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Body Piercing and Health Complications Among College Students in Puerto Rico

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Abstract

The incidence and prevalence of body piercing health complications among students is a public health matter that has not been researched in Puerto Rico. College students are the most consistent participants in body piercing activities and have reported health complications resulting in visits to medical offices and emergency rooms. Based on the health belief model, which is used to explain and predict health attitudes, the purpose of this quantitative nonexperimental study was to analyze the health risks and possible complications occurring after body piercing and to investigate the association between sex and age and medical complications. Data were collected from 64 nursing students from Puerto Rico who completed the Body Piercing Experience survey. Results of descriptive analyses and logistic regression analyses indicated no significant associations between sex and age and medical complications. Most participants reported they would repeat a body piercing after having knowledge of the health risks and complications of this activity. Results may be used in various ways: to change attitudes of health professionals and the general population regarding health implications related to body piercing; to develop educational programs for children, because results of this study revealed that piercing began in many participants at age 11; and to develop education through promotion and prevention programs with college students and others who engage in body piercing.

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Dedication

I would like to thank God for his support and presence in my life. I know I was selected by you since I was in the womb of my mother and without your presence there would not be any meaning or direction in my life. To the memory of my dear aunt and second mother who died of cancer during this process: Ileana Goicochea who always believed in me.

This work is dedicated to my daughters: Janorette Rivera, for your support and cheering me up when I was sad and my faith would decrease. Thank you for understanding that mama many times could not help you with your baby because I had work to do on the computer. Natalia Rivera, I will never forget your words telling me I was an example for you and your sister to follow every time I would take the decision to leave my studies. I know it has been difficult at times when your health has been affected and mami has had to take care of you and at the same time take the computer to the hospital to finish assignments.

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Chapter 1: Introduction to the Study

Body piercing, also known as body art, is an activity that has been known for over 5,000 years (Yadav, Mohapatra, & Jain, 2014). The use of ornaments in the body is an invasive procedure that is considered a surgery. This procedure is being performed by people who do not necessarily have the medical knowledge and skills regarding the anatomy and physiology of the pierced areas. This has resulted in common health complications that must be treated by physicians.

From 2002 to 2008, an estimated 24,559 individuals visited U.S. emergency rooms with medical complications related to body piercing (Antoszewski, Szychta, & Fijalkowska, 2009). Studies have revealed an increase in piercing in recent years even though there has been very little data that quantifies the health complications of this activity (Bone, Ncube, Nichols, & Noah, 2008, Ferringer, Pride, & Tyler, 2008). Prevention programs are needed to educate university students about possible health compilations after body piercing.

Puerto Rico (Law to Regulate the Practice of "Body Piercing" in Puerto Rico, 2003) regulates body piercing activity through the Law 073 of 2003, which requires a person who receives a piercing in a shop to be at least age 18 years old. If the client is younger than 18, there must be a written consent of the parent or legal guardian (Lex Juris de Puerto Rico, 2003). The United States has not established federal health standards or training requirements for body piercing. Each state has requirements that may vary from one state to another (Armstrong, 2005). The fact that regulations related to

health standards and regulations vary among states may have consequences including young people undergoing piercing in an unclean environment, undergoing piercing by an amateur, or doing the piercing themselves (Ferringer et al., 2008).

Background

Body piercing has become very common for body modifications (Phillips, 2014; Stirn & Hinz, 2008). In the last 25 years, body piercing has become a widespread activity (Cohen, 2014). Many people decide to get their body piercings during adolescence and young adulthood (Braverman, 2006). In the late 1990s, the United States and the United Kingdom reported at least 30,000 new body piercings per year (Pramod et al., 2012).

In 2005, a study was performed surveying 1,753 U.S. college students who were asked to report piercings; results indicated a 37% body piercing rate (Koch, Roberts, Armstrong, & Owen, 2010). By 2011, 6.8% to 51% of the population had a body piercing (Fijalkowska, Pisera, Kasielska, & Antoszewski, 2011), and the most consistent group with piercings included those ages 18 to 25 years with a prevalence of 25% to 35%. These percentages exclude the traditional earlobe piercing in males and females (Armstrong, Tustin, Owen, Koch, & Roberts, 2014).

Most body piercers adhere to sterile practices and measures, but some clients permit friends and family members who do not have proper knowledge or certifications to perform their piercings, which can result in health complications due to improper cleaning techniques and aseptic practices (Davis, 2014). Not having complete knowledge of health complications and understanding the importance of proper cleaning methods

during and after a piercing can lead to unexpected health issues that can compromise the life of body piercing participant (Bone et al., 2008). The insertion of needles can provoke adverse effects on the skin (Ghersetich & Tanini, 2014). Performing procedures without following the required rules of hygiene can result in the spread of germs and infectious diseases such as fungi and protozoa (Bianco, 2014). Gold et al. (2005) referred that pierced participants in their investigations ages 12-21 years old perceived as minimum the health complications of body piercing and they even perceive these as a normal reaction.

Body piercing can expose people to health complications such as infections that an unhealthy person cannot resist (Carmen, Guitar, & Dillon, 2012). Body piercing may result in significant health complications (Fijalkowska et al., 2011; Holbrook, Minocha, & Laumann, 2012). There are potential diseases that can be acquired after a piercing. Studies have shown that body piercing can cause infections involving viruses, bacteria, fungi, and protozoa that are transmitted by blood exchange (Bone et al, 2008; Carmen et al, 2012; Ferringer et al., 2008; Phillips, 2014).

HIV is identified as the most dangerous virus that can be obtained by the piercing procedure (Bianco, 2014). Quaranta et al. (2011) conducted a study of freshmen at an Italian university with the purpose of investigating students' knowledge on health risks regarding body piercing. Results indicated that most participants knew about HIV risks but no other possible health complications of piercings.

The United States has not established health standards or regulations of training

requirements for body piercing. Each state has requirements that may vary from one state to another, but the most common requirement is parental consent for minors (Ferringer et al., 2008). The Department of Health of Puerto Rico (Lex Juris de Puerto Rico, 2003) recognized that body piercing is hazardous, especially among teens, exposing them to a variety of lesions and infections when the piercing is not done in a clean environment using sterilized procedures. When the procedure is done without the correct environmental and medical measures, the participant can acquire infections such as Hepatitis B, Hepatitis C, and HIV. For this reason, the law has established (Lex Juris, 2003) that individuals performing piercings must use sterilized equipment and disposable gloves and needles to decrease the possibility of disease transmission.

Problem Statement

Previous research has shown that college students lack complete information on body piercing health complications, yet they still engage in piercing activity despite incomplete knowledge (Quaranta et al., 2011). According to Hogan and Armstrong (2009), body piercing involves the insertion of a sharp needle with the purpose of creating an opening to place decorative ornaments. These ornaments can be jewelry or different kinds of materials such as plastic, wood, gold, stainless steel, and titanium. A recent study was done in the states of Texas and Pennsylvania where 12 body piercing shops were visited, and none had compliance with administrative standards like the training of staff working in the shops and an exposure control plan, among others (Lehman, 2010). This suggests the need for enforcement of state regulations in these

establishments and the need to evaluate complications among those who have experienced a body piercing.

Researchers on this topic such as Horne et al. (2007) have revealed the need for more investigation to address the issues identified in previous studies. Some of these gaps include participants who are embarrassed to report genital area piercing complications (Bone et al., 2008). The purpose of this study was to fill the gap that exists regarding the incidence and health complications resulting from body piercing among college students in Puerto Rico.

This study was significant because Puerto Rico does not have statistical data about body piercing complications, which limits the capacity to identify needs for people who have experienced piercing. Complications from body piercing require medical assistance, representing a public health burden (Bone et al., 2008). The study of body piercing activities in Puerto Rico could provide useful information to begin assessment, intervention, and prevention activities. Results may enhance participants' understanding of body piercing medical complications before they decide to do the piercing. Knowledge of complications could influence the decision of performing the activity or repeating a body piercing activity in the future. Health professionals should provide guidance to college students who plan to perform body piercing through promotional activities addressing body piercing health risks and strategies to minimize health complications.

Purpose

The purpose of this quantitative nonexperimental study was to examine the health

risks and possible health complications that occur after a body piercing, and to investigate possible correlations between variables such as age and sex. I also examined participants' willingness to continue with body piercing after having knowledge of health risks or a history of health complications. Participants included a group of college students from a university in Puerto Rico. This was the first study in Puerto Rico addressing body piercing among college students to obtain information that could enhance understanding of the scope of this activity and knowledge of possible medical complications that result from this procedure. Because of the risks of piercing, it is essential to promote a clean environment in body piercing parlors and education to reduce health risks and complications of body piercing.

Research Questions and Hypotheses

The following research questions (RQs) were addressed in this study:

RQ1: What is the relationship between the variables of age, gender, and medical complications after performing a piercing among college students?

Ho1: There is no relationship between age, gender, and medical complications after performing a piercing among college students.

Ha1: There is a relationship between age, gender, and medical complications after performing a piercing among college students.

RQ2. How likely are individuals obtaining a body piercing to receive verbal information of possible medical complications, written information of medical complications, both oral and written information, or no information?

Ho2: There is no information presented to individuals regarding possible medical complications of body piercing.

Ha2: There is information (oral, written, or both) presented to individuals regarding possible medical complications of body piercing.

RQ3. What is the correlation between age and gender with body piercing health complications?

Ho3: There is no correlation between age and gender in body piercing health complications.

Ha3. There is correlation between age and gender in body piercing health complications

RQ4. Where are medical complications associated with body piercing being treated: medical office, the emergency room, or self-care at home?

