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Preventing the Spread of Illness in College Residence Hall Populations

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Author Note

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Abstract

Illness contributes to a decrease in student class attendance which can lead to increased academic stress. Decreasing the spread of illness among those living in residence halls is essential to academic success. The purpose of this systematic review was to identify interventions implemented in residence halls on college campuses to reduce the spread of illness. The PICO question directing the research for this study asks, “How do interventions affect the spread of illness in university residence hall populations?”. The research conducted was completed by means of a systematic review of literature including 20 peer reviewed articles published between 1999-2017 from the databases CINAHL Plus, PsychInfo, and PubMed. Findings from this review revealed a focus on three interventions used to decrease illness among college students living in residence halls: (1) hand washing, (2) lifestyle initiatives, and (3) education. Of the three, hand washing and educational measures were found to decrease the spread of illness, while lifestyle initiatives were found to have no direct correlation to the spread of illness.

Keywords: college students, education, disease, disease education, spread of illness, hygiene, health interventions, college campus, illness, residence halls, dormitories

Preventing the Spread of Illness in College Residence Hall Populations

The prevalence of illness among college students living in residence halls is a common concern among universities. Approximately one in four college students contract the flu every year (Knox, 2008). The National Center for Educational Statistics (2017), estimated that roughly 20.4 million students would be enrolled in college in the fall of 2017, demonstrating a 5.1 million student increase since the fall of 2000. To be noted, in the 2003-2004 school year, 15.1 % of college students enrolled in an institution lived on campus in residence halls (National Center for Educational Statistics, 2004). With the increasing overall university student population there is potential to also increase the number of students living in campus residence halls. This high density of students living in residence halls on college campuses has demonstrated to be a risk factor for the spread of illness (Decker & Slawson, 2012).

Communicable illnesses can be correlated with many negative outcomes for college students. According to White et al (2003), illness often causes students to miss class which tends to result in a decrease in the overall educational success of the student. This decrease in success can be linked to the stress of academics which has been found to be one of the biggest sources of stress for college students (Dusselier, Dunn, Wang, Shelley, & Whalen, 2005).

The literature provides strong evidence supporting three methods that can lead to a decrease in the spread of illness within college residence halls: (1) hand washing, (2) lifestyle initiatives, and (3) preventative education (Prater, Fortuna, McGill, Brandeberry, Stone, Lu, 2016; Miller, Chandler, and Mouttapa 2015; Kattelman, Bredbenner, White, Greene, Hoerr, Kidd, . . . Morrell, 2014; Small, Bailey-Davis, Morgan, and Maggs 2013; Decker and Salwason, 2012; Huttlinger, 2010; Wilson et al, 2010; Taylor, Basco, Zaied, & Ward, 2010). Handwashing is used to decrease the spread of microbial colonies through physical contact with others.

Lifestyle initiatives are used to increase overall student health, decreasing the risk for illness. Lastly, preventative education teaches students the signs and symptoms of illness, management of illness, and how to prevent illness.

Decker and Slawson (2012) performed experiments to assess bacterial contamination inside residence halls on a college campus. They discovered four factors that contributed to the spread of bacteria in residence halls including the abundance of objects that have potential to carry infection, large concentrations of students who are frequently changing locations, “splash and dash” hand hygiene, and gendered behavior, regarding the normal hygiene patterns of males and females. These findings demonstrated the presence of decreased healthy lifestyle habits of college students living in residence halls related to hand washing practices. Proper hand washing practices repeatedly demonstrated a decrease in the spread of illness on college campuses (Prater, Fortuna, McGill, Brandeberry, Stone, Lu, 2016; Decker & Slawson, 2012; Wilson et al, 2010; Taylor, Basco, Zaiid, Ward, 2010). Overall, the hand washing initiatives that were shown to be most effective were using gel sanitizers, proper hand washing technique after restroom use, and education about hand hygiene.

Research has also demonstrated that lifestyle can be a significant factor in regards to contracting infection and college students are at risk for inadequate lifestyle habits (Brown, O’Connor and Savaiano, 2014; Kattelman, Bredbenner, White, Greene, Hoerr, Kidd, . . . Morrell, 2014; Small, Bailey-Davis, Morgan, & Maggs, 201; Decker and Slawson, 2012). Proper diet, adequate sleep and fitness initiatives have been studied among college students as a means of illness prevention as these factors are important in overall health (Brown, O’Connor & Savaiano, 2014; Kattelman, Bredbenner, White, Greene, Hoerr, Kidd, . . . Morrell 2014; Small, Bailey-Davis, Morgan, & Maggs, 2013; Decker & Slawson, 2012). According to Small, Bailey-

Davis, Morgan, and Maggs (2013), college students are gaining weight at a rate of six times that of the general population and many college students engage in behaviors that decrease the likelihood of optimal health and increase the likelihood of being overweight or obese. In regards to sleep habits, 89% of college students report problems with sleepiness during daytime activities which is an indicator of chronic sleep problems. These chronic sleep problems lead to a decreased physical and mental health status (Mackert, Lazard, Guadagno, & Wagner, 2014).

Research has also demonstrated the importance of preventative education as an effective means of decreasing the spread of illness among college students (Miller, Chandler, & Mouttapa 2015; Wilson & Huttlinger, 2010). Students that were trained to educate other students about illness spread, the use of a smartphone application providing health information, and in-person teaching through evidence-based practices were methods resulting in an overall increase of student knowledge regarding illness prevention (Pogreba-Brown et. al, 2017; Miller, Chandler,& Mouttapa 2015; Butler, 2007).

The purpose of this systematic review was to analyze and synthesize the research surrounding these three common methods of illness prevention:(1) hand washing, (2) lifestyle initiatives, and (3) preventative education, as they relate to college campus residence halls (Prater, Fortuna, McGill, Brandeberry, Stone, & Lu, 2016; Miller, Chandler, & Mouttapa, 2015; Kattelman, Bredbenner, White, Greene, Hoerr, Kidd, . . . Morrell, 2014; Small, Bailey-Davis, Morgan, & Maggs, 2013; Decker & Salwason, 2012; Huttlinger, 2010; Wilson et al, 2010; Taylor, Basco, Zaied, & Ward, 2010). While these are not the only methods available to prevent the spread of illness, these were chosen due to the large number of research studies focusing on these methods as well as being the most relevant for residence hall populations.

The PICO question directing the research for this study is as follows, “How do interventions affect the spread of illness in university residence hall populations?”. This aligns with the purpose of this systematic review which was to identify interventions implemented in residence halls on college campuses to reduce the spread of illness. The literature reviewed includes evidence of and discusses varying interventions that affect the spread of illness on college campuses, which directly or indirectly affects the university residence hall populations.

