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Research Article

A Collaborative Intervention to Combat the Misuse of Prescription Drugs in Adolescents in Appalachia

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Abstract

The study purpose was to determine if a collaborative educational program would increase the knowledge of prescription drug abuse/misuse in adolescents. This quasi-experimental study consisted of a drug prevention program with a pre and post-test survey for knowledge. The convenience sample included 1,067 middle school/high schools in an Appalachian state. Utilizing a paired t-test, it was determined that the difference between pre and post-test answers was significant with a p-value of 0.006 (95% CI: 7.8%-37.1%) for increase in knowledge. When schools were analyzed separately, all schools experienced a significant increase in knowledge as indicated by the corresponding p-values $p<0.05$. A collaborative educational program can be an effective way to increase knowledge about prescription drug abuse/misuse in adolescents in Appalachia.

Keywords: Adolescents; Appalachia; Drug abuse/misuse; Educational program

Introduction

Many people take prescription drugs daily without incident. However, prescription drugs can be a source of danger. Prescription drug abuse/misuse is when an individual takes a medication that was prescribed for someone else or takes their own prescription in a way not intended by a doctor such as taking more than the prescribed amount or for a different reason; to experience a high [1]. Americans, especially young people assume a prescription medication that is prescribed by a physician is safer than illegal drugs [1]. Prescription drug abuse is a public health problem in America and most specifically in the Appalachian region of the United States. In the Appalachian region, prescription painkillers increased by 1,098 percent from 1999 to 2011 and was the number one cause of death by opioid overdose through 2015 [2]. According to the Office of Inspector General [3] in 2017 more than 42,000 opioid-related overdose deaths occurred in the United States with nearly 7,000 occurring in the Appalachian region in the states of Alabama, Kentucky, Ohio, Tennessee, and West Virginia. By the year of 2017, opioid overdose deaths in Appalachian counties

was reported as 72 percent higher than non-Appalachian counties with 24 opioid overdose deaths per 100,000 Appalachian counties compared with 14 opioid overdose deaths per 100,000 in non-Appalachian counties [2].

Adolescents are particularly vulnerable to prescription drug abuse/misuse. Research has shown that the primary developmental risk period for the onset of prescription drug abuse is during adolescence [4,5]. The National Survey on Drug Use and Health (NSDUH) Survey (2015-2016) reported 1,050 adolescents and 2,207 young adults (18-25 years of age) had misused opioids [6,7]. Additionally, a survey from the NSDUH data on youth and young adults, reported that more than 5,700 youth in 2014 reported using prescription pain relievers without a doctor's guidance for the first time [6,7]. In 2015, it was reported that in West Virginia, one state in the Appalachian region, 15.5% of high school students self-reported they took a prescription drug without a doctor's prescription including OxyContin (Oxycodone), Percocet (Oxycodone/ acetaminophen), Vicodin (Hydrocodone/ acetaminophen), codeine, and other non-opioid prescriptions like Adderall (Dextroamphetamine sulfate), Ritalin (Methylphenidate), or Xanax (Alprazolam) [8]. Adolescents obtain these prescription drugs in various ways. In one survey, 55.7% percent of adolescents

who abused/misused prescription opioids stated they obtained their drug of choice from friends or family members, 25.4% from the healthcare system, and 18.9% other means [9].

Prescription opioid drug abuse can have devastating effects on the physical development of adolescents. Brain development and maturation during the adolescent years can be adversely affected from the abuse of drugs [10]. This alteration in brain maturation and development can lead to risk-taking behaviors and the development of substance use disorders. The adolescent period is a time of transition both physical and psychological development in one's life. Heavy drug use during this vulnerable developmental period can interfere with normal growth and development. Healthy People 2020 [11], a national effort to promote health and prevent disease of all Americans, targets strategies and interventions to improve adolescent health. The Healthy People 2020 initiative is addressing the growing problem of prescription drug abuse in youth. Leading health indicators in Healthy People 2020 [11] contain objectives which focus on outcome indicators to reduce the use of tobacco, alcohol, and other drug misuse. A goal of Healthy People 2020 is to have programs in place to educate American adolescents about the deadly consequences of substance abuse [11].

Previous studies have looked at various ways to reduce prescription drug abuse and general drug abuse in adolescents. However, research with a collaborative intervention delivered in a school setting is limited. A study by [12] used two online science education games to look at changes in attitudes of prescription drug abuse and knowledge gains in two groups of students grades 11 and 12 [12]. They reported that changes in students' attitudes toward prescription drug abuse significantly shifted toward negative attitudes for both groups after exposure to the games. The researchers however were not able to determine science and health related knowledge gains due to low internal consistency reliabilities of the content measures [12].

Another study by Moore, et al. [13] developed and then evaluated a science-based interactive Web-based program to prevent the nonmedical use of prescription opioids in adolescents ages 12 to 17 years [13]. In Phase I of the development, significant knowledge gains were achieved on pre and posttest for youths in treatment for opioid dependence, for youths in general substance abuse treatment, and for opioid naïve youths. In Phase II, an increase in knowledge between pre and posttest was reported for youths in treatment and for opioid naïve youths [13]. Additionally, a study by Botvin, et al. [14] tested a school-based drug abuse intervention in minority students in New York City Schools [14]. A prevention program was used that discussed drug refusal skills, general social skills, antidrug norms, and self-management skills. Researchers found that those who received the school-based program reported fewer negative behaviors such as smoking, drinking, inhalant use,

polydrug use and drunken episodes.

