JOHNSON COUNTY PUBLIC HEALTH

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The Impact of Flu Fighters Intervention Campaign on the Incidence of Student Absence Due to Illness at Two Johnson County Elementary Schools

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Abstract

The 2003-2004 influenza season had the potential to cause severe morbidity and mortality due to cases seen early in the fall, widespread vaccine shortage, and antigenic drift between the vaccine strain and circulating strain. In response to the potential for a severe flu season, a pilot flu prevention program was initiated in a Johnson County elementary school. Another school monitored student illness to allow comparison of rates between schools after the program ended. The school participated in disease prevention educational activities, and began using ethanol-based hand sanitizer. The interventions used in this program were successful in reducing the incidence of student absence due to illness at the school.

Introduction

For more than a decade, the influenza vaccine has been promoted as the best defense against influenza[1]. The vaccine is most effective in preventing influenza illness when the vaccine strains are the same as strains circulating among the general population. However, widespread morbidity and mortality may result when vaccine is in short supply, the strain circulating does not match the vaccine, and/or influenza cases are seen in early fall[1]. The 2003-2004 flu season met all of the criteria for an especially severe flu year[2].

The intervention used in this program involved traditional methods of disease prevention: education, proper hand sanitizing technique, and disease awareness. A key component of this intervention was the use of ethanol-based hand sanitizers in the classroom.

The antimicrobial effects of alcohol have been documented for over a century[3]. In recent years, alcohol-based hand sanitizers have become part of standard hospital disinfection practices[4]. Several studies have documented antimicrobial activity of alcohol against gram-positive, gram-negative, and even multi-drug resistant

pathogens. Many viruses are also susceptible to alcohol including herpes simplex, human immunodeficiency virus (HIV), influenza, respiratory syncytial virus, vaccine, hepatitis B, hepatitis C, rotavirus, adenovirus, and rhinovirus[4]. Studies have also shown that preparations with alcohol concentrations of 60-90% are most effective[5,6]. Hospital-based studies have shown that alcohol-based solutions have a greater reduction of bacterial contamination when compared to simple hand washing[7,8]. However, alcohol-based solutions have limited lasting efficacy and cannot adequately cleanse visibly soiled hands[5]. For these reasons, it was decided the use of alcohol-based hand gel in this intervention program would be beneficial. Therefore, it was believed the school participating in the intervention will have a significant reduction in the incidence of student absence due to illness.

Methods

School communities

The school participating in the intervention, Elementary School A, has approximately 450 students, grades kindergarten through fourth. The school is located in a rural community of 1,100 residents[9]. The school not participating in the intervention and serving as the control, Elementary School B, also has approximately 450 students, and is located in a rural community of 700 residents[9]. Both communities are located in Johnson County.

Both schools kept an attendance log, and recorded the date, grade, and symptoms of each incident of absence due to illness for approximately 2 months.

Elements of the intervention

A guide to student illness was sent home to parents in elementary school A, which included a simple symptom chart, suggestions for taking care of ill children, and symptoms of flu. A Johnson County Public Health Disease Prevention Specialist gave a presentation to the staff at Elementary School A explaining the components of the Flu Fighters program. Students participated in Flu Fighters lesson plans which included a lesson on germ transmission, hand washing, and proper use of hand gel. The students then completed a paper exercise. The final classroom component was an experiment using Glo-Germ™ mock germs. The students observed the spread of the mock germs under ultra-violet light. They then practiced hand washing and the removal of the mock germs. The students continued paper exercises throughout the program to reiterate disease prevention methods. The educators were provided with the same symptom guide as the parents, and were asked to limit student group activities if classroom absence due to illness exceeded 10%.

Alcohol-based hand gel

The alcohol-based hand gel used contained 60% ethanol. Individual bottles were placed in student groups of 3-4, a pump was provided for each classroom, and two wall-mounted pumps were placed at the entrance to the school cafeteria.

Illness monitoring and classification

The daily incidence of student illness was categorized into symptoms of influenza-like illness (ILI) and symptoms of non-influenza like illness (NILI). The symptoms were classified according to the Iowa Department of Public Health Reporting of Student Absenteeism form[10]. Reasons for student absence not attributable to communicable disease were excluded from the analysis. Symptoms classified as ILI were: fever, headache, fatigue, cough, sore throat, nasal congestion, and body aches. Stomach

ache, diarrhea, nausea, and vomiting were classified as ILI if at least one non-gastrointestinal influenza-like symptom was also present. Symptoms classified as non-influenza like illness were: stomach ache, nausea, vomiting, diarrhea in the absence of flu-like symptoms, earache, strep throat, and any other communicable disease-related symptom given.