Ho4: Medical complications from body piercings are not treated beyond self-care at home.

Ha4: Medical complications from body piercings are treated beyond self-care at home (medical offices or emergency rooms).

RQ5. How do demographic aspects (age and gender) of students who had body piercing complications influence the decision to stop repeating piercing activities?

Ho5: Demographic aspects of students who had body piercing complications are not likely to stop repeated piercing activity.

Ha5: Demographic aspects of students who have had body piercing complications

are likely to stop repeated piercing activity.

Theoretical Framework

Health actions are related to three main factors: understanding that a negative health issue can be avoided, knowing that with certain preventive actions a person can decrease the possibility of acquiring any given health condition, and the belief that the decided preventive measure to avoid a disease will be effective if the person has confidence in the decision (Rosenstock, Strecher, & Becker, 1988). College students must be made aware of body piercing health complications such as infections and metal jewelry rejection to reduce or prevent their occurrence. According to Huxley and Grogan (2005), individuals who are not aware of potential health problems of piercing will be more likely to perform this activity compared to those who have the knowledge. I selected the HBM for this study because it had been used extensively to analyze health behaviors of individuals based on their understanding of the consequences of any given action.

Nature of the Study

This study included a questionnaire I created for this investigation. The purpose was to assess knowledge of health risks associated with body piercing practices. Participants provided demographic information, body piercing history, knowledge of health risks associated with piercings, and intention to repeat the procedure of body piercing. A quantitative nonexperimental design was appropriate to describe characteristics of the participants and examine relationships between variables. Using the

Raosoft formula (Raosoft, Inc., 2004), I calculated that 64 participants were needed for the study. The sample included Spanish speaking nursing students ages 18 years and older from a university Puerto Rico. Inclusion criteria were having a body piercing or having had a body piercing removed. Participation was voluntary, and all available nursing students in diurnal and nocturnal courses had the possibility to participate. Data were analyzed using SPSS software and binomial logistic regression.

Operational Definitions

Body modification: Semi or permanent alteration of the human body such as performing a body piercing (Antoszewski et al., 2009).

Body piercer: A person who makes perforations in the human skin (Lex Juris de Puerto Rico, 2003.

Body piercing: The opening of the skin with the insertion of a needle through which there is the application of an ornament (Antoszewski et al., 2009).

Body piercing anatomic sites: Eyebrows, helices of ears, lips, tongues, nose, navels, nipples and genital areas (Antoszewski et al., 2009). Other sites are penis, scrotum, labia, clitoris, cheeks, and uvula, but the most common areas selected are the lips and tongue (Pramod et al., 2012).

Body piercing health complications: Foreign body rejection, systemic infection, fever and discharge of secretions in pierced sites, hemorrhage, damage to the nerve, HIV, Hepatitis B, Hepatitis C, and bacteremia (Johnson, 2011; Stein & Jordan, 2012; Meltzer, 2008).

Body piercing ornaments: Jewelry in different kinds of materials such as plastic, wood, gold, stainless steel, and titanium (Hogan & Armstrong, 2009).

Body piercing shop/parlor: Any establishment that has a license from the department of health to perform a body piercing (Law 073, 2003).

Assumptions

The major assumption was that participants who underwent a piercing procedure accurately reported having postpiercing health complications. According to Wong et al. (2012), body piercing health complications are present among college students who have experienced piercings. The second assumption was that even though college students may have some knowledge about health risks related to body piercing, they are not influenced by this information and decide to continue with the piercing (King & Vidourek, 2007; Koenig & Carnes, 1999).

Scope and Delimitations

This study addressed body piercing among college students attending a university in Puerto Rico. Participants were students 18 years and older from the nursing department who had received a body piercing or had a piercing removed.

Significance of the Study

The results of this study may provide health professionals with information regarding body piercing activities, and may be used to develop educational and preventive programs targeting the study population. These educational and preventive programs can begin in elementary schools through health classes and with the

collaboration of health teachers. Findings may be used to fill a gap in the literature on this topic. Positive social change may be effected through providing knowledge about body piercing and strategies to reduce or prevent health complications associated with body piercing.

Summary

There is evidence that body piercing among college students presents risks and has resulted in many health complications (Antoszewski, Szychta, & Fijalkowska, 2009). Body piercing is related to infections such as Hepatitis B and Hepatitis C, jewelry rejection, redness and discharge in the pierced site, bacteremia, and other health complications (Bone et al, 2008; Carmen et al, 2012; Ferringer et al., 2008; Phillips, 2014). Some of these health complications may result in the person visiting an emergency room for treatment. Body piercing health complications need to be investigated and documented in Puerto Rico where there is no data related to body piercing health complications among college students, even though there is much evidence of this topic in the United States. Health professionals need to have all the information related to body piercing health complications to promote prevention and intervention activities and reduce health risks. Chapter 2 presents a review of literature related to body piercing among college students and health complications.

Chapter 2: Literature Review

Body piercing has been classified as a form of body art that has been increasing in popularity and demand among people around the world, irrespective of sex, age, ethnic background, religion, or socioeconomic status (Phillips, 2014). In the last 25 years, body piercing has become so widespread that it is no longer considered a sign of a rebellious group, and therefore it has been classified as body art (Cohen, 2013). There have been numerous studies about body piercing as a risk-taking activity, and many articles are available for health professionals. Health science journals, books, magazines, government reports, and websites have addressed issues associated with body piercing, health complications, and potential risks (Vanston & Scott, 2008).

Body piercing health complications vary depending on factors such as body piercing site selection, type of materials used in the procedure, the piercer's experience, hygiene regimens used during and after the procedure, and postpiercing care by the person receiving the piercing (John, 2013). Matheron (2011) reported various health complications that body piercing can provoke such as allergies to jewelry being inserted, headaches, skin infections, cartilage damage, and dental health problems. There are findings that Hepatitis C is not a risk in those who receive the procedure from professional hands, but it is a risk in those who are pierced in prison settings or by friends (Tohme & Holmberg, 2012). Body piercers who are responsible with their clients are conscious of safety procedures to protect their customers and themselves, but there are no standardized regulations in the United States (Johnson, 2011).

Because of lack of government regulations in many states regarding piercing parlors or establishments (Vanston & Scott, 2008; Johnson, 2011), many piercers may not have the correct professional training and sterilization procedures, which can cause infections and life-threatening health complications to the clients (Stein & Jordan, 2012). Young, Armstrong, Roberts, Mello, and Angel (2010) reported that even though many women may have health complications because of genital piercing procedure, they did not visit any health care provider but searched for assistance from the Internet or their piercer. Additionally, health care providers stated having little understanding and limited communication with patients concerning health issues related to body piercing (Young & Armstrong, 2008).

Gueguen (2012) found that college students who had body piercings were more eager to perform any activity or procedure of high risk than those who did not have body piercing. These findings contrast with the health belief model (HBM), which states that there is a relationship between a person's belief about his or her health and the attitude of improvement or decrease of health (John, 2013). In this study, I investigated participants' understanding of body piercing medical complications before deciding to do the piercing and whether having knowledge about these complications influenced the decision to perform the activity or repeat a body piercing. Understanding the relationship between factors that may produce a health problem creates a basis for providing useful information to begin assessment, intervention, and prevention programs.

Literature Search Strategy

I used multiple databases to search for recent publications. Key words and combinations included *body piercing*, *health risks*, *health complications*, *body piercing shops*, *body piercers*, *theory of reasoned action*, *bloodborne pathogens*, *health behavior*, and *body art*. Databases included Academic Search Premier, CINAHL, Nursing and Allied Health Source, Medline, and PubMed. I also used the Google Scholar search engine. I searched for articles published from 1996 through the present. No articles addressing body piercing and health complications in Puerto Rico were found. All articles related to body piercing and health complications were read, and those that were relevant for the topic were downloaded and included in the literature review.

Overview of Body Piercing

Statistics on Piercing

In the United States, body piercing is classified as a popular form of art (Park & Mehran, 2012). Body piercing involves from 6.8% to 51% of the population, depending the age group (Fijalkowska et al., 2011). In 2013, body piercing ranged from 33% to 50% in the United States population (Armstrong et al., 2014). Koziel and Sitek (2013) estimated body piercing rates between 8% and 50% but noted that exact statistics do not exist.

Many people decide to get their body piercings during adolescence and young adulthood (Braverman, 2006). Body piercing has been increasing in popularity among adolescents and young adults (Desai & Smith, 2011). Performing a piercing may result in

multiple health complications (Holbrook et al., 2012). These complications vary (Antoszewski et al, 2009) from minor body reactions to those classified as serious and can lead to death (Bone et al., 2008).

Cegolon et al. (2010) stated that as there has been an increase in the activity of performing body piercings, there has also been an increase in the health risks related to this activity (Desai, 2011). This is because every time there is a procedure done, there is a risk of exposure to contaminated body fluids (Armstrong, 2005). Studies have indicated that piercing is a prevalent trend in U.S. culture (Carmen et al., 2012), which can lead to health complications affecting individuals who have decided to get pierced (Fijalkowska et al., 2011). Wong et al. (2012) indicated that most body piercing clients do not consider the potential health complications before making the decision to receive body piercing.

Medical literature includes studies that are being done with university students where participants' perceptions of health risk from body piercing is being researched. After two decades of research on body piercing, the major reason for performing this kind of body art is to express individuality and identity and to demonstrate a group affiliation and religion beliefs (Armstrong et al., 2014). Antoszewski et al. (2009) stated that the two most frequently used reasons for body piercing found in the literature are the expression of individuality and the ornamentation of the body. These are followed by desire for self-expression, beauty, art and fashion, pleasure, group affiliation or commitment, resistance, spiritual and cultural traditions, daring attitudes, addiction, and sexual motivation, or fun.