Methods

Twenty peer-reviewed articles, published between 1999 and 2017, were retrieved using the databases CINAHL Plus, PsychInfo, and PubMed. Articles were selected that included studies regarding illness prevention interventions implemented on college campuses. These interventions focused on decreasing the spread of communicable illness and health promotion efforts that would directly affect the spread of communicable illness. Keywords used to search the databases included: college students and education and disease; disease education and college students; disease and prevention and college students; spread of illness and college students; hygiene and college students; health interventions and college campus; spread of illness and college students; illness and residence halls or dormitories; spread of illness and college students and prevention. An inclusion criterion was that the population being studied focused on college students. The age of students was not taken into account as the research criteria must have been relevant to university or college populations. Although the focus of this systematic review was primarily related to students living in residence hall communities, studies that looked at entire college campus populations were also included to allow for a more holistic look at the spread of all illness on campus. Each article reviewed was unbiasedly chosen, as the goal of the literature review was to find varying interventions on college campuses. Due to the variety of the

interventions reviewed in the literature, there were not any significant inconsistencies or controversies. Each intervention reviewed provided its own unique methods and populations.

Review of Literature

This section will describe studies that focused on how three interventions; hand hygiene, lifestyle initiatives, and preventative education, play a role in preventing the spread of disease on college campuses. The PICO question directing the research for this study asks, “How do interventions affect the spread of illness in university residence hall populations?”. The gaps in knowledge for this research project are due to the lack of research articles for the topic being researched. Due to the variety of methods researched, there is a gap in knowledge regarding the effectiveness of these methods in varying sizes and types of universities and residence halls. Also, due to the varying methods of interventions used on varying sizes of universities, the inconsistencies are not clear. Included in the review of literature below is the data collected from the overall research and its effectiveness. Methods and practices regarding efforts aimed to reduce the spread of disease are detailed below.

Hand Hygiene Practices and Initiatives

Among the articles reviewed, many highlighted hand hygiene and its effects on a person’s health. Using gel sanitizers, hand washing after restroom use, and education about hand hygiene were all used to decrease illness among college students. Key studies regarding hand hygiene practices and initiatives are discussed in detail in this section.

Hand washing plays a significant role in the spread of illness among people. Many hospitals have implemented strict hand washing guidelines that have demonstrated a reduction in the spread of various illnesses (Pittet, & Donaldson, 2005). Similarly, several university residence halls have begun to implement hand hygiene initiatives in order to decrease the spread

of illness among students (Taylor, Basco, Zaied, & Ward, 2010; White et. al., 2003). White et al. (2003) conducted a study among 430 students living in residence halls at the University of Colorado, Boulder. During this study, two groups were used to determine accurate results. One group was not given any hand hygiene education and no gel sanitizers were placed in their residence halls. The other group was given education and gel sanitizers in their residence halls. The group that received education and gel sanitizers reported less illness and loss of school days (White et al., 2003). White et al. (2003) found that hand hygiene education and implementation was shown to decrease illness and decrease missed school days due to illness. Similarly, in a study done of 100 students at Auburn University in Montgomery, Alabama, students who reported washing their hands more frequently reported less illness with 66% of hand washers reporting rarely being sick while 53% of non-hand washers reported being sick every 3 months (Taylor, Basco, Zaied, & Ward, 2010).

A study performed at the University of Findlay in Findlay, Ohio tested bacteria on the hands of 220 students. The students were found to have a significant number of microbial colonies on their hands that had the potential to increase illness and absences from class. The students were then educated about the proper technique of handwashing as described by the Center for Disease Control and Prevention (CDC). The CDC hand washing procedure includes wetting hands with water, applying soap and rubbing the soap into a lather over hands, scrubbing the hands for at least 20 seconds, running the hands under running water, then drying the hands with a paper towel ("Hand Washing: Clean Hands Save Lives", 2016). Implementing the Center for Disease Control and Prevention handwashing procedures significantly increased proper handwashing practices among these students, therefore decreasing microbial colonies, as

evidenced by less students self-reporting illness. (Prater, Fortuna, McGill, Brandeberry, Stone, & Lu, 2016).

Other studies performed showed that hand hygiene was a social construct and many more women than men performed hand hygiene after using the restroom. A study conducted at the University of Kansas suggested that hand hygiene was highly influenced by social pressure. If a nurse was being watched by other nurses or physicians, the nurse was more likely to perform hand hygiene (Wilson et al, 2010). Similarly, Thumma, Aiello, and Foxman (2009) found that there were differences between hand hygiene practices among males and females. Both studies suggest that women feel a stronger social pressure to wash their hands, especially if other women are in the bathroom (Wilson et al, 2010; Thumma, Aiello, & Foxman, 2009). Although, social pressure has demonstrated to have a positive effect on hand hygiene it does not indicate proper hand washing technique (Wilson et al, 2010; Thumma, Aiello, & Foxman, 2009).

While much of the research demonstrates that increasing hand washing decreases the prevalence of illness, some research does not show a correlation between hand hygiene practices and illness. In a study conducted at the University of Michigan in Ann Arbor, Michigan, illness rates did not decrease due to increased hand hygiene (Thumma, Aiello, & Foxman, 2009). This study did find that women washed their hands more often than men, but no decrease in illness was demonstrated as a result. This may have been due to lack of proper hand washing education leading to improper hand hygiene (Thumma, Aiello, & Foxman, 2009).

Overall, the research stresses that hand hygiene is an important factor in decreasing the spread of illness among students living in residence halls. Proper hand washing technique is a vital part of hand hygiene leading to a reduction of illnesses among college students (Prater, Fortuna, McGill, Brandeberry, Stone, & Lu, 2016; Taylor, Basco, Zaied, & Ward, 2010). Along

with hand hygiene, lifestyle habits and initiatives have also demonstrated a reduction of illnesses among college students.

Lifestyle Habits and Initiatives

Of the twenty articles reviewed, several lifestyle initiatives focusing on eating, sleeping, and exercise emerged as being implemented on college campuses (Brown, O'Connor & Savaiano, 2014; Kattelman, Bredbenner, White, Greene, Hoerr, Kidd, . . . Morrell, 2014). The data gathered displayed information that discussed the current lifestyle habits of college students living on a university campus, initiatives that encouraged healthy lifestyle habits on college campuses, and the effect of those initiatives on the lifestyle habits of college students.

