found the program easy to navigate, 86% found it useful, 84% found it interesting, and 67% found it to be motivating. Table 6 summarizes descriptive data collected on all subjects in the experimental group for the number of times they entered the program, the time spent in the program, and the number of pages viewed. There were seven subjects in the experimental condition that did not login, and four of these subjects were study dropouts. Total attrition for the SmartRx study was only 4%. The low attrition rate was attributed to frequent contact with program participants, a cohesive and a well-integrated wellness program, and program incentives. The average number of logins was 4.

DISCUSSION

The results of this randomized trial provide evidence of the benefits of using a Web-based program to educate working women on the safe use of psychoactive prescription medications. Compared with the wait-list control group, users of the Web-based program significantly increased their knowledge of proper prescription drug use and had greater self-efficacy in their ability to manage and adhere to appropriate pharmaceutical treatment compared with the control group. In addition, the significant effects of the program on CAGE scores indicate that the Web-based SmartRx program resulted in a reduction of symptoms commonly associated with drug misuse

problems. There were no significant effects of the intervention found in changing physician–patient interactions or reported nonmedical use of the medications under consideration.

The multimedia Web-based intervention was designed to educate individuals taking medications with use potential through training that emphasized vicarious learning, modeling of positive behaviors, and verbal reinforcement of program content. The theory underlying this approach draws heavily from the literature on social cognitive theory and self-efficacy (Bandura, 1986). The study findings lend support to the growing literature on the utility of offering Web-based, multimedia programs to the general population (Van Straten, Cuijpers, & Smits, 2008) and provide insights for future efforts. Web-based programs like the SmartRx can be an effective means of increasing knowledge and building skills in patients and have the advantage of ease of administration and broad-based application.

Program findings argue for offering Web-based programs as a precursor and/or supplement to care provided by medical professionals, since knowledge of prescription safety issues and self-efficacy in managing health are often linked with improved outcomes (Aspden, Wolcott, Bootman, & Cronenwett, 2007). This is especially critical as many patients fail to receive proper screening, diagnosis, and counseling prior to the initiation of a pharmaceutical treatment. Reduced time for doctor–patient interactions makes it difficult to identify problems with substances and drug interactions, and this is especially pronounced in female and elderly populations (Korper & Raskin, 2009). Referring parents to supplemental information and resources can be a beneficial addition to clinicians' direct services. Web-based programs are increasing in popularity for a number of reasons including cost, privacy, lessening the effects of stigma, and flexibility in delivery (Griffiths, Lindenmeyer, Powell, & Thorogood, 2006). Web-based programs can also be offered to individuals in multiple settings, including the workplace and at home, thereby reaching large numbers of users.

An important finding was that users of the program showed significant improvement in self-efficacy, with reports of greater confidence in their ability to manage their health care and effectively handle drug-related problems. Much empirical evidence supports Bandura's contention that self-efficacy beliefs touch many aspects of people's lives, including how they effectively address difficult issues such as a substance use problem (Bandura, 1986; Pajares, 2002). Further, combinations of proper medical treatment, patient education, and counseling offer the best prognosis for preventing and treating substance misuse (Morgan & Whitney, 2007).

Overall utilization of the intervention was quite high, as average utilization was substantial (2 hours), and took place over four sessions. So it appears that the program had the ability to catch users' attention and that enough interest was maintained to allow the program to promote positive effects for the majority of program users. Together with the low attrition rates (which also compare favorably to those of past studies of workplace-based programs) and high ratings on the usefulness of the program, these data suggest that users have interest in programs like the SmartRx and find the program to be a worthwhile intervention.

The reasons why patient–physician communication and adopting nonpharmaceutical approaches to managing health were not changed merits careful consideration. It is possible that the program as currently constructed was simply insufficient to achieve fundamental changes in these behaviors. Also plausible is that the period between the pretest and posttest might have been too short (approximately 1 month) to effect significant changes–or to adequately measure change related to complex behaviors such as patterns of communication and health management strategies. It is possible the foundation was set for influencing positive change in these areas, and a study design that allowed for both a longer intervention period and a longer period of time between measures would result in important differences on these indicators in a fashion similar to the areas of knowledge and self-efficacy. Future studies could benefit by addressing this question in greater detail than was permitted within the scope and time frame of this project, e.g., by lengthening the study period and supplementing the Web-based intervention with more intensive counseling and education.

Limitations to Findings

There were limitations to the study design that require mention. First, the data were all based on self-report surveys. There were anecdotal reports from the Wellness Director that participants were interested in doing well on the items and that some of the respondents may have looked up answers to questions while taking the online survey. The exact degree of information that was looked up prior to, or while taking, the survey is unknown; however we have no reason to believe that there were differences in this occurrence between the experimental and control groups.