Shulz et al. (2006) found in a study with 1,061 university students that there were gender differences with the fact that 39.4% women had performed a body piercing and only 12.2% men had done so. Aizenman and Conover (2007) and Gallè et al. (2011) also found a higher percentage of women performing body piercing than men. King and Vidourek (2007) included a sample of 536 university students to test for reasons for doing a piercing, health complications, attitudes toward this procedure, and knowledge of aseptic measures of body piercing. Results revealed that 43% of the participants did not consider infections that can be acquired when having a piercing done. Also, 18% of the pierced students revealed having health complications, and of these 18%, 67% reported that they would repeat the procedure despite the postpiercing health complications.

Grief, Hewitt, and Armstrong (1999) examined the body piercing activities and experiences of 391 university students. The purpose of the study was to receive information about the health complications after performing a piercing and whether students considered health risks before deciding to perform a piercing. The results revealed that 78% of the university students did not consider that there could be health issues and complications with piercing activities and that they would repeat the procedure even after learning about health complications after piercing. Lehman (2010) conducted a study in the Texas and Pennsylvania where 12 body piercing shops were visited, and none had compliance with administrative standards such as the training of staff working in the shops and an exposure control plan.

Risks associated with the body piercing process. Body piercing is the opening of the skin with the insertion of a needle through which there is the application of an ornament such as jewelry in anatomic sites such as eyebrows, helices of ears, lips, tongues, nose, navels, nipples, and genital areas (Antoszewski et al., 2009). Other areas selected for piercing are penis, scrotum, labia, clitoris, cheeks, and uvula, but the most common areas selected are the lips and tongue (Pramod et al., 2012). Nose piercings and umbilical piercings are the most common type of body art in the United States (Park & Mehran, 2012). Meltzer (2008) and Johnson (2013) also reported problems caused by body piercing, such as foreign body rejection, systemic infection, fever, and discharge of secretions in pierced sites. Other complications can be hemorrhage, damage to the nerve, HIV, and bacteremia (Stein & Jordan, 2012).

Guidelines for body piercing. Body piercing is a form of art in which a piercing tract is created in any part of the body. The jewelry inserted in this piercing tract can be removed any time and no trace of the puncture will be noticeable afterward (Armstrong et al., 2014). Body piercers in the United States are not permitted to use any kind of anesthetic injection, which is a procedure authorized for licensed health professionals (Park & Mehran, 2012). Johnson (2011) recommended that to identify a body piercing shop that implements correct aseptic measures, it is important to observe proper hand-washing techniques, the use of new disposable gloves for each client, and sterilized instruments. Also, Johnson raised an issue with the piercing guns used in malls, since these cannot be sterilized completely because they have parts that cannot be removed.

Finally, Johnson explained the importance of using high-quality jewelry to prevent allergic reactions after a piercing.

Body piercing shops. In many countries, body piercing shops are not regulated by government laws for strict hygiene measures. Therefore, most of the procedures are performed in commercial areas by unlicensed personnel, who may not use aseptic measures (Wong et al., 2012). Gallè et al. (2011) reported that 33.5% of university students who participated in their study on body piercing indicated having their procedure done in unauthorized facilities, and 7% of these reported having health complications from their piercing. In the United States, only 6% of the states have regulations about body piercing in establishments, and these state laws vary from state to state (Stein & Jordan, 2012).

In a study was done in Texas and Pennsylvania where 12 body piercing shops were visited, none had compliance with administrative standards like the training of staff working in the shops and an exposure control plan (Lehman, 2010). State regulations only require that the person who operates a piercing studio practice precautions to avoid infections (Stein & Jordan, 2012). This confirms the need for the enforcement of state regulations in these establishments and the need to evaluate complications among those who have experienced the procedure of body piercing.

Epidemiology of body piercing-related diseases. Because of the increase in popularity of body piercing, there has been concern about the regulations of this activity due to reported medical complications due to unsanitary practices that have caused an

impact in public health. For many years, interest has increased among investigators in relation to infection, allergies, and dental problems due to body piercing (Schulz, 2006). Nevertheless, few studies have been done to investigate the health complications that are associated with body piercing (Gallè et al., 2011).

Body piercing is considered an invasive procedure that has potential for health risks (Brotherton, 2012). Case reports have been documented in medical literature related to the dangers and health consequences of piercings that are identified as mild discomfort of inflammation to life-threatening situations that can lead to death. Some reported complications are infection, pain, bleeding, and edema (Antoszewski et al., 2009; Park & Mehran, 2012).

Fijalkowska et al. (2011) stated that body piercing complications can be divided into two groups: local complications that occur directly in pierced area and general complications. Complications of body piercing include dermatitis, traumatic tearing of the skin, transmission of virus and infections such as staphylococcus, Group A Streptococcus, and Pseudomonas aeruginosa (Fijalkowska et al. (2011). These three bacteria are the most common in skin piercing, but there are also reports of cases with complications with tetanus, tuberculosis, hepatitis, and HIV (Ferringer et al., 2008). Other serious complications can be endocarditis and brain abscess (Meltzer, 2008).

Prevalence. By the year 2011, studies have given the information that up to 51% of the population has had a body piercing (Fijaldowska et al., 2011). Those in the age of 18-25 years old are the group with more consistency in performing body piercings

(Armstrong et al., 2014) Multiple studies have demonstrated that the prevalence of body piercing is increasing among young adults (Lipscomb et al., 2008). Laumann (2006) reported a study conducted via telephone with 253 women and 247 men related to body piercing. Results revealed body piercing is associated with risk-taking activities and high incidence of medical complications. Many of the participants revealed having post-piercing medical complications which include broken teeth and increased jewelry allergies as the number of piercings were done to the same person (Lauman, 2006). Mayers et al. (2002) revealed in a study that was performed with undergraduate university students, that of a total of 229 pierced students 17% revealed having health complications such as local trauma, bleeding, and bacterial infection

Diseases acquired from body piercing. Gallè et al., (2011) conducted a research to investigate knowledge of health risks of body piercing among college students resulting that only 15% of the participants considered that piercing could lead to viral infections. Bone et al. (2008) presented interviews done to pierced selected population and provided statistics that demonstrated that body piercings can provoke health complications that many times require professional help and reported cases that required hospitalizations addressing that this situation can place a burden to health services. Of 754 adult participants that had piercing, 233 reported having health complications after the procedure. A total of 115 of these, had to claim medical help and 7 were hospitalized for these health complications (Bone et al., 2008).

Armstrong et al. (2004) and Grief et al. (1999) conducted a study with college students to obtain risk behavior information revealing health complications that include skin irritations, site infections, allergies, keloids and embedded jewelry, rips/tears, and mouth health problems with tongue piercings. Perez et al. (2013) noted that body piercing is a risk factor for Hepatitis C infection in Puerto Rico. Intimate piercings such as nipples and genital have been increasing among adolescents and young adults (De Jesus et al., 2014). Caliendo et al. (2004) explored factors associated with intimate piercings and health complications that included skin irritations, local infections, sexually transmitted diseases and changes in urinary flow.

Gill et al. (2012) reported the results of a research related to emergency room visits by teenagers and young adults with oral piercing complications. This study held data from 2002 through 2008 with interesting results. There was an estimate of 24,459 oral piercing injuries that had to be seen in United States emergency rooms. These injuries were classified in different parts of the face such as lips, tongue, and teeth. Of these, 1% of the visits resulted in hospitalization. Plastargias and Sakellari (2014) reveal health complications among those who perform oral piercing such as difficulty to speak, difficulty to swallow and problems with mastication of food. Phillips (2014) recognized that body piercing involves health risks which have been reported in general practice such as transmissions of bloodborne diseases. They also report other health risks that are being treated in their practice.

Hepatitis C. Hepatitis C (HCV) is a liver disease considered an important issue for public health worldwide which statistics have accounted 170 million affected people (Bouvard et al, 2009). In the United States, 3.5 million people are estimated infected with HCV (CDC, 2014). Body piercing has been classified as a risk activity for HCV infection (Rodriguez-Perez, 2013). The impact of HCV has been classified as a major problem for physicians. Statistics may be presented with a decrease in the condition in the last 20 years but still it is considered a disease where more people can die than with human immunodeficiency virus (HIV)/AIDS (Klevens et al., 2012).

Other pathogens. Some cases of endocarditis due to Staphylococci have been reported due to bacterial growing around the jewelry that runs up to the heart areas (Armstrong et al., 2014; John, 2013). The use of non-sterile equipment can make a safe body piercing become complicated. There have been reports of the presence of Pseudomonas Aeruginosa, hepatitis and heart disease (Ladizinski, 2013).

Skin complications. Most of the local skin complications are due to poor procedure during piercing or lack of correct skin care (Armstrong et al., 2014). Park and Mehran (2012) described a surgical complication on a 35 years old woman who had a history of umbilical piercing which caused intestinal adhesions. She had to be submitted to a laparoscopic surgery and because of these intestinal adhesions, an intestinal injury occurred during the surgery which lead to some operatory complications.

Body piercing is a procedure where the skin is involved, occurring the possibility of introducing pathogens from the normal flora colonizing the surface of the skin with

bacteria. Also, the use of contaminated instruments, jewelry and disinfectants can produce the insertion of organisms such as Pseudomonas aeruginosa and mycobacteria (Wong et al., 2012).