Researchers have demonstrated that there is evidence of a decrease in the frequency of healthy lifestyle habits overall throughout the college experience. Small, Bailey-Davis, Morgan, and Maggs (2013) researched, by means of a survey, the eating and exercise habits of college students over a period of a seven-semester span. The researchers sent the survey to 746 students before and after a seven-semester span, with 608 students completing both surveys. According to Small, Bailey-Davis, Morgan, and Maggs (2013), daily fruit and vegetable consumption and daily physical activity declined significantly from the first to the seventh semester. The survey results displayed that in their first semester of college, students consumed, on average, 2.37 servings of fruits and vegetables each day and did not increase their vegetable and fruit intake over the following six semesters. Also, on average, freshman students exercised 26 minutes a day their first semester and by the seventh semester the average hours spent exercising each day decreased to 18 minutes a day. Both of these findings are less than the recommended 60 minutes a day of exercise according to the writers of the Physical Activity Guidelines Advisory Committee Report (2008).

Research conducted by Decker and Slawson (2012), demonstrated the compliance of college students to behavioral health preventative measures, such as vaccines was low, even during the H1N1 epidemic crisis. The research completed was based off a survey of 656 students at a Canadian university. Decker and Slawson (2012) found that many college students reported being worried about contracting the illness but did not plan on receiving the vaccination. In fact, 70% of the students did not plan on receiving the H1N1 vaccine and 83% did not plan on receiving the annual flu shot. When asked the reason for noncompliance to the previously stated vaccinations, 40% of students stated that they did not feel it was necessary. Other reasons included that the students did not want to get sick, they were afraid of needles, it was inconvenient, and it was not beneficial because they had not had the flu before. Overall these sources indicate the presence of decreased healthy lifestyle habits of college students living in residence halls (Decker & Slawson, 2012).

Several researchers have suggested and evaluated various initiatives on college campuses that demonstrated effectiveness in increasing healthy lifestyle habits among college students living in residence halls (Brown, O'Connor & Savaiano, 2014; Kattelman, Bredbenner, White, Greene, Hoerr, Kidd, . . . Morrell, 2014). Brown, O'Connor and Savaiano (2014) conducted an study to evaluate the acceptance and effectiveness of sending repetitive nutrition-related text messages to college students with the goal of increasing their knowledge. At the conclusion of the experiment, which involved 150 undergraduate students being sent images of the United States Department of Agriculture's Dietary Guidelines and MyPlate icon for seven weeks, there was found to be an increase in self-reported MyPlate recognition among the students as well as an increase in fruit and vegetable consumption (Brown, O'Connor & Savaiano, 2014).

A similar experiment was performed by Kattelman et al. (2014), which found that educating college students by means of internet lessons and emails was effective resulting in a slight increase in fruit and vegetable intake as well as a more healthful self-regulated mealtime. This initiative took the form of a 10-week, web based internet lesson intervention that included 1,639 college students across thirteen college campuses. These lessons and emails took a non-diet based approach and covered topics such as healthy eating, physical activity, stress management, and healthy weight management. Students who received the lessons and emails increased their daily intake of fruits and vegetables from 2.6 cups to 2.8 cups per day and reduced their overall fat intake from 31.3% kilocalories from fat a day to 30.4% kilocalories from fat a day. Overall, these interventions show that technologies such as text messages, the internet, and emails may be effective avenues for promoting healthy lifestyle habits in college students (Kattelman et al., 2014).

Preventative Education

Preventative education is a hallmark in preventing the spread of disease in community format (Miller, Chandler, & Mouttapa, 2015; Wilson & Huttlinger, 2010). This section of this systematic review focuses on diseases such as influenza, colds, upper respiratory tract infections, and other common diseases found in people dwelling in small residential communities on college campuses.

Throughout the literature there was limited information regarding the spread of communicable diseases within college residential communities. Much of the existing research regarding college students living in residence halls focuses on sexually transmitted infections (STIs) and mental health prevention education. Although the existing research focuses on the preventative education strategies used in preventing STIs and mental illnesses, the research is

outlined in this section since the methods can be applied to preventative education for communicable illnesses as well.

There are multiple studies that indicate that preventative education is an effective tool in minimizing the spread of illness (Miller, Chandler, & Mouttapa, 2015; Wilson & Huttlinger, 2010). In a study conducted at New Mexico State University, researchers looked at the amount of knowledge students had regarding influenza spread and strategies to prevent the spread among residence hall students (Wilson & Huttlinger, 2010). This study included 175 dormitory students and showed that students were only moderately aware of the pandemic flu in the United States and only 40% knew proper isolation when sick (Wilson & Huttlinger, 2010). The implications of this study suggest that education should be provided for students about what to do when experiencing illness and when it is appropriate to go to class (Wilson & Huttlinger, 2010). This study demonstrates the need for education among college students about illness response and prevention.

Developing upon the need for preventative health education programs, Morris-Paxton, Van Lingen, and Elkonin (2017) studied the effectiveness of one such program among students at a university in South Africa. In the study, students completed a 15- week online course to educate about health promotion and disease prevention strategies. Data from the pre and post test scores were analyzed and showed that students had an increase in health information knowledge after participating in the education program. The results of these studies demonstrate the need and effectiveness of preventative education among college students residing in residence halls regarding the prevention of illness (Morris-Paxton, Van Lingen, & Elkonin, 2017; Wilson & Huttlinger, 2010).

Methods of preventative education.

This section of the literature review will focus on the most effective teaching strategies to prevent disease and decrease its spread in residence halls. Miller, Chandler, and Mouttapa (2015) looked at the potential use of a smartphone application to give students on college campuses increased access to health information. This study took place at a large university in California with a sample size of 219 students. Data was collected through surveys and focus groups to determine how students would be most likely to use health information provided by the university. Researchers asked students what method of providing health information they would be most likely to use. The results of this study showed that the use of a smartphone application would be an effective means to get information to students on campus because many college students have smartphones and would be more likely use it (Miller, Chandler, and Mouttapa, 2015). Similarly, a study conducted by Butler (2007) investigated the most effective means of delivering health information across campus. This study surveyed 32 college healthcare providers to gain insight into best practice. The results indicated that printed material would be most useful and that PowerPoint presentations would be most effective for communicating health information to large groups. Additionally, it was found that the best way to disseminate the information to healthcare providers would be over email or in letter form. Another outcome of the study done by Butler (2007) was the development of an evidence based curriculum for meningitis education. While meningitis was not the focus of this review the format and information developed in this evidence based curriculum can be used to create evidence based curriculums for communicable diseases on college campuses.

Student response teams are another form of educating college students that has demonstrated effectiveness (Pogreba-Brown et. al, 2017). Student response teams are students

that have been trained by the public health department to educate large numbers of students on campus. Pogreba-Brown et al. (2017) looked at data regarding the impact student response teams had when diseases was spreading on the campus. In this study, student response teams helped train other students and increase the communication between public health departments, university officials, and students. This demonstrated an effective means of increasing student education to help stop the spread of illness on campus and a way for accurate information about prevention to be communicated to students.