Materials and Methods

With the growing seriousness of prescription drug abuse, especially in the adolescent population, schools and communities are partnering to explore prevention and intervention strategies appropriate for this vulnerable population. Collaborating with a community partner in primary prevention strategies has the potential to increase awareness and decrease prescription drug abuse/misuse. Primary prevention strategies are key to curbing prescription drug misuse/abuse. Education about drugs, safe alternatives to prescription pain medication use, and the promotion of a healthy lifestyle are harm reduction approaches that focuses on health promotion and disease prevention [15]. An educational program that can teach adolescents about prescription drug abuse/misuse has the potential to change behavior. Changing behavior can result in a decrease in the abuse/misuse of drugs especially in the Appalachia region that has been hit so hard by the drug abuse problem. However, little research has been conducted to determine the effectiveness of an educational collaborative program to increase prescription drug abuse/misuse awareness in the middle/high school population in Appalachian adolescents. Thus, the purpose of this quasi-experimental study was to determine if an interventional program developed in collaboration with a State Agency, would increase the knowledge of middle/high school students in Appalachia.

Research Question: Will a structured educational program on prescription drug abuse result in an increase in knowledge in middle/high school students in Appalachia?

Hypothesis: A structured educational program on prescription drug abuse will result in an increase in knowledge in middle/high school students in Appalachia.

This study was a quasi-experimental pre-test post-test design with an educational program as the intervention. The participants consisted of 1,067 middle school and high school students (Ages ranging from 11-18 years of age) from four counties in an Appalachian state. The study did not differentiate between gender nor age range. Therefore, stratification of these various factors could not be addressed. Convenience sampling was used. Participants were included in the study if they were present at school on the day the study was conducted. To protect the ethical rights of the participants, participants had the right to refuse to participate in the study if they chose not to by not completing the study survey. Surveys were coded to provide anonymity. The study was conducted in collaboration with the State Attorney General's Office. The educational intervention "Prescription Drugs That Kill" consisted of two parts developed by the State Attorney General's Office. Part one was a power point presentation describing the opioid epidemic in the state, opioids,

the effects of opioids, addiction, prescription drug disposal, resources, and support services offered. The second part of the educational intervention was a trivia type game. The questions in the trivia type game were administered by senior nursing students from a community nursing class from a local University.

A written multiple-choice survey was used to determine the knowledge level of the students about opioids, opioid abuse, and prescription drug abuse. The survey was administered before and after the educational program. All students received the educational program “Prescription Drugs That Kill” regardless of completion of the survey. The survey was developed by the researchers. Content validity of the survey was assessed by a panel of experts. The Scale Content Validity Index (S-CVI) was 0.90. This is considered valid [16]. The Individual Content Validity Index (I-CVI) was 1.00 for nine of the ten questions as these nine questions received a 3 or 4 rating by the experts demonstrating validity. The number of students who took the pre-test was 1,041 while 1,067 completed the post-test. Overall, similar numbers of students took each exam; only 26 more students took the post-test compared to the pre-test. See (Table 1). Statistical analysis of data was completed using frequency counts, a paired t-test, and confidence intervals were computed. The level of significance was set at $p < 0.05$. School data was aggregated for overall analysis. Correct answers were determined by students who selected one and only one choice; student choices that included the correct answer but also one or more incorrect answers were not considered correct.

School Name	Pre-Test	Post-Test
Middle #1	67	69
Middle #2	49	49
Middle #3	183	184
Middle/High Combo	119	166
Middle #4	141	111
High School #1	61	61
Middle #5	177	170
Middle #6	244	257
Total	1041	1067

Table 1: Demographics - Number of students who took each test.

Results and Discussion

Results

The average difference between test scores was 22%. Utilizing a paired t-test, it was determined that the difference in knowledge between pre and post-test was significant with a p-value of 0.006 (95% CI: 7.8%-37.1%). See (Table 2).

Question Number	Pre-Test	Post-Test	Difference
1	0.86	0.97	0.11
2	0.56	0.8	0.25
3	0.32	0.76	0.44
4	0.57	0.67	0.11
5	0.92	0.96	0.05
6	0.09	0.84	0.75
7	0.64	0.82	0.18
8	0.77	0.93	0.16
9	0.83	0.9	0.06
10	0.7	0.84	0.14
Average	0.63	0.85	0.22

*p-value of 0.006 (95% CI: 7.8%-37.1%)

Table 2: Overall Results - Percentage of correct answers by exam type and question number.

When schools were analyzed separately, all schools experienced a significant increase in knowledge as indicated by the corresponding p-values. See (Table 3).