Studies involving body piercers and clients. In the last 20 years, body piercing has been gaining popularity among young people but while there is a high demand for this body art, the number of body non-professional piercers without knowledge of health and hygiene standards has also increased, creating post-piercing complications (Quaranta, 2011). Body piercers risk transmitting blood-borne viruses and bacterial infections if there is lack of practicing the correct precautions to avoid health complications (Brotherton, 2012).

The state of Texas is an example of a place where there are laws directed to piercing parlors but none of these regulatory laws apply to the piercing artist (Stein & Jordan, 2012). Researchers have visited body piercing shops and have found positive attitude towards practicing safe measures to avoid complications but these establishments failed in other areas such as the maintenance of exposure control plan, offering hepatitis B vaccines, and training their staff (Lechman et al., 2010). Among clients, Vanston and Scott (2008) found that information related to potential risk of body piercing in young people has been limited and far from the reality of daily experience. John (2013) performed a study with the purpose of assessing knowledge on body piercing complications among college students. The total number of students (N=80) participating revealed not having sufficient knowledge of health complications of the procedure.

Regulations Related to Body Piercing

Many countries in the world do not have regulations by law over body piercing parlors, and for this reason, the use of infection control methods is in doubt in many occasions (Wong et al., 2012). The AABB (American Association of Blood Banks) have established a regulation where an individual who has had a body piercing in a licensed establishment does not require deferral to donate, otherwise it is required a 12-month deferral (O'Brien et al., 2014). Puerto Rico has legislated on body piercing activities to avoid health complications and health risks which is explained in Law #73 of year 2003. This law defines concepts related to body piercing and establishes that anyone who practices this activity must possess a license from the State Department of Health which should be renewed every three years (Lex Juris de Puerto Rico, 2003).

Other important aspects of this law (Lex Juris de Puerto Rico, 2003) state that applicants who desire to practice body piercing must demonstrate their abilities, through an exam administered by the State Department of Health. Courses that should be approved and are included in the exam are the following: (1) Care, storage and the correct use of equipment. This includes sterilization process and disposal of used needles and other equipment, (2) practices and procedures of body piercing, (3) aseptic measures and infection control, (4) Center for Disease Control guides about universal precautions to prevent contagious or infectious disease during the procedure of body piercing, and (5) any other course that is required by the State Department of Health.

Theoretical Framework

Health Belief Model

The HBM was developed in 1950 by psychologists who were trying to understand people's behavior towards prevention programs and their willingness to participate in these programs (University of Twente, 2014). This model has been utilized extensively to explore and analyze health behaviors which are based on the individuals understanding of the consequences of any given action. The HBM relates health actions to three factors: health concern on a given issue, the belief that an action can provoke vulnerability to a health problem, and the belief that following certain indications may reduce any health risk (Rosenstock, Strecher, & Becker, 1988).

Huxley and Grogan (2005) studied a group of 108 participants with tattoos and/or piercings. The purpose was to identify whether those who engaged in healthy behaviors are likely to decline performing a body art such as piercing. After answering a questionnaire, it was determined that there was no significant relationship between having healthy behavior and the decision to perform a body piercing. In fact, it was observed that those who performed piercings were not aware of the potentially health problems that they could confront after the procedure (Huxley & Grogan, 2005).

It is important for future investigations to encourage body piercing clients to consider the pros and cons of this type of body expression and know the importance of selecting a piercing parlor that maintains the correct hygiene and practice clean and safe environment (Chismark, 20013). Holbrook, Minocha, and Laumann (2012) highlighted

that body piercing activities continue to increase in popularity and the importance to provide real information on risks related to this activity. Recent research suggests that people who are practicing the art of body piercing have knowledge of health risks but despite this information decide to continue with the procedure (Randall & Sheffield, 2013).

Critique of Methodology

The methodology used for this study was a quantitative non-experimental design. This method is appropriate for the development of knowledge using standards of cause and effect thinking or also the use of hypothesis and questions, among others. The conclusions of the study are obtained using surveys and other instruments to collect data (Creswell, 2003). For example, Malta et al. (2014) evaluates the prevalence of body piercing among 58 medical students and health consequences of this action. This study was performed in the country of Brazil in a private university using the quantitative design. The measures used for statistical methods were Chi-Square, Marascuilo procedure, variance analysis, a significance level of $p < 0.05$ and statistical program XLStat2010.

Even though bias in this study had to do with the small sample that was selected, this research presented the following: (1) established the socio-demographic data of all the participants such as age and sex being the age prevalent in this investigation between 21 to 27 years old and a higher amount prevalence of female participants, (2) placement of the first piercing they ever did and the age of this first piercing resulting in the stage of

adolescents the time were most of them did the first piercing, (3) established if parents had the knowledge that they were performing a piercing, resulting that the first piercing was done without parents giving consent in most of these cases, (4)the most frequent area of the piercing resulted in their ears or umbilical area, (5) health complications after performing piercing (s) were noted during the first six months of the procedure with cutaneous reactions such as hypertrophic scars, pain, swelling and infections especially the naval type of piercing, and (6) establishes there is a need for educational and preventive activities among college students.

Mayers and Chiffriller (2008) used the quantitative method with the use of a questionnaire to survey the prevalence of health complications among 661 students who had performed body piercing. The particularity of this study is that it was done in two occasions using identical recruiting methods. The purpose was to compare these complications in 2001 and the same study repeated in 2006, both done with college students. Descriptive statistics, level of $p < 0.05$ and Chi-Square were some of the statistical tests and procedures performed to obtain final results. This study identified that females (60%) were more given to perform body piercing then men (40%). Piercing health complications were present in 19% of the surveyed students. Conclusions of this study suggest that there are frequently health complications among those who perform body piercing.

Schorzman et al. (2007), through the application of a survey, evaluated knowledge on health risks of body piercing; personal attitudes and health complications

after performing this activity among 103 college students. They also used descriptive statistics, Chi-Square, and logistic regression. Analysis revealed that most of the participants estimated the chance of the potential health complications after being pierced and stated knowing at least one person who had health complications after having a body piercing. Also, some participants noted having experienced themselves health complications post-piercing. Because of this study, the conclusion was reported that many young adults (17-25 years) have knowledge of potential health risks of the activity of body piercing but underestimate these possible complications and continue with their plans on performing this type of body art. Also, the importance of education on this matter is implied.

King and Vidourek (2007) also used Chi-Square analysis and significance level of $p < 0.05$ when they studied 536 university students and their involvement with body piercing activity. They examined the students' experience including health complication knowledge and their adherence to safe practice when performing their piercings. The results of this study were the following: females (48%) were reported having more events of piercing than men (15%), navel piercing was the area more used for this type of procedures (68%) while tongue (22%), nose (13%) and eyebrow (11%) were the next more common areas in the order that were mentioned. Most of the students that participated in this study considered health complications of performing a piercing. 81% considered the complication of infection, 70% considered scarring and 43% considered the risk of allergic reaction to the materials being used, but did the procedure regardless

of this knowledge, and one of each six students reported having symptoms of health complications after the piercing procedure. The authors of this research recommend that there should be awareness of piercing health complications among young adults and more campaigns and educations must be performed to help young people make the best decision and be aware of the implications of a body piercing (King and Vidourek, 2007).

Summary

Research about body piercing has been widely investigated, but these investigations have focused on the reasons for performing piercing and psychological implications (Armstrong, 2014). Other research has focused on the different diseases that can be acquired by performing this type of body art. Some of these are infections, Hepatitis, skin tear and virus and bacterial growth, among others (Vanston & Scott, 2008). All these health conditions are documented cases in journals and other professional literature.

Body piercing is defined as a form of art where there is the performance of an opening in any part of the skin to insert jewelry or a piece of an adornment (Armstrong et al., 2014). As body piercing activity increases, health complications also increase. Few studies have been done to investigate and discuss the health complications of a body piercing (Galle et al., 2011). Medical research has demonstrated that college students that perform body piercing can present health risks after the procedure whereas Wong et al. (2012) refer that many body piercing clients do not take in consideration the potential hazards that are present in this type of body art. King and Vidourek (2007) and Koenig

and Carnes (1999) present the fact that university students are not intimidated by health complications of piercings when deciding to perform a piercing.

Mayers et al. (2002) presents a study where a group of university students were surveyed and 17% of the total of participants revealed having body piercing health complications. Bone et al. (2008) also performed a research where participants revealed having health complications after a body piercing. Other investigators such as Armstrong et al. (2004) and Grief et al. (1999) conducted studies that also revealed body piercing health complications. Some of these complications have had to be treated in an emergency room as stated by Gill et al. (2012).

Vanston and Scott (2008) did a study to investigate if college students had the knowledge of health complications after a body piercing resulting that participants had limited knowledge on health complications before the performance of piercings. HBM is states if people understand the consequences of a given activity there will be a better decision making on performing this activity that can affect the person negatively. Information on body piercing health complications among college students, the impact of having knowledge on health risks among the decision to perform a piercing and where were these health complications treated were some of the investigation being performed in this study. Chapter 3 provide information on methodology utilized to support the hypothesis and investigation questions using a survey among college students of a selected university in Puerto Rico.

Chapter 3: Research Method

In this chapter, I describe the methodologies that were used to investigate body piercing health complications among college students through the application of an instrument I prepared for this study. Some of the questions in the questionnaire addressed demographic information, health complications after piercing, and health risk knowledge on body piercing. Also, I included dependent and independent variables in the formulation of survey questions to answer the research questions and test the hypotheses.