This current review of the literature suggests that college students in residential communities have an increased need for health information education (Pogreba-Brown et al., 2017; Miller, Chandler, & Mouttapa, 2015; Wilson & Huttlinger, 2010). There are many ways that this information could be distributed to students such as by healthcare professionals on campus, smartphone applications, educating students that can go and distribute information in greater numbers, or via printed materials. A key feature of this education is that it needs to be evidence based and strategically distributed to increase students access (Butler, 2007).

Preventative education is vitally important in halting the spread of illness and preventing disease on college campuses, specifically in the residence hall populations. Through proper educational resources and tools there is potential to prevent the spread of disease in college students creating a healthier university population.

Critical Appraisal of Evidence

Limitations of Findings

This systematic review faced several limitations that affect the breadth of the data reviewed. One limitation includes the lack of articles published on the topic of decreasing the spread of illness on college campuses. Three databases, CINAHL Plus, PubMed, and PsycInfo

were used to search for articles on the research topic. The original research goal was to focus on one specific initiative but early in the data collection process it was discovered that the lack of articles on the topic would require us to broaden our research to other health related educational methods and initiatives. Out of the 20 articles collected, six were directly related to hand washing initiatives on college campuses and the remaining 14 included data and research on varying healthy lifestyle initiatives and preventative education for college students. More articles found would have increased the depth of the information synthesized, making the systematic review more accurate of the study of decreasing the spread of illness on college campuses.

Validity of Methods

In order to provide the most accurate information regarding the topic of research, it is important that the research collected and synthesized meets appropriate criteria. As previously stated in the methods section, each article met the criteria of being peer-reviewed and included information regarding the spread of illness on college campuses. Due to the lack of articles available, the articles collected for this study were all published within the past 20 years. Eleven of them were published in the last five years, making over half our research more applicable to present day college situations. A way to focus the research would have been to include in the criteria the need for the data to be directly focused on spread of illness in residence halls, but due to the lack of available articles these criteria were not able to be met.

Reliability of Methods and Findings

There are several aspects in the review of literature that depict the reliability of the findings including the level of evidence, the sample size and characteristics, and how the results were gathered. Of the articles collected, 55% were Level Four: Cohort and Case Design Studies.

Three articles were Level Five: Systematic Review of Descriptive and Qualitative Studies and both Level Three: Controlled Trials without Randomization and Level Six: Single Descriptive or Qualitative Study had two articles each. Lastly, one article was found that met the criteria for Level One: Systematic Reviews & Meta-analysis of RCTs and Level Seven: Expert Opinion. Fifteen of the articles included research each completed on one specific college campus of varying sizes. The sample sizes vary from 32 students (Butler, 2007) to 4,000 students (Brown, O'Connor, & Savaiano, 2014) on college campuses. Several of the research articles reported low response rates to the number of people originally surveyed (Morris-Paxton, Van Lingen, & Elkonin, 2017; Decker & Slawson, 2012). Two research articles reported high percentage of female responders (Mackert, Lazard, Guadagno, & Wagner, 2014; Decker & Slawson, 2012) and one study only collected data from male restrooms in regards to effectiveness of visuals prompts in decreasing urine splatter (Clayton & Blaskewicz, 2012). Due to the differences of health promoting strategies across genders as found in the research, unequal responses to surveys in the research process may skew the results. Another limitation to this systematic review was that nine of the twenty articles were based on self reports from college students involved in the data collection process. These subjective responses can decrease the reliability of the data collected.

Limitations Across Studies

One inconsistency in the research as a whole is that of the articles that included data collected on college campuses, only one applied a health promoting strategy to more than one college campus (Kattelman et. al., 2014). Due to the lack of research strategies applied to more than one college campus, there is limited knowledge of how these strategies will transfer to campuses of differing sizes and locations. There were also two studies that had a sample size of less than 50 students (Lucas, Lakey, Alexander, & Arnetz, 2009; Butler, 2007). Lack of

diversity and the risk of the sample not being an accurate representation of the population limits the research in its ability to apply to college campuses as a whole.

Synthesis of the Evidence

In this study, various common methods used to reduce illness in college students living in residence halls were examined. After reviewing the research, we found that hand washing, lifestyle initiatives, and preventative education were all used to decrease the spread of illness in college residence halls. Through the research obtained, we found that there were schools looking to implement health measures within the residence halls. Overall, there was a positive correlation between increased hand washing and decreased illness (Prater, Fortuna, McGill, Brandeberry, Stone, Lu, 2016; Decker & Slawson, 2012; Wilson et al., 2010; Taylor, Basco, Zaied, Ward, 2010). In the studies analyzed, hand washing was linked to decreased incidences of illness symptoms; however, some studies showed no difference (Thumma, Aiello, & Foxman, 2009). There also appeared to be gender differences. Women reported washing hands more often than men throughout many of the studies. Women were also more likely to wash their hands after using the restroom if other women were present (Wilson et al, 2010; Thumma, Aiello, & Foxman, 2009). These results may have been skewed due to the way in which the information was obtained. Many studies reviewed used self-reporting tools so students had to remember and report any illness and how many times in which they washed their hands (Prater, Fortuna, McGill, Brandeberry, Stone, Lu, 2016; Decker & Slawson, 2012; Wilson et al, 2010; Taylor, Basco, Zaied, Ward, 2010).

Lifestyle initiatives were examined in many of the articles reviewed. Throughout the articles, there were initiatives such as exercise, stress management, sleeping habits, and eating habits (Brown, O'Connor & Savaiano, 2014; Kattelman, Bredbenner, White, Greene, Hoerr,

Kidd, . . . Morrell, 2014). The researchers did not show a direct decrease in illness from the practice of healthy lifestyle habits. It did show that the use of emails, text messages, and other technological avenues to increase awareness about lifestyle initiatives were successful in educating students about their benefits (Brown, O'Connor, & Savaiano, 2014; Kattelman, Bredbenner, White, Greene, Hoerr, Kidd, . . . Morrell, 2014; Small, Bailey-Davis, Morgan, & Maggs, 2013; Decker & Slawson, 2012). Several studies showed an increase in eating fruits and vegetables and decreasing unhealthy diet habits after students received emails and text messages about healthy eating and physical activity (Brown, O'Connor, & Savaiano, 2014; Kattelman, Bredbenner, White, Greene, Hoerr, Kidd, . . . Morrell, 2014). Students across studies were also uneducated about illness and the spread of illness on their campus. Many students were found to be unaware of the benefits of healthy lifestyle initiatives. Overall, research did not suggest that lifestyle initiatives decreased illness among college students living in residence halls.