School Name	Pre-Test	Post-Test	Difference	P-Value
Middle #1	61%	85%	24%	0.0139
Middle #2	58%	80%	22%	0.0064
Middle #3	64%	88%	24%	0.0074
Middle/High Combo	62%	75%	13%	0.0317
Middle #4	63%	90%	26%	0.0029
High School #1	57%	87%	30%	0.0017
Middle #5	66%	88%	22%	0.0097
Middle #6	62%	86%	24%	0.0025

Table 3: Individual School Results - Average percentage of correct answers by school.

Discussion

Prescription drug misuse/abuse in adolescents in a major public health issue. Data supports an increase in the misuse/abuse

of prescription medication and opioids in adolescents and young adults. Strategies must be implemented to increase knowledge about the safe use of prescription medication, alternative modes of treatment, and the proper disposal of unused medication. The goal of this educational program was to examine whether a collaborative community approach utilizing an interactive teaching strategy on the dangers of prescription drug misuse/abuse can be successful in increasing middle and high school students' knowledge about prescription drug abuse and opioid use. In this study, an educational program consisting of a PowerPoint lecture/discussion with a pretest-posttest survey was utilized. The results of this study showed a significant knowledge increase on the dangers of prescription drug misuse/abuse. Results in all schools showed an increase in knowledge ranging from 13-30 percent. Therefore, the hypothesis was supported by the results from the pre and post-test survey.

Results from this study are similar to previous research looking at prescription drug abuse interventions. The current study showed a significant increase in knowledge after the collaborative educational program which consisted of power point presentation and trivia type game. In a study by Moore, et al. [13], after the researchers developed and tested a science-based interactive Web-based program to prevent the nonmedical use of prescription opioids in adolescents, they found an increase in knowledge from pre to posttest [13]. Findings from the current study are also similar to the study by Botvin, et al. [14] in which they reported that students who received the school-based prevention program reported fewer negative behaviors such as smoking, drinking, inhalant use, polydrug use and drunken episodes [14]. Lastly, results are similar to a study by Klisch, et al. [12] which used two online science education games to look at changes in attitudes of prescription drug abuse and knowledge gains in two groups of students grades 11 and 12 [12]. They reported that changes in students' attitudes toward prescription drug abuse significantly shifted toward negative attitudes for both groups after exposure to the games.

Early intervention utilizing school-based programs may be the key to preventing life-long addiction. Studies have been conducted to determine the effectiveness of school-based programs in both urban and rural settings and have found this approach to be beneficial in producing positive outcomes [17]. Using a collaborative community approach in a school setting will not only increases knowledge but strengthens a "Sense of community". Early intervention versus late intervention can change a child's path from one of addiction to positive behaviors.

Limitations

The study has several limitations. The majority of students were from middle schools in four counties in the Appalachian state thus the generalizability of the study is limited. It would be

difficult to generalize to students outside the Appalachian region. Additionally, it would be difficult to generalize this information to high school students as most of the students were from middle schools. Another limitation is the survey used to collect data needs additional testing to determine further reliability and validity. A final limitation is the difference between pre-tests collected and post-tests collected although this difference is only 2.4% of the total sample.

Implications for Practice and Research

If a structured education program can be used to improve knowledge in middle/high school students in Appalachia, then this can be used as a basis for an early intervention for preventing prescription drug abuse/misuse. Primary prevention is very important in decreasing the incidence and prevalence of substance abuse/misuse. Education about the risks and adverse effects of prescription drug abuse/misuse can help adolescents make informed decisions about behaviors that will affect their health.

Collaborating with local government agencies can assist nursing in the resources needed to prevent prescription drug abuse/misuse by early intervention in the school system. Taking a proactive preventive approach and partnering with government agencies and community agencies foster quality community outcomes. Making progress towards positive population health initiatives involves the integration of knowledge from many disciplines to achieve health outcomes and alleviate health determinants [18]. Communities and schools are taking a collaborative approach to address this serious problem of prescription drug abuse in youth. The philosophy of the Community Anti-Drug Coalitions of America is embedded in a multifaceted approach to raising awareness and educating youth, parents, schools, and communities about prescription drug abuse [6,19]. Community coalitions build and strengthen the ability of communities to design safe, healthy, drug-free environments for all who reside.

Future research is needed on the efficacy of collaborative drug prevention programs in knowledge building in both Appalachia and states outside the Appalachian region. It is also needed to examine the perceptions, attitudes and beliefs held by middle/high school students in relation to the use of prescription drugs for nonprescribed purposes. Identifying commonly held beliefs and perceptions about the use of prescription drugs for nonprescribed purposes may provide indicators on structuring future educational prevention programs. Research focusing on prescription drug abuse/misuse and associated perceptions and beliefs, may have the power to alter the course of addiction.

Conclusion

Prescription drug abuse/misuse in the adolescent population is a public health problem across the United States and particularly

the Appalachian region. In this study, an educational intervention developed in collaboration with a community partner was found to be significantly effective in increasing knowledge about prescription abuse/misuse. By increasing knowledge, behaviors can be changed decreasing the incidence of prescription drug abuse/misuse. A preventive educational program on the prescription drug abuse/misuse in young teens is one way to combat this issue in Appalachia and across the United States.

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