This study was the first of this type to be done on the island of Puerto Rico related to body piercing and health complications. I conducted a nonexperimental study using a correlational design through the application of a questionnaire (Appendix A) to a convenient sample of university students in Puerto Rico. I used Quantitative analysis to analyze data reflecting the perceptions of the participants.

The main purpose of the study was to analyze the health risks and possible health complications that occurred after a body piercing. The second purpose was to investigate the correlations between different variables such as age and sex with body piercing, and the third purpose was to study the participants' willingness to continue with body piercing after having knowledge of health risks or a history of health complications. All these questions were investigated in a group of college students from a university in Puerto Rico. This study was the first study completed on this topic in Puerto Rico.

Research Design and Approach

Although research has been done on body piercing including risk factors, knowledge of the procedure, factors that can lead to the performance of piercings, psychological implications, and health complications, research on body piercing in Puerto Rico has not been done. As a Spanish-speaking territory of the United States, national health programs are not always available within Puerto Rico, so findings from this population may be unique. I used convenience sampling to identify the participants who had undergone body piercing and were willing to share their experiences related to number of piercings, health risks, and possible health complications. I constructed the questionnaire used in the study after reading previous studies on body piercing health complications among college students. Questions were prepared to collect the needed data based on the concepts included in this study and the health belief model.

Setting and Sample

Participants were recruited through posters on bulletin boards at the nursing department in the selected university. All participants needed to have undergone a body piercing. Also, participants had to be enrolled in the nursing department and be 18 years or older. These criteria were included in the posters and were applied in the selection of participants. Those interested in the study were directed to call my telephone number and receive all pertinent information about the study. Participants were asked to complete the questionnaire after being informed of the study. Each participant signed a consent form and no compensation was offered for participation.

To determine the appropriate sample size for the study, I used the Raosoft sample calculator (Raosoft, 2004) because it had the options of selecting the margin of error and confidence level that I desired. The total number of nursing students available at the selected university was 376. Using a margin of error of 10%, a confident level of 90%, and a response distribution of 50%, I calculated that a sample of 58 university students was needed for the study (Raosoft, 2004). The actual sample used was 64 participants. If a confidence of level of 95% had been adopted, the total number of participants necessary to complete this investigation would have been 191 students. This was not possible because at the time of the study, students were on summer vacation and only a small number was taking a summer courses in the department of nursing.

Procedures

The questionnaire used in this study was based on questionnaires used in two studies related to body piercing health complications that were reviewed for this investigation. I obtained permission to use these questionnaires and to change the original English language of the questions to Spanish. Appendix B shows the permission letters received by the authors of the questionnaires. One of the questionnaires was used in an investigation by Cingui et al., (2009). The purpose of their study was to identify health complications and attitudes among participants who had nose piercings. The second questionnaire was used by Quaranta et al. (2011). In this study, investigators assessed the knowledge of risks and health complications of body piercing among a group of college

students. Both studies had some tested questions that were selected to construct the instrument used in the current study.

The purpose of the questionnaire used for the current study was to obtain information related to the identified variables in this investigation. The name of this survey was Body Piercing Experience Among College Students. It addressed (a) demographic information, (b) body piercing history, (c) regulation knowledge of the participants, (d) health complication history, and (e) attitude of the participant toward repeating a piercing procedure. Sociodemographic data included age, gender, program of study (associate's degree or bachelor's degree), and level of study (first year, second year, third year, fourth year). The selected university was visited prior to performing the pilot study and the investigation procedure was explained to university officials in the nursing department. Officials were informed of the study, including the process of recruiting participants ensuring their anonymity in accordance with IRB specifications to ensure participants' rights would be respected.

Pilot Study

Before using the questionnaire with the selected population, I tested the instrument and validated it in two ways. The questionnaire was given to a group of three nursing professors asking them to check each item in the questionnaire and provide feedback on the formulation of the questions. Professors were asked to challenge the premises and to provide their recommendations to make these questions the most accurate possible for the pilot study.

The other way to verify the validity of the questionnaire was by conducting a pilot study with 10 participants who had undergone a body piercing procedure. These participants attended the same university for this investigation. Only students interested in participating were admitted in the pilot study. After they answered the questionnaire, I analyzed answers for internal consistency using Cronbach's alpha. If answers did not show an acceptable coefficient, the items would be modified. After this procedure, changes would be made (if necessary) to the questionnaire for use in the current study.

Based on Walden University IRB approval (04-12-16-0064876), data for this pilot study were collected in the June 2016 in a university in Puerto Rico. I announced the pilot study using posters presented in different areas in the nursing department. Participants had to be 18 years or older, had to be male or female, had to have experienced the process of a body piercing, and had to be a registered nursing student. An important aspect that was indicated in the posters was that no compensation would be awarded for participating.

I also visited the nursing department and the classrooms that had nursing students 10 minutes before class ended, and I explained to the class the investigation and the purpose. Also, I explained that participation would be voluntary and that they could withdraw from the study at any time without repercussion. I repeated all the inclusion criteria necessary to participate and emphasized that all answers would be anonymous. At the end of the class, the students who wanted to participate took a folder and answered the questions in their spare time. Folders were submitted in a locked box in an area of the

nursing department. Each folder contained a consent form and the questionnaire. I read the consent form to all possible participants and reminded them to answer all questions. A total of 10 nursing students participated in the pilot study, and data were analyzed to make modifications to the questionnaire, if necessary. To measure reliability of the data collection instrument (questionnaire), I used the Cronbach's alpha coefficient. The alpha coefficient indicates the internal consistency of the questions. The coefficient is a value between 0 and 1, where 0 means no reliability and one means total reliability.

Data Collection Study

Two weeks after conducting the pilot study and not making changes based on the reliability results, I announced the study in the selected university using posters in the nursing department. Participants had to be 18 years or older, had to be male or female, had to have passed through the process of a body piercing, and had to be a registered nursing student. No compensation was awarded for participating.

I visited the nursing department and the classrooms that had nursing students 10 minutes before class ended, and I explained to the class the investigation and the purpose. Also, I explained that participation would be voluntary and that they could withdraw from the study at any time without repercussion. I explained the inclusion criteria and indicated that all answers would be anonymous. At the end of the class, the students who wanted to participate took a folder and answered the questions in their spare time. Folders were deposited in a locked box in an area in the nursing department. Each folder contained a consent form and the questionnaire. I read the consent form to all possible

participants and notified that I was available to answer any doubt that could be present. A total of 64 nursing students participated in the study.

Instrumentation Method

Demographic Information

In the questionnaire submitted to the students, Questions 1to 4 consisted of demographic information including age, sex, education level (first year, second year, third year, or fourth year), and whether the student was in an associate's or bachelor's degree program of nursing. Through the data obtained in this section, Research Question 1 (What is the relationship between the variables of age, gender, and medical complications after performing a piercing among college students?) could be answered after final analysis was performed.

Body Piercing History

Question 5 was included to have information on placement of the piercings and age this identified piercing was performed. This question elicited data to answer Research Question 1.

Regulation Knowledge

Questions 6 to 13 addressed education received by the piercer regarding the health risks of the chosen body piercing and whether this education was oral, written, or both. Some questions addressed the sterile measures used by the piercer. These questions were included to answer Research Question 2 (How likely are individuals obtaining a body piercing to receive verbal information of possible medical complications, written

information of medical complications, both oral and written information, or no information?). These questions were answered with “yes”, “no”, or “do not know.”

Health Complications

Questions 14-19 were presented in a table where the participant had to identify any health complications that occurred after piercing. For identified symptoms and degrees of complication, the following scale was used: “none,” “poor,” “moderate,” or “severe.” Responses to these questions were used to answer Research Questions 1 and 3.

In Question 21, participants were asked to identify how the health complication were treated. The question provided for three alternatives: self-treatment at home, visit to a medical office, and the need for emergency room treatment. These responses were used to answer Research Question 4 (Where are medical complications associated with body piercing being treated: medical office, the emergency room, or self-care at home?).

Attitudes

The last question was related to the analysis of what was the attitude of the participant towards repeating a body piercing after having had health complications and the knowledge on health risks of this procedure. The purpose of this question, which is based on the Health Belief Model, was to have information of the impact of having gone through health issues related to body piercing and future decisions on this behalf. This question was useful to answer research question 5 (How do demographic aspects (age and gender) of students who had body piercing complications influence the decision likely to stop repeating piercing activities?)

Statistical Analysis of Research Questions and Hypothesis

Data Analysis

The data was obtained in the formal administration of the questionnaire. This questionnaire was tested to determine that written information was obtained correctly and completely. For statistical analysis, I used Statistical Package for the Social Science "SPSS" software program (All statistical data analyses were performed using SPSS version 23.0 (IBM Corp, 2015). Data were analyzed using descriptive statistics and a logistic regression model. The findings of this study are presented using two types of analysis principles: descriptive analysis and multivariate analysis. For descriptive statistics were used frequencies, measures of central tendencies as arithmetical mean, minimum and maximum, and dispersion measure as standard deviation. This analysis was used to show the sociodemographic aspect of the college students who participated in the study.

Furthermore, a logistic regression was used to measure the relationship of the factors that influence in the practice of corporal piercing between university students and if there could be medical complications. The logistic regression model was adequate to predict the outcome of a categorical variable according to the independent or predictor variables.

For this study, the multiples categories of the dependent variable medical complication (none "0", poor "1", moderate "2" and severe "3") had to be collapsed to a dichotomous variable (no "0" and yes "1") for correct lack of data in some cells that do

not allow the chi-square analysis to prove the significance. For this reason, the binomial logistic regression was the selected model. The following statistical analyses was performed based on the five major research questions addressed by this study:

RQ1. What is the relationship between the variables of age, gender and medical complications after performing a piercing among college students?