Multiple articles showed that education regarding illness prevention did in fact decrease the spread of illness in residence halls (Miller, Chandler, and Mouttapa, 2015; Wilson & Huttlinger, 2010). Many schools within the studies had implemented educational initiatives in order to help students learn how to better prevent illness (Miller, Chandler, & Mouttapa, 2015; Wilson & Huttlinger, 2010). After reviewing the literature, there were different ways that were effective in educating students. Some of the methods used to educate were cell phone applications, paper powerpoint presentations, and student response teams. Student response teams allowed a few students to be educated by the local health department in order to relay information to large groups of students (Pogreba-Brown et. al, 2017; Miller, Chandler, and Mouttapa, 2015; Wilson & Huttlinger, 2010; Butler, 2007). All of these methods of educating were helpful in informing students in ways they could decrease the spread of illness. When the

students were educated, the spread of illness decreased (Miller, Chandler, and Mouttapa, 2015; Pogreba-Brown et. al, 2017; Wilson & Huttlinger, 2010; Butler, 2007).

Overall, hand washing and preventative education were helpful in decreasing illness. While lifestyle initiatives were not directly correlated to the decrease in illness, preventative education was helpful in increasing overall health among college students. Further research needs to be conducted on college campuses in order to determine additional information on the effectiveness of these interventions.

Recommendations

Based on the data reviewed there are two recommendations that can be made regarding clinical practices. The first is that hand washing would be a way to help prevent the spread of illness on college campuses (Prater, Fortuna, McGill, Brandeberry, Stone, Lu, 2016; Decker & Slawson, 2012; Wilson et al, 2010; Taylor, Basco, Zaied, Ward, 2010). After reviewing the literature hand washing initiatives were shown to have a positive correlation with the decreased spread of illness in university residence hall populations (Prater, Fortuna, McGill, Brandeberry, Stone, Lu, 2016; Decker & Slawson, 2012; Wilson et al, 2010; Taylor, Basco, Zaied, Ward, 2010). One way this could be implemented into clinical practice would be by implementing hand hygiene education based on Centers for Disease Control guidelines (Prater, Fortuna, McGill, Brandeberry, Stone, & Lu, 2016; White et. al., 2003).

The second recommendation for clinical practice that can be made after reviewing the data is preventative education would help prevent the spread of disease in residence hall populations (Miller, Chandler, & Mouttapa, 2015; Wilson & Huttlinger, 2010). Methods that were shown to be effective in educating students were smartphone applications and student education teams from local health departments (Pogreba-Brown et. al, 2017; Butler, 2007). The

most important aspect of this preventive education is that it needs to be easily accessible to students and evidence based (Butler, 2007).

In further research more data needs to be collected in this specific population regarding the specific illnesses looked at in this paper. Throughout the literature there was limited data looking specifically at residence hall university students. In further research it would be important to specifically examine the effects of lifestyle modification, preventative education, and hand washing in residence hall students. With more data further recommendations could be made for clinical practice.

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Appendix

Reference	Purpose Statement	Setting, Sampling method, Sampling size	Design, Level of evidence	Findings, conclusion	Practice and Research Implications	Limitations of Findings
<p>1. Decker, J., & Slawson, R. (2012). An evaluation of behavioral health compliance and microbial risk factors on student populations within a high-density campus. <i>Journal Of American College Health</i>, 60(8), 584-595. doi:10.1080/07448481.2012.724744</p>	<p>To assess student behavior responses to disease transmission risk while identifying high microbial deposition/transmission sites. (pg 584)</p> <p>Research question: Will students change hygienic behavior and receive vaccination to prevent disease? What are areas of high microbial deposition and transmission sites in residence halls?</p>	<p>Setting: A medium-sized university during H1N1 crisis.</p> <p>Sampling method: Sent to all students via school issued email.</p> <p>Sample size: 656 student responses</p>	<p>Design: An online survey covering use of health services, vaccination compliance, and hygiene practices as well as microbial sampling across 7 on-campus residences (bathroom, common room, and kitchens)</p> <p>Level of Evidence: Level 5 – Systemic Review of Descriptive and Qualitative Studies</p>	<p>Place Effects (physical characteristics and lifestyle) in campus residences play an important role in potential transmission risk for infectious diseases</p> <p>Cross-contamination potential is enhanced for 4 main reasons: abundance of fomites, concentrations of highly mobile students, “splash-and-dash” hand hygiene around sinks,</p>	<p>Setting up a gendered, case-control study with a control group residence based on the placement of hygiene methods</p>	<p>Response rate was low at 4%. 75% of respondents were female</p>

				and gendered behavior		
<p>2. Small, M., Bailey-Davis, L., Morgan, N., & Maggs, J. (2013). Changes in Eating and Physical Activity Behaviors Across Seven Semesters of College: Living On or Off Campus Matters. <i>Health Education & Behavior</i>, 40(4), 435-441. doi:10.1177/1090198112467801</p>	<p>Purpose Statement: Developmental changes and changes in living situation may play an important role in the nutrition and physical activity behaviors of college students. (pg 435)</p> <p>Research Question: Do the changes in living environment affect college students' nutrition and physical activity habits in college?</p>	<p>Setting: Large university in the Northeastern United States</p> <p>Sampling Method: Random sampling procedure</p> <p>Sample Size:</p>	<p>Design: Web-based surveys examined fruit, vegetable, and sugared soda consumption, physical activity, and sedentary activity behaviors across seven semesters</p>	<p>Few college students consumed fruits and vegetables or exercised at optimal levels Daily fruit and vegetable consumption and daily physical activity declined significantly from the first to the seventh</p>	<p>Try to offer an all you can eat fruit option instead of all you can eat soda option to reduce sugar consumption.</p>	<p>Dietary items did not measure serving sizes</p> <p>Study did not measure distances to fitness locations or food places</p>

		746 students (65.6% response rate)	Level of Evidence: Level 5 Systemic Review of Descriptive or Qualitative Studies	semester. Average number of hours of sedentary behaviors declined over time, as did number of days on which at least one sugared soda was consumed.		
3.Mackert, M., Lazard, A., Guadagno, M., & Wagner, J. H. (2014). The role of implied motion in engaging audiences for health promotion: Encouraging naps on a college campus. <i>Journal Of American College Health</i> , 62(8), 542-551. doi:10.1080/07448481.2014.944534	<p>Purpose Statement: Building on research that implied motion imagery increases brain activity, this project tested visual design strategies to increase viewers' engagement with a health communication campaign promoting napping to improve sleep habits (pg. 62)</p> <p>Research Question: Will a campaign to encourage napping decrease the ill effects that a lack of sleep has on a student's health and academic outcomes?</p>	<p>Setting: large southwestern university in October 2012</p> <p>Sampling Method: questionnaire distributed to students who received extra credit for participation</p>	Design: Participants were randomly assigned to 1 of 3 questionnaires: health campaign messages with implied motion characters, health campaign messages with static characters, or no health promotion campaign messages	The campaign messages did not have desired affect but superheroes may be a way to promote healthy habits to college students.	Although intentions are an acknowledged strong predictor of actual behavior, it is crucial to assess the impact of sleep promotion campaigns on actual behavior regarding naps and general sleep habits.	<p>Participants in this study were exposed to messages just once</p> <p>Majority female respondents</p>