Another limitation relates to the lack of external validity–the extent to which the findings are generalizable to other, more diverse workforces and populations–as all participants were relatively well educated with exposure to physicians and medical information. A large percentage of participants were medical professionals (37%), which included nurses and other practitioners and another 24% were medical technical or medical assistants. Consequently, baseline findings may have been biased toward greater knowledge and understanding of dealing with the medical world. The extent that groups came to the study with advanced knowledge of prescription drugs may have dampened the strength of program findings. However, a positive aspect of using this population was that health careworkers are often cited as being at higher risk for pharmaceutical misuse given greater availability of prescription medications. Medical professionals also work in a field that is considered higher in stress level. Medical professionals were therefore viewed as a population with greater need for such interventions. In addition, we felt

that by providing medical practitioners with messages and perspectives on the safe use of prescription medications and the warning signs of prescription drug misuse, they would be in a position to relay this information on to patients under their care.

Implications

Overall, these findings support the notion that the SmartRx online program can be an effective means of educating working women about prescription medications with abuse potential, building important self-efficacy skills, and helping to reduce the likelihood of drug misuse. Additional research is needed to test the implications of this finding on actual administration of these medications and issues related to misuse and abuse. It would be worthwhile to test whether changes in CAGE scores are mediated by the observed increases in skills and knowledge that were found following the intervention in this same group. It may be that when greater knowledge of proper medication administration is acquired and self-efficacy in managing and adhering to medical advice is increased, problems of prescription drug misuse will decrease.
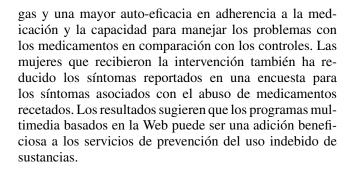
Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

RESUME

But du projet était de tester un programme basé sur le Web visant à prévenir l'utilisation abusive des médicaments d'ordonnance. L'échantillon comprenait 346 femmes travaillant randomisés en soit une condition de contrôle expérimental ou liste d'attente. Une analyse de covariance et de régression logistique ont été utilisés pour comparer les réponses. Les femmes recevant l'intervention avait eu une meilleure connaissance des faits de drogue et une plus grande auto-efficacité des médicaments dans le respect et la capacité à gérer les problèmes avec des médicaments par rapport aux témoins. Les femmes recevant l'intervention avait aussi réduit les symptômes signalés sur la cage pour les médicaments sur ordonnance. Les résultats suggèrent que les programmes multi-media sur le Web peut être un complément bénéfique aux services de prévention de l'abus de substances.

RESUMEN

Objetivo del proyecto era poner a prueba un programa basado en web diseñada para impedir el uso indebido de medicamentos recetados. muestra del estudio consistió en 346 mujeres trabajadoras que se agruparon en un grupo experimental oa un grupo control. El análisis de covarianza y la regresión logística se utilizó para comparar las respuestas. Las mujeres que recibieron la intervención tenían más conocimiento de los hechos de drogas y una mayor auto-eficacia en adherencia a la medicación y la capacidad para manejar los problemas con los medicamentos en comparación con los controles. Las mujeres que recibieron la intervención también ha reducido los síntomas reportados en una encuesta para los síntomas asociados con el abuso de medicamentos recetados. Los resultados sugieren que los programas multimedia basados en la Web puede ser una adición beneficiosa a los servicios de prevención del uso indebido de sustancias.

THE AUTHORS

Dr. Diane Deitz is a health psychologist and senior health scientist at ISA Associates, a behavioral health organization that designs and implements health promotion programs for workplaces and other communities serving adult and youth populations. Since joining ISA in 1998, Dr. Deitz has served as Principal Investigator on several research projects that have focused on innovative approaches to substance abuse prevention. Dr. Deitz has authored peer-reviewed publications on this topic and presented at professional meetings and conferences. Dr. Deitz has focused much attention on issues related to the development of Internet- and DVD-based health programs, including program design, implementation, and analysis of data evaluating program effectiveness. Diane lives with her two children in Virginia.

Dr. Royer Cook is a research psychologist and president of ISA Associates, a behavioral health research organization specializing in substance abuse prevention and health promotion in the workplace. Since founding the ISA Group in 1978, he has directed a program of R&D on health improvement programs, serving as Principal Investigator on more than 25 research projects, supported mainly by numerous grants from the National Institutes of Health. Dr. Cook is the author of more than 75 peer-reviewed publications and has presented testimony before two committees of the US Congress. For the past 15 years, Dr. Cook and his colleagues have focused on the development of Internet- and DVD-based health programs for working adults, including substance abuse prevention programs cast in a health promotion framework. Royer lives in Alexandria, VA, with his wife Kathleen, and enjoys sailing, tennis, skiing, and reading.

April Hendrickson worked for the ISA Group from November 2000 through May 2007. While there responsibilities included providing principal investigators with support on health behavior research and evaluation projects, managing project databases, analyzing data, designing and managing online surveys, co-running focus groups, and conducting interviews. April has been employed by OMNI Institute in Denver, CO, since May 2007 where she manages small to medium research projects, provides support to leaders of larger projects, supervises junior staff, analyzes process and outcome data, provides evaluation technical assistance to local nonprofit organizations, and contributes to reports and grant proposals.

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