Ho1: There is no relationship between age, gender and medical complications after performing a piercing among college students.

Ha1: There is relationship between age, gender and medical complications after performing a piercing among college students.

A binomial logistic regression would be conducted to predict the probability of the different possible relationship or outcomes between the variables: age, gender and medical complications after performing a piercing. The logistic regression assumes that the dependent variable (medical complications) is a random event. This dependent variable describes the outcome of this unpredictable event with a density function (a function of cumulated probabilities ranging from 0 to 1). Binomial regression analysis uses the concept of probabilities and k-1 log odds equations that assume a cut-off probability 0.5 for a category to happen. Logistics coefficient will be interpreted as the effect as the unit of change in the dependent variable on the predicted logits with the other variables held constant. Odd ratios are a constant behavior.

If the likelihood ratios test shows a value near 1, we fail to reject the null hypothesis. In other hand, if the ratio test value is 0, the null hypothesis will be rejected

significant at 5% level. Another way to prove the significance and reject or not the null hypothesis is using the Chi-square test. If the p-value is greater than .05, we fail to reject the null hypothesis. If the p-value is less than .05 the null hypothesis will be rejected and it presume that there are significant differences. In the case, we fail to reject the null hypothesis its means that is no relationship between variables, there is no purpose to considerate the likelihood of occurrence of the dependent variable under control of the independent.

RQ2. How likely are individuals obtaining a body piercing to receive verbal information of possible medical complications, written information of medical complications, or both oral and written information, or no information?

Frequency distributions will be used to address this research question. This analysis will serve to reach an initial description of the data gathered toward information given to individuals (college students) obtaining a body piercing.

RQ3. What is the association between age and gender with body piercing health complications?

Ho3: There is no association correlation between age and gender in body piercing health complications.

Ha3. There is association between age and gender in body piercing health complications

A binomial logistic regression would be conducted to predict the probability of the possible association or outcomes between the variables: age, gender and body

piercing health complications. The analysis of these tables would guide to calculate the logs of the series to assess the relationship of age and gender with body piercing health complications.

The likelihood ratio test value would be used for hypothesis testing. A ratio value near to 1 than the predetermined significance level of 0.05 have been used to reject the null hypothesis (Ho3). If the ratio value shows at 0 the null hypothesis would be fail to reject. Another way to prove the significance and reject or not the null hypothesis is using the Chi-square test. If the p-value is greater than .05, we fail to reject the null hypothesis. If the p-value is less than .05 the null hypothesis will be rejected and it presume that there are significant differences.

In the case, we fail to reject the null hypothesis its means that is no relationship between variables, there is no purpose to considerate the likelihood of occurrence of the dependent variable under control of the independent.

RQ4. Where are medical complications associated with body piercing being treated: medical office, the emergency room or self-care at home?

Frequency distributions by categories level will be used to address this research question. Data regarding where medical complications relationship with body piercing are being treated.

RQ5. How do demographic aspects (age and gender) of students who had body piercing complications influence the decision likely to stop repeating piercing activities?

Ho5: Demographic aspects of students who had body piercing complications are not likely to stop repeated piercing activity.

Ha5: Demographic aspects of students who have had body piercing complications are likely to stop repeated piercing activity.

The analysis would guide to predict the probability of possible relationship or outcomes between the college students that decided to repeat body piercing and those that opt to stop repeating piercing activity. The likelihood ratio test value would be used for hypothesis testing. A ratio value near to 1 than the predetermined significance level of 0.05 have been used to reject the null hypothesis (Ho5). If the ratio value shows at 0 the null hypothesis would be fail to reject.

Another way to prove the significance and reject or not the null hypothesis is using the Chi-square test. If the p-value is greater than 0.05, we fail to reject the null hypothesis. If the p-value is less than 0.05 the null hypothesis will be rejected and it presume that there are significant differences. In the case, we fail to reject the null hypothesis its means that is no relationship between variables, there is no purpose to considerate the likelihood of occurrence of the dependent variable under control of the independent.

Protection of Human Participants

To protect human subjects and their privacy, there was no information to be collected that can identify each participant. The only identifiable information is a number that was assigned to each questionnaire to have a control of the order of succession of

each paper. The participants of this research were those who have a body piercing or had a piercing that was removed already. The survey tool was designed to collect information on the experience of the participant with the activity of body piercing and participation was totally voluntary.

No direct intervention with the human subject was performed or any experiment was planned. The only activity that is asked was to answer a paper questionnaire. The subject had the option to decline their participation at any time once starting to answer the questionnaire since some questions were related to health disease and complications. All questionnaires were stored in locked container to protect it from any damage and has been kept by the investigator in a drawer with a key for protection for 5 years, then will be discarded through shredding procedure.

Summary

A quantitative non-experimental study was design to investigate the body piercing procedure and behaviors, health risks, and possible health complications among college students. The method used for this research was the survey type. A questionnaire was constructed, and validate, for made available to participants that voluntarily wanted to participate in the research. This instrument was constructed for gather demographic information, knowledge of regulations, piercing history, attitudes and knowledge on health risks.

The sample size of college student participated were 64. Even though a larger number of participants were desired in the beginning of the formation of this

investigation, it was not possible to recruit more than what was presented since students were on summer vacation and only a very small amount was taking summer classes. This provoked that I had to visit the selected university more days that predicted to get as much students to answer the questionnaire as I could possibly could.

A descriptive statistics and regression model will be used to measure the behavior of the variables. Then in chapter 4 there will be present the analysis of the collected data from the questionnaire and chapter 5 will include the final results of this analysis and conclusion.

Chapter 4: Results

The statistical results of this investigation are presented in accordance with the purpose of the investigation, research questions, and hypotheses formulated to examine the health risks and possible health complications that occur after performing a body piercing among university students. The results are presented for each research question. Before detailing the findings of the relationship between sociodemographic variables (sex and age), body piercing, and the disposition of the participants to continue with this activity after having knowledge about the health risks or health complication backgrounds, I present the coefficient results regarding the instrument's reliability and a description of the demographics of the participants.

The research questions and the hypotheses of this study were the following:

RQ1. What is the relationship between the variables of age, gender and medical complications after performing a piercing among college students?

Ho1: There is no relationship between age, gender and medical complications after performing a piercing among college students.

Ha1: There is relationship between age, gender and medical complications after performing a piercing among college students.

RQ2. How likely are individuals obtaining a body piercing to receive verbal information of possible medical complications, written information of medical complications, or both oral and written information, or no information?

RQ3. What is the association between age and gender with body piercing health

complications?

Ho3: There is no association between age and gender in body piercing health complications.

Ha3. There is association between age and gender in body piercing health complications

RQ4. Where are medical complications associated with body piercing being treated: medical office, the emergency room or self-care at home?

RQ5. How do demographic aspects (age and gender) of students who had body piercing complications influence the decision likely to stop repeating piercing activities?

Ho5: Demographic aspects of students who had body piercing complications are not likely to stop repeated piercing activity.

Ha5: Demographic aspects of students who have had body piercing complications are likely to stop repeated piercing activity.

Data Collection Pilot Study

For this part of the study, data were collected from 10 participants selected on a voluntary basis. The purpose was to perform a pilot study to measure the reliability of the instrument using Cronbach's alpha. Cronbach's alpha indicates whether survey questions are internally consistent. The values can vary depending on the extension or the length of the test and the sample size. For the interpretation of the Cronbach's alpha coefficient, I used the range structure shown in Table 1. Results for the current study are shown in Table 2.

Table 1

Range Structure Interpretation of the Results of Cronbach's Alpha

Ranges	Internal consistency
0.0-0.20	Very low
0.21-0.40	Low
0.41-0.60	Moderate
0.61-0.80	Acceptable
0.81-1	High

Table 2

Reliability of Coefficient of the Investigation Questionnaire

Cronbach's Alpha	*N* of elements
.688	17

The Cronbach's alpha was .688, indicating that the different items were related to each other and could be used to perform statistical analyses.

Sociodemographic Description of the Student Participants

This study included 64 college students, of which 76.6% (*n* = 49) were female and 23.4% (*n* = 15) were male. About age, 50% (*n* = 32) were less than 21 years old at the time of the study. Also, 69% (*n* = 44) of participants were taking courses in the first and second year of their nursing program. Demographic data are shown in Table 3.

Table 3

Descriptive Statistics of the Participants

Variables		Number	Percentage
Gender	Male	15	23.4%
	Female	49	76.6%
	Total	64	100%
Age	Under 21 years	32	50%
	21-25 years	18	28%
	26-30 years	8	13%
	31-35 years	3	4.5%
	36 years and older	3	4.5%
	Total	64	100%
Nursing program	Associate's	6	9%
	Bachelor's	58	91%
	Total	64	100%
Level of study	First year	24	38%
	Second year	20	31%
	Third year	8	13%
	Fourth year	12	19%
	Total	64	100%

The descriptive statistics of the variable age are presented in Table 4, which indicates that the minimum age of the participants was 18 and the maximum age was 41. The average age was approximately 23. Variable age between participants is shown in the following Table 4.