Analysis

The total number of student absences due to illness at each school was determined along with total potential absences due to illness. An odds ratio was calculated to ascertain the probability of absence in School B compared to School A.

Results

Elementary School A had a total of 274 out of 16286 potential absences due to illness for the duration of the program. Elementary School B had a total of 457 out of 15743 potential absences due to illness for the duration of the study. School A had an average of 7.6 absences due to illness each day, and School B had an average of 12.7 absences due to illness each day. Based on the total absences, School A had a 40% reduction in absence due to illness when compared to School B.

School B was 1.7 times more likely to have students absent due to illness than School A.

Influenza-like illness

Elementary School A had a total of 137 absences due to influenza-like symptoms. Elementary School B had a total of 277 absences due to influenza-like symptoms. School A had an average of 3.8 absences due to ILI each day, and School B had an average of 7.7 absences due to ILI each day. Based on the total absences, School A had a 50% reduction in absence due to ILI when compared to School B.

Non-Influenza like illness

Elementary School A had a total of 140 absences due to non-influenza like symptoms. Elementary School B had a total of 181 absences due to non-influenza like symptoms. School A had an average of 3.9 absences due to NILI each day, and School B had an average of 5.0 absences due to NILI each day. Based on the cumulative incidence rates, School A had a 22% reduction in absence due to NILI when compared to School B.

Discussion

Based on the analysis of total absences and daily averages, the intervention conducted at Elementary School A significantly reduced student absence due to communicable illness. This was the expected result since the components of the intervention used in this program were chosen based on proven efficacy in reducing pathogen transmission in hospital settings. There was no examination of which components were most effective.

Alcohol-based hand gel in the classroom

The inclusion of alcohol-based hand gel within the classroom has several benefits. First, students needing to disinfect their hands do not have to leave the classroom. When one hand gel is available for groups of 3-4 students, accessibility is improved and class disruption is minimized. Second, the hand gel is an acceptable substitute for hand washing when hands are not visibly soiled. Alcohol-based hand gels show little evidence of causing adverse skin reactions and may hydrate dry hands when

the product used contains an emollient as the product used[11]. Schools wanting to implement the use of alcohol-based hand gel have several options. Hand gel may be added as a school supply requirement for individual use or in pump size. Schools may also work with a commercial supplier to provide hand gel. Commercial suppliers can provide large, multi-use pumps which may be more cost effective than individual bottles. School A is currently working to continue providing hand gel from a commercial supplier using Parent Teacher Organization funding.

It is important to note that students must understand the proper use of hand gel to prevent over-use. Also, the use of alcohol-based hand gel should never completely replace hand washing.

Analysis

The difference between the percent reductions in ILI verses NILI may be attributable to symptom classification. Without confirmation of influenza, it is difficult to determine which absences may be influenza. Further analysis will be completed during the summer of 2004, and at that time the method of symptom classification will be reviewed.

Specific illness

There was a higher incidence of strep throat in Elementary School A compared to School B. Studies indicate alcohols have antimicrobial activity against non-spore forming bacterial pathogens[4]. Therefore it is likely that alcohol is effective in eliminating *Streptococcus pyogenes*. School A may have had a preexisting elevated prevalence of strep throat.

Conclusion

The success of this intervention raises the possibility that alcohol-based hand gels could play a vital role in student absence reduction in schools. However, all elements of disease prevention including education, hand sanitization, and awareness should be emphasized whenever a school attempts to reduce rates of student illness. In addition, the involvement of parents and administrators is another factor in making a program like Flu Fighters successful. Parental participation may improve results by helping parents discern when it is appropriate to keep children home from school, how to continue disease prevention in the home, and recognition of the importance of parental encouragement. The school administrators involved in this program were dedicated to maintaining focus on the intervention. The program must capture the attention of students throughout the duration of the intervention. The combination of lessons, writing activities, and hands on experiments provides optimal opportunity for students to learn and retain disease prevention methods.

Hopefully this program will be available to other elementary schools in Johnson County next school year.

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