		<p>Sample Size – 194 students</p>	<p>shown. After reporting their current sleep habits, the participants were randomly assigned to a condition and asked to evaluate the messages if shown Level of Evidence: Level 4 Evidence Cohort Study</p>			
<p>4. Brown, O. N., O'Connor, L. E., & Savaiano, D. (2014). Mobile MyPlate: A pilot study using text messaging to provide nutrition education and promote better dietary choices in college students. <i>Journal Of American College Health</i>, 62(5), 320-327. doi:10.1080/07448481.2014.899233</p>	<p>Purpose Statement: To evaluate the acceptance and effectiveness of repetitive nutrition-related text messages on college students' nutrition knowledge and fruit and vegetable consumption. (320) Research Question: Will students be receptive to repetitive nutrition-related text messages encouraging nutrition knowledge?</p>	<p>Setting: Sampling Method: Mass recruitment e-mail with linked survey (sent to ~4000 randomly selected students) Sampling Size: 150 students</p>	<p>Design: The intervention group - biweekly text messages including MyPlate icon as well as USDA's Dietary Guidelines (DGs) for 7 weeks. The control group – same but</p>	<p>Greater MyPlate food recognition and knowledge of USDA's DGs. Fruit and veggies consumed increased.</p>	<p>With a more specific topic, more detailed messages could be generated. Repetitive text message interventions increase nutrition awareness and improves eating habits</p>	<p>There is no way to tell if the results had a lasting effect or if the behavior changes only occurred during the intervention period. No ability to document if and when the text messages were actually</p>

			<p>mailed. A pre and post online survey assessed the students' knowledge and behavior.</p> <p>Level of Evidence: Level 4 Cohort Studies</p>			read by the receiver
<p>5 Michael C. Clayton & Julie Blaskewicz (2012) The Use of Visual Prompts to Increase the Cleanliness of Restrooms on a College Campus, Journal of Organizational Behavior Management, 32:4, 329-337, DOI: 10.1080/01608061.2012.729393</p>	<p>Purpose Statement: To evaluate the effectiveness of visual prompts to decrease urinal splatter on men's restroom floors. (329)</p> <p>Research Question: Will visual prompts decrease urinal splatter on men's restroom floors, increasing bathroom cleanliness?</p>	<p>Setting: Men's restrooms on three floors in the Arts and Sciences building on a 13,000-person college campus</p> <p>Sampling Method: n/a</p> <p>Sample Size: Three men's restrooms</p>	<p>Design: Between 4 p.m. and 5 p.m., two observers checked the floor tiles in each of the restrooms using the data sheet – each sheet had a grid of square reflecting the square tiles around the toilet</p> <p>Level of Evidence:</p>	<p>Prompts were immediately effective, and was still effective 4 months later</p> <p>Signage reduced urinal splatter by 35.7% (d = 1.50) in setting 1 and by 40.2% (d = 1.73) in setting 2</p>	<p>“Score” the tiles in such a way that urine on tiles immediately adjacent to the urinal doesn't weigh as heavily as urine several feet away does</p>	No replication

			Level 3 – Controlled Trials without Randomization			
<p>6. Kattelman, K. K., PhD, RD, Bredbenner, C. B., PhD, RD, White, A. A., PhD, RD, Greene, G. W., PhD, RD, Hoerr, S. L., RD, PhD, FACN, Kidd, T., PhD, RD, . . . Morrell, J. S., PhD. (2014). The Effects of Young Adults Eating and Active for Health (YEAH): A Theory-Based Web-Delivered Intervention. <i>Journal of Nutrition Education and Behavior</i>, 46(6), S27-S41. doi:10.1016/J.JNEB.2014.08.007</p>	<p>Purpose Statement: To assess the effectiveness of a tailored theory-based, Web-delivered intervention (Young Adults Eating and Active for Health) developed using community-based participatory research process.</p> <p>Research Question: Is the web delivered intervention (YEAH) effective at increasing healthy habits and behaviors?</p>	<p>Setting: Thirteen college campuses</p> <p>Sampling Method: Randomized, controlled trial delivered via Internet and e-mail</p> <p>Sample Size: A total of 1,639 college students</p>	<p>Design: Twenty-one mini-educational lessons and e-mail messages (called nudges) developed with the non-diet approach and focused on eating behavior, physical activity, stress management, and healthy weight management. Participants assessed before and after in regards to BMI, fruit and</p>	<p>Intervention increased fruit and veggie intake and self-regulated mealtime behaviors</p>	<p>YEAH lesson activities were interesting and relevant, and nearly 75% of experimental participants accessed and viewed the lessons even though this was not a requirement of the study</p>	<p>Limitations include the self-selected sample, and self-reported measures of eating behaviors, physical activity, and perceived stress.</p>

			<p>vegetable intake, physical activity, perceived stress, etc.</p> <p>Level of Evidence:</p> <p>Level 5 – Systemic Review of Descriptive and Qualitative Studies</p>			
<p>7. Wilson, S., Jacob, C. J., & Powell, D. (2011). Behavior-change interventions to improve hand-hygiene practice: A review of alternatives to education. <i>Critical Public Health</i>, 21(1), 119-127. doi:10.1080/09581591003786122</p>	<p>Purpose Statement: The review was conducted to identify alternative interventions for compelling change in hand-hygiene behavior. (119)</p> <p>Research Questions: What other methods are effective at promoting hand-washing other than education.</p>	N/A	<p>Design: Systematic review of literature about alternatives to education and training.</p> <p>Level of Evidence: Level 1 Systemic Reviews</p>	<p>Recent research indicates that handwashing is a ritualized behavior mainly performed for self-protection. Therefore, interventions that provoke emotive sensations (e.g., discomfort, disgust) or use social marketing may be the</p>	<p>An intervention that incorporates cultural and societal influences may be the most effective. How do gender, ethnicity, and environment affect these compliance rates?</p>	<p>There is still a low and hygiene compliance rate so education may be needed.</p>