Table 4

Descriptive Statistics of the Variable Age Between Participants

Aspect	Min.	Max.	Mean	*SD*	*N*
Age at interview	18	41	22.83	5.78	64

Descriptive Analysis

This section presents descriptive measures as frequencies, percentages, and measures of central tendency to display the characteristics about attitudes of adults and practices of body piercing, information received when performing body piercing, health complications after body piercing, and the attention given to these health complications. The first group of variables was related to the characteristics about the area where body piercing was performed and the age of the participant when piercing was done (Table 5). Of the university students who participated in the study, 89% (n = 57) mentioned having a body piercing in the ears, the most common body area pierced among the participants. The average age of this type of piercing was approximately 16 years. The body area with the lowest frequency was the nipples. Regarding the age when the body piercing was performed, body piercings at the ears were performed at a youngest average age of 15.54 years; the age range was 11 years to 25 years. Piercings with lips, navel, nose, eyebrow, and other parts of body piercing were performed at an average age of 17.00 and 18.00. Piercings with tongue and nipples were performed at the oldest average age. Following Table 5 demonstrates body area piercing and age that is was performed.

Table 5

Body Area Piercing and Age Performed

Area of the body	Body piercing				*N*	Age body piercing was performed			
	Yes		No			Min	Max	Mean	***N***
	n	%	*n*	%					
Ears	57	89%	7	11%	64	11	25	15.54	57
Eyebrow	5	8%	59	92%	64	13	21	18.00	5
Nose	7	11%	57	89%	64	13	21	17.57	7
Lips	6	9%	58	91%	64	14	22	17.00	6
Tongue	9	14%	55	86%	64	15	29	19.78	9
Nipples	1	2%	63	98%	64	23	23	23.00	1
Navel	16	25%	48	75%	64	13	30	17.56	16
Genitals	0	0%	64	100%	64	-	-	-	-
Other	7	11%	57	89%	64	15	22	17.57	7

To answer RQ 2 (How likely are individuals obtaining a body piercing to receive verbal information of possible medical complications, written information of medical complications, both oral and written information, or no information?), Table 6 was prepared. Participants received information about body piercing complications most often verbally (53%), and 41% of the students said that they asked for someone's advice before deciding to do the procedure. Regarding a written document with health complications information, 27% indicated they had received written information about the risk of undergoing a body piercing. The remaining 25% received both oral and written information about the risk of the performance. Table 6 is presented with the type of information received before performing the body piercing.

Table 6

Type of Information Received Before Body Piercing

Type of information	Received				N
	Yes		No		
	f	%	*f*	%	
When you decided to do a piercing, did you ask for someone's advice before deciding the procedure?	26	41%	38	59%	64
Were you verbally informed about the risks of undergoing a body piercing?	34	53%	29	45%	63
Were you informed through written documents about the risks of undergoing a body piercing?	17	27%	45	71%	62
Were you verbally and through written documents informed about the risks of undergoing a body piercing?	16	25%	46	72%	62

About health complications, once body piercing was performed, the highest percentages were manifested as redness and tenderness (81%), pain (78%) and edema (73%). However, additional symptoms that were identified by participants were trauma or skin rupture (20%), infection (42%), and profuse bleeding (48%), as shown in Table 7 in the following.

Table 7

Health Complications and Symptoms After Body Piercing

Symptoms after body piercing	Health Complication					
	Yes		No		Total	
	F	%	F	%	F	%
Profuse bleeding	31	48%	33	52%	64	100%
Pain	49	78%	14	22%	63	100%
Redness and tenderness	52	81%	12	19%	64	100%
Swelling	46	73%	17	27%	63	100%
Trauma/rip of the skin	13	20%	51	80%	64	100%
Infection (redness, discharge of pus, fever)	27	42%	37	58%	64	100%

Data needed to answer RQ4 (Where are medical complications associated with body piercing being treated: medical office, the emergency room, or self-care at home?) indicated that the health complications of body piercing were treated through self-care at home (98%). Only one participants (2%) mentioned visiting a medical office, as shown in Figure 1.

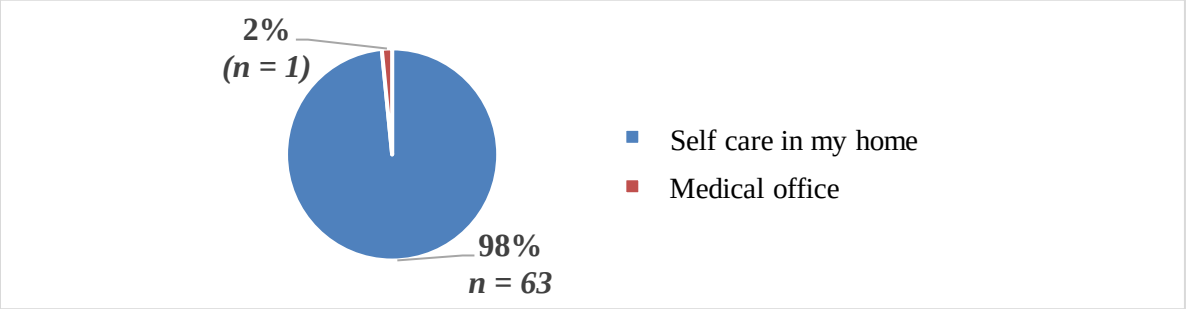

Figure 1. Place where health complication was treated after body piercing.

Bivariate Analysis

This section presents bivariate analysis to display the characteristics about health complications of the participants after performing the piercing. Considering the size of the sample, I used the Fisher's Exact Test for nominal variables. The group of variables

considered for this analysis was the sociodemographic variables of age and sex.

For this analysis and interpretation, the independent variable of age and the dependent variable of health complications were collapsed and manipulated as dichotomous variables. Age was dichotomized to those younger than16 years and those 16 years old and older. Results were tested to determine whether the health complications were related to sex and age of the participants. The contingency table was used to register and analyze the relationship between the three categorical variables. This table shows that there was little difference in the distribution of health complications by age or sex. Both male and female participants had high percentages of health complications: 67% (n = 10) of male participants and 76% (n = 37) of female participants. I observed similar proportions in age for health complications: 68% (n = 17) of participants younger than 16 years had health complications compared to 77% (n = 9) of participants age 16 years and older. Table 8 below presents a review of the findings related to health complications stratified by sex and age.

Table 8

Health Complications of the Participants by Sex and Group of Ages

Sociodemographic variables	Health complications				Subtotals	
Sex						
	Yes		No			
	n	%	*n*	%	n	%
Male	10	67%	5	33%	15	25%
Female	37	76%	12	24%	49	75%
Group of ages						
Less than 16 years	17	68%	8	32%	25	39%
16 years and over	30	77%	9	23%	39	61%
Subtotals	47	73%	17	27%	64	100%

To identify statistical significance between the categorical variables expected, values were calculated to be evaluated with a Fisher Exact test (Table 9). For this purpose, the following presents the corresponding hypothesis:

H0: There is no relationship between age, sex and medical complications after performing a piercing among college students.

H1: There is relationship between age, sex and medical complications after performing a piercing among college students.

When applying the test, the obtained p value for both sociodemographic variables were greater than 0.05, thus there is no rejection of the null hypothesis. In the case of sex, the obtained p value was 0.356; for the variable of age groups it was 0.307. Thus, health complications after a body piercing were independent of sex and the age of the university student.

Table 9

Fisher Exact Test for Research Question 1

Sociodemographic variables	Value	df	Asymp. Sig. (2-sided)	*P* Value
Sex				
Pearson Chi-Square	.460	1	.497	
Continuity Correction[b]	.119	1	.730	
Likelihood Ratio	.446	1	.504	
Fisher's Exact Test				.356
Linear-by-Linear Association	.453	1	.501	
Age Group				
Pearson Chi-Square	.622[a]	1	.430	
Continuity Correction[b]	.249	1	.618	
Likelihood Ratio	.615	1	.433	
Fisher's Exact Test				.307
Linear-by-Linear Association	.612	1	.434	
N of valid case	64			

RQ5: How do demographic aspects (age and sex) of students who had body piercing complications influence the decision likely to stop repeating piercing activities?

In Table 10, there is a review of the answers obtained related to the decision of repeating a body piercing after presenting health complications by sex and the group of ages of the students. Both sexes had a high percentage response that they would repeat a body piercing after presenting medical complications: 80% (n=12) of male students and 73% (n=36) of female students. Likewise, similar proportions are observed by age group. Eighty-six percent (n=21) of less than 16 years of age had health complications compared to 69% (n=27) of students in the group 16 years and over. Below table 10 presents results of decision to repeat a body piercing after presenting health complications.

Table 10

Decision About the Repetition of Body Piercing Between Participants After Presenting Health Complications for Sex and Age

Sociodemographic variables	Repetition of body piercing after presenting health complication				Subtotals	
Sex	Yes		No			
	F	%	F	%	F	%
Males	8	80%	2	10%	10	21%
Females	27	73%	10	27%	37	79%
Age Group						
Less than 16 years	15	88%	2	12%	17	36%
16 years and over	20	67%	10	33%	30	64%
Subtotals	35	74%	12	26%	47	100%

To identify the statistical significance between the categorical variables, expected values were calculated to be evaluated with a Fisher's Exact test. The next corresponding hypothesis is presented:

Ho5: Demographic aspects of students who had body piercing complications are not likely to stop repeated piercing activity.

Ha5: Demographic aspects of students who have had body piercing complications are likely to stop repeated piercing activity.

When applying the test, the obtained p value for both sociodemographic variables were greater than 0.05, thus there is no rejection of the null hypothesis. In the case of sex, the obtained p value was 0.499; for the variable of age groups it was 0.098. Thus, the decision about the repetition of body piercing between participants after presenting health complications were independent for demographics aspects of sex and age.