				most effective. (125)		
8. Dusselier, L., Dunn, B., Wang, Y., Shelley, M., Whalen, D. (2005). Personal, Health, Academic, and Environmental Predictors of Stress for Residence Hall Students. <i>Journal of American College Health</i> , 54(1), 15-24. Doi:	<p>Purpose Statement: study how stress affects health and lifestyle and what gives college students stress</p> <p>Research Question: What contributes to stress and how does it affect college students?</p>	<p>Setting: A land grant University in the midwestern United States</p> <p>Sampling Method: Random Selection</p> <p>Sample Size: 462</p>	<p>Design: Cohort study</p> <p>Level of evidence: 4</p>	<p>Frequency of experiencing chronic illness, depression, anxiety disorder, seasonal affective disorder, mononucleosis, and sleep difficulties were significant stress predictors. Women and US citizens experienced greater stress than did men and non-US citizens, respectively</p>	<p>More research on how these factors will affect health and implementation of stress relieving education among college students.</p>	<p>Single institution with 88% majority and only 7% minority and 5% international.</p>
9. Mitchell, T., et. al. (2014). Swine Flu in College: Early Campus Response to Outbreak Control Measures. <i>American Journal of Health Behavior</i> , 38(3), 448-464. Doi: 10.5993/AJHB.38.3.14	<p>Purpose Statement: To describe student and faculty attitudes towards and adherence to nonpharmaceutical control measures during the first-known university outbreak of 2009 pandemic influenza A (H1N1).</p>	<p>Setting: University of Delaware</p> <p>Sampling Method: Focus Groups</p> <p>Sample Size:</p>	<p>Design: cohort study</p> <p>Level of Evidence: 4</p>	<p>Reported concern and commitment to recommendations decreased rapidly. Initial university messaging</p>	<p>Answering questions as to why concern and commitment decreased. Educate Early</p>	<p>Based on participant reports, may be skewed</p>

	Research Question: What is the adherence rate to nonpharmaceutical measures to decrease the spread of the flu?	Seven focus groups		and response was critical in shaping participants' later perceptions.		
10. Prater, K., Fortuna, C., McGill, J., Brandeberry, M., Stone, A., Lu, X. (2016). Poor hand hygiene by college students linked to more occurrences of infectious diseases, medical visits, and absence from classes. <i>American Journal of Infection Control</i> , 44(1), 66-70. Doi: http://dx.doi.org.ezproxy.uakron.edu:2048/10.1016/j.ajic.2015.08.012	<p>Purpose Statement: To study hand hygiene statuses of college students and their occurrences in relation to infectious diseases, medical visits, and absence from classes or work. Also, to examine the effects of education on handwashing technique to improve hand hygiene.</p> <p>Research Question: Do college students need education on hand washing and how will education affect the spread of illness.</p>	<p>Setting: University of Findlay, Findlay, OH</p> <p>Sampling Method: Random Selection</p> <p>Sample Size: 220</p>	<p>Design: cohort</p> <p>Level of Evidence: 4</p>	Hands of 57.7% volunteers were colonized by an uncountable number of microbial colonies, which were significantly linked to more occurrences to infectious diseases, medical visits ,and arguably more absence from classes or work. The handwashing procedure provided by the CDC significantly improved hand hygiene.	It is critical to promote education on proper handwashing in colleges, in grade schools, and at home to improve health and learning outcomes	Small group, only one campus.
11. Thumma, J., Aiello, A., Foxman, B. (2009). The association between handwashing practices and illness symptoms among college students living in a university dormitory.	Purpose Statement: To evaluate hand washing practices among students living in residence halls to	Setting: University Residence Halls at	Design: cohort study	Differences found between male and female hand	Finding new ways to educate about hand hygiene	Only a 63% response rate

<p><i>American Journal of Infection Control</i>, 37(1), 70-72. Doi: ebscohost.com.</p>	<p>see the relationship of hand washing to illness.</p> <p>Research Question: Does hand hygiene increase health among students living in university residence halls?</p>	<p>The University of Michigan, Ann Arbor</p> <p>Sample method: volunteer</p> <p>Sample Size: 468</p>	<p>Level of evidence: 4</p>	<p>washing practices, students lacked self-reporting of illness symptoms, lack of correlation between hand washing and gastrointestinal illness</p>	<p>practices may decrease infectious disease transmission.</p>	
<p>12 White, C., et. al. (2003). The effect of hand hygiene on illness rate among students in university residence halls. <i>American Journal of Infection Control</i>, 31(6), 364-370. doi:ebscohost.com</p>	<p>Purpose Statement: To test the effectiveness of hand-hygiene education campaign and using gel hand sanitizer to decrease upper respiratory illness among students living in dormitories.</p> <p>Research question: Does education and hand sanitizer decrease the prevalence of upper respiratory illness in dormitories?</p>	<p>Setting: University residence halls at the University of Colorado, Boulder</p> <p>Sampling method: Control group and product group</p> <p>Sample size: 430</p>	<p>Design: cohort study</p> <p>Level of Evidence: 4</p>	<p>Through giving hand hygiene education and providing gel sanitizer, hand hygiene was improved and illness decreased along with missed school days.</p>	<p>Research should continue to be done on how other factors might affect health among university students. Gel sanitizers and hand hygiene education should be implemented in university residence halls.</p>	<p>Lack of research on outside factors that may contribute to health. Students may not recall when they were feeling sick or experiencing symptoms.</p>
<p>13. Taylor, K., Basco, R., Zaied, A., Ward, C. (2010). Hand Hygiene Knowledge of College Students. <i>Clinical Laboratory Science</i>, 23(2), 89-93. Doi: ebscohost.com.</p>	<p>Purpose statement: To determine hand washing norms among students and evaluate the effectiveness of education.</p> <p>Research Question:</p>	<p>Setting: Auburn University, Montgomery, AL</p>	<p>Design: cohort study</p> <p>Level of evidence: 4</p>	<p>Women more likely to wash their hands than males, science majors more like to wash their hands than</p>	<p>Educating students on the importance of hand washing and informing of the benefits of</p>	<p>The observational method used may have swayed results in the females because of</p>

	Do hand washing norms exist within the student population and does science education increase the incidence of hand washing and ameliorate the gender differences so often observed?			non-science majors, hand washers reported less illness than non-hand washers.	regular hand washing.	social pressure to wash hands.
14. Wilson, S., Huttlinger, K. (2010). Pandemic flu knowledge among dormitory housed university students: a need for informal social support and social networking strategies. <i>The international Electronic Journal of Rural and Remote Health Research, Education, Practice and Policy</i> , 10(4), 1-9. Doi: ebscohost.com.	<p>Purpose statement: To prepare data about knowledge of pandemic illness among college students to use for the University's illness preparedness and response plans.</p> <p>Research Question: What knowledge about the pandemic flu do college students possess?</p>	<p>Setting: University residence halls at New Mexico State University, Las Cruces</p> <p>Sampling Method: volunteer sampling</p> <p>Sample Size: 175</p>	<p>Design: qualitative</p> <p>Level of evidence: 6</p>	Students were moderately unaware of flu pandemic in the U.S. and 40% of students did not know proper isolation when sick.	Education should be given to students on what to do when experiencing illness and whether or not to go to class if they have certain symptoms.	The University had a relatively low incidence of the flu on their campus. Students lack of knowledge may be attributed to the lack of illness among the student population at the university.
15. Miller, T., Chandler, L., & Mouttapa, M. (2015). A Needs Assessment, Development, and Formative Evaluation of a Health Promotion Smartphone Application for College Students. <i>American Journal Of Health Education</i> , 46(4), 207-215. doi:10.1080/19325037.2015.1044138	Purpose statement: "This study describes the needs assessment, development, and formative evaluation of a smartphone application designed to link students to health promotion information and on campus resources at a public university" (207)	<p>Setting: large California public university</p> <p>Method: closed-ended survey and focus group</p>	<p>Design: qualitative and quantitative measures</p> <p>Level of Evidence: 4</p>	Found that the majority of students sampled use a smartphones and thus would be likely to use an app for university health and wellness	An app would be an effective way to communicate health information in large quantities to college students with 3 target areas identified.	Would require ongoing institutional support which can be costly, interactive features were not used, didn't get any info about other apps or opinions of

	<p>Research Question: Will a smartphone application help students at universities have greater access to health information?</p>	<p>Sample size: 219</p>			<p>Would need to study if apps are effective at leading to behavior changes.</p>	<p>health related apps.</p>
<p>16. Lederer, A. M., & Oswalt, S. B. (2017). The Value of College Health Promotion: A Critical Population and Setting for Improving the Public's Health. <i>American Journal Of Health Education</i>, 48(4), 215-218. doi:10.1080/19325037.2017.1316692</p>	<p>Purpose Statement: Show that college students are an important to improving overall public health concerns.</p> <p>Research Question: What are common misconceptions about college health promotion and why are college students important in public health improvement?</p>	<p>Setting: Colleges in the US. Sampling: N/A Sample Size:N/A</p>	<p>Design: systemic review Level of Evidence: Level 7</p>	<p>College students are an ideal way to reach large portions of the US population and universities are key in promoting health and well-being.</p>	<p>Research about health and academic performance, health of college students versus similar aged people not in college, practice-based recommendations specific to college students.</p>	<p>The authors perspective was formed by their experience so bias may exist, authors are professors at universities so their opinion may be more influenced by being on a university and not working in a public health setting</p>
<p>17. Morris-Paxton, A. A., Van Lingen, J. M., & Elkonin, D. (2017). An evaluation of health information and wellness priorities among socioeconomically disadvantaged students. <i>Health Education Journal</i>, 76(3), 271-281. doi:10.1177/0017896916670690</p>	<p>Purpose Statement: Assess the value socioeconomically disadvantaged students place on health information and wellness.</p> <p>Research Question: What is the effect of a health education program on socioeconomically disadvantaged students?</p>	<p>Setting: University in South Africa Sampling: surveys (pre and post intervention questionnaires)</p>	<p>Design: mixed-method→ quantitative-qualitative Level of Evidence:4</p>	<p>Found that participants had an increase in health information value following a 15 week education program.</p>	<p>Shows how an educational program can be an effective way to make students more aware of the importance of health and wellness</p>	<p>Size and location of study, specific to only socioeconomically disadvantaged students, not a lot of qualitative data found because if lack of participation.</p>

<p>18. Lucas, T., Lakey, B., Alexander, S., & Arnetz, B. (2009). Individuals and illnesses as sources of perceived preventability. <i>Psychology, Health & Medicine, 14</i>(3), 322-330. doi:10.1080/1354850080270591</p>	<p>Purpose Statement: Looks at the perceived preventability of illness and how that affects individuals and occurrence of illness.</p> <p>Research Question: How does perceived preventability of illness affect disease occurrence?</p>	<p>Setting: small college</p> <p>Sampling Methods: survey</p> <p>Sample size: 44</p>	<p>Design: quantitative</p> <p>Level of evidence: 3</p>	<p>Found that addressing illness characteristics can be important to communicate disease and that perceived preventability depends on the person and the illness.</p>	<p>Further research into procedural justice belies interaction with perceived preventability.</p>	<p>Small sample size, mostly Caucasian sample, homogenous sample, small set of physical illnesses studies.</p>
<p>19. Butler, K. (2007). The development of an evidence-based toolkit to prevent meningococcal disease in college students. <i>Family & Community Health, 30</i>(2), 93-111.</p>	<p>Purpose Statement: Describes the creation of toolkits to address health problems that is evidence based.</p> <p>Research Question: What are evidence-based education programs that will help prevent the spread of meningococcal disease in college students living in dorms most effectively?</p>	<p>Setting: College healthcare providers</p> <p>Sampling methods: convenience sample</p> <p>Sample size: 32</p>	<p>Design: qualitative</p> <p>Level of Evidence: 6</p>	<p>Findings: Found that printed materials in the toolkit would be most useful and power points would be good for communicating to students in large groups and the best way to distribute it would be to send it in a letter or email.</p> <p>Conclusion: The article describes an educational tool for</p>	<p>Continue to review evidence related to problem, test interventions effectiveness, long term studies, multiinstitutional studies.</p>	<p>Limitations: small sample size, only done at one institution, only looks at meningitis no other diseases.</p>

				meningitis but could be used for other diseases and serve as an evidence based guide for practice.		
<p>20. Pogreba-Brown, K., Weiss, J., Briggs, G., Taylor, A., Schumacher, M., England, B., & Harris, R. B. (2017). Student outbreak response teams: lessons learned from a decade of collaboration. <i>Public Health (Elsevier)</i>, 14960-64. doi:10.1016/j.puhe.2017.04.013</p>	<p>Purpose Statement: Describes the role of student response teams and health departments to show role students can hold in health education.</p> <p>Research Question: What were the outcomes of students providing health education at the University of Arizona during outbreaks of disease over a decade?</p>	<p>Setting: University of Arizona</p> <p>Sampling Methods: Case studies</p> <p>Sample Size: Varies depending on case</p>	<p>Design: qualitative</p> <p>Level of evidence: 4</p>	<p>Findings: “Best practices and lessons learned found that communication, preplanning and a willingness to collaborate increased the learning opportunities for students and ability for health departments to increase their capacity both during an emergency and for routine work.” (14960)</p> <p>Conclusion: Student Response teams help</p>	<p>Shows how students can be used as works during acute outbreaks, serves as an example for other institutions to develop similar programs.</p>	<p>Limitations: Only at one university so effectiveness may be contributed to university cultural or other variables, expensive to recreate</p>

				train students and increase communication between public health departments and university		
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