Table 11

Fishers Exact Test for Research Question 5

Sociodemographic variables	Value	df	Asymp. Sig. (2-sided)	*P* Value
Sex				
Pearson Chi-Square	.204	1	.651	
Continuity Correction[b]	.002	1	.965	
Likelihood Ratio	.213	1	.645	
Fisher's Exact Test				.499
Linear-by-Linear Association	.200	1	.655	
Group of Age				
Pearson Chi-Square	2.655	1	.103	
Continuity Correction[b]	1.642	1	.200	
Likelihood Ratio	2.896	1	.089	
Fisher's Exact Test				.098
Linear-by-Linear Association	2.599	1	.107	
N of valid case	47			

Multivariate Analysis

This section presents multivariate analysis to determinate the probability of occurrence of health complications of the university students after performing the piercing. The group of variables considered for this analysis was the sociodemographic variables of age and sex, level of studies, and the body piercings areas.

RQ3. What is the association between age and gender with body piercing health complications?

To identify statistical significance and the association between the categorical variables expected, values were calculated to be evaluated with a Chi Square test and determined if the independent variables can be examined under the logistic regression

model (Table 12).

For this purpose, the following presents the corresponding hypothesis:

Ho3: There is no association between age and gender in body piercing health complications.

Ha3. There is association between age and gender in body piercing health complications

According to the results presented in Table 12, there is no effect of the independent variables (sex and age) on medical complications among students after performing the body piercing was found even the presence of behavior and social variables of this study. The *P* value of all variables included in the logistics model did not fall into the rejection region. In this case, the null hypothesis it is assumed.

Table 12

Logistic Regression Model for Research Question 3

	Pearson Chi-Square Test	*P* Value	OR	95% Confidence Lever	
				Low	High
Sex	.421	.517	.589	.119	2.914
Age	.650	.420	.576	.151	2.200
Level Studies	1.836	.175	1.528	.828	2.822
Ear piercing	.547	.459	2.104	.293	15.107
Eyebrow piercing	.109	.741	1.587	.102	24.607
Nose piercing	.563	.453	2.472	.233	26.245
Lip piercing	.069	.792	.740	.079	6.956
Tongue piercing	.167	.683	.677	.105	4.390
Constant	.001	.972	.957		

Summary

The purpose of this study was to determine body piercing health complications among college students enrolled in the nursing department of a selected university in Puerto Rico. Descriptive statistics, logistic regression models, and Fisher's Exact Test were used to measure the health risks and possible health complications that occur after performing a body piercing among university students and its relations between sociodemographic characteristics such as age and sex. The analysis of the results showed high rates of health complications among college students in females and males after performing a body piercing and the repetition of the activity of body piercing regardless of medical complication. However, the sociodemographic characteristics of the students were not shown to be related to these behaviors.

In the examination of RQ1, both males (67%) and females (76%) presented a high percentage of health complications after piercings. Participants less than 16 years (68%) presented health complications comparable in frequency to those 16 years or older (77%).

For RQ2, I conducted a descriptive analysis to determine how likely were participants to receive information of medical complications. This information could be verbal, written, or both. Results of this analysis was that only a 53% received verbal information, 27% received written information and 25% of the participants received both verbal and written information. To examine RQ3, a multivariate analysis logistic regression model was applied. I examined the association between age and gender with body piercing health complication. There was no statistically significant association

between age and gender with body piercing health complications.

To answer RQ4, a descriptive analysis was performed to identify where complications post piercing were being treated. The alternatives were medical office, emergency room, or self-care. Results were that 98% of participants with health complications were treated by themselves as self-care. Only 2% had the necessity to visit a medical office to receive treatment for complications. In RQ5, I wanted to investigate if participants, after having body piercing health complications, were willing to repeat the procedure. Among those who had complications, the questionnaire demonstrated that most of both males and females were willing to repeat the procedure.

In Chapter 5, there is exposition of the purpose of this investigation. Also, discussion of findings and conclusions, limitations of the study and the recommendations will be addressed for future investigations on this topic. Finally, discussion of the impact of this study for the community and general population of the island will be described.

Chapter 5: Conclusion

The conclusions of this quantitative study are presented in accordance with the purpose of the investigation and research questions formulated and to examine the health risks and possible health complications that occurred after a body piercing among a group of college students enrolled in the nursing department in a university in Puerto Rico. The conclusions are presented for each of the following research questions:

RQ1: What is the relationship between the variables of age, gender and medical complications after performing a piercing among college students?

RQ2: How likely are individuals obtaining a body piercing to receive verbal information of possible medical complications, written information of medical complications, or both oral and written information, or no information?

RQ3: What is the correlation between age and gender with body piercing health complications?

RQ4: Where are medical complications associated with body piercing being treated: medical office, the emergency room or self-care at home?

RQ5: How do demographic aspects (age and gender) of students who had body piercing complications influence the decision likely to stop repeating piercing activities?

Body piercing, also known as body art, is an activity that has been known for over 5,000 years (Yadav et al., 2014). In the last few years, body piercing has become an activity that is performed all around the world (Cohen, 2014). This excludes the

traditional earlobe piercing in males and females (Armstrong et al., 2014). Performing procedures without the required rules of hygiene of the body piercer can produce the spread of germs and, as a result, infectious diseases such as fungi and protozoa (Bianco, 2014).

Neither the United States nor Puerto Rico has established health standards or regulations of training requirements for body piercing. This gap may cause young people to undergoing piercing in an unclean environment, to undergo piercing from amateurs, or do the piercing themselves (Ferringer et al., 2008). The Department of Health of Puerto Rico (Lex Juris, 2003) recognizes that body piercing is hazardous, especially among teens, exposing them to a variety of lesions and infections when the piercing is not done using sterilized procedure. For this reason, it was necessary to investigate college students in Puerto Rico who may experience health complications after performing a body piercing.

This study was conducted with 64 students enrolled in the nursing program in a university in Puerto Rico. Most of the participants had some type of health complications after a piercing was done. Redness, tenderness, and swelling were the symptoms that most affected the participants, but very few decided to seek help from health professionals, preferring to stay home and apply self-care to the symptoms.

In this chapter, I interpret findings based on the research questions and hypotheses. I also present implications for social change. In addition, I identify limitations of the study and recommendations for further research. I conclude with a

summary of the study.

Interpretation of Findings

I addressed five research questions for this study using a quantitative nonexperimental design. Data were analyzed using descriptive and multivariate analysis. Answers to the research questions are presented in the following sections.

Research Question 1

What is the relationship between the variables of age, sex, and medical complications after performing a piercing among college students? The findings indicated that health complications occurred after performing a body piercing, but they occurred in the same way without significant differences between sex and age. Results indicated no significant differences for the independent variables of sex and age regarding medical complications after performing the body piercing. Therefore, the null hypothesis was not rejected. Mayers et al. (2002) revealed in a study done with 229 undergraduate university students that 17% had health complications after piercings such as local trauma, bleeding, and bacterial infection. According to Wong et al. (2012), body piercing health complications were present among college students who performed piercings.

Research Question 2

How likely are individuals obtaining a body piercing to receive verbal information of possible medical complications, written information of medical complications, both oral and written information, or no information? According to the results of my study, participants were more likely to receive verbal information or no

information about medical complication after performance of a body piercing than written information. According to the descriptive analysis, A total of 53% (*n* = 34) of the participants indicated that they received information verbally, and 41% (*n* = 26) said that they asked for someone's advice before having the procedure. A total of 72% (*n* = 46) of the participants indicated they did not receive verbal or written information related to health risks of body piercing. Some participants indicated that they received information through written documents (27%, *n* = 17) and both verbal and written documents (25%, *n* = 16). Overall, most participants received verbal information (53%) compared to written information (27%).

Compared with other findings, where participants did receive information of complications of piercings, Quaranta et al. (2011) conducted a survey study of college students addressing the risks taken when performing body piercings. Participants were asked whether they received verbal or written information on the health complications of piercings. The results indicated that 74% of the participants were informed about health complications of piercings. Of this 74%, 54% were informed verbally followed by 29.3% who were informed by another person and 18.7% who were informed in a written document. John (2013) performed a study with the purpose of assessing knowledge on body piercing complications among college students. Participants revealed having inadequate knowledge of health complications of the procedure.

Research Question 3

What is the correlation between age and sex with body piercing health

complications? Both male and female participants had high percentages of health complications: 67% (n = 10) of male participants and 76% (n = 37) of female participants. Similar proportions were observed for age: 68% (n = 17) of participants younger than 16 years had health complications and 77% (n = 9) of participants 16 years and older had health complications. There were no significant differences between complications by sex and age. Therefore, the null hypotheses were not rejected. These results were different from those reported by Mayers et al. (2002) who surveyed 454 college students regarding the prevalence of body piercing and postpiercing medical complications. According to Mayers et al., female participants reported more complications than men who participated in the study.

Grief et al. (1999) investigated on body piercing and tattooing in 19 universities. The sample included 828 university students. A total of 45% reported health problems after the procedure. Participants described these complications as infections (redness, blisters, presence of pus and discharge of secretions). Grief et al. indicated that most participants were women, but they did not compare results of women versus men.

Research Question 4

Where are medical complications associated with body piercing being treated: medical office, the emergency room, or self-care at home? Most of the participants reported some type of health complication after a piercing was done. Redness, tenderness, and swelling were the symptoms that most affected the participants, but very few participants decided to seek help from health professionals, preferring to stay home

and apply self-care to the symptoms. Only one student mentioned visiting a medical office. In study by Grief et al. (1999), 45% of participants reported health complications, and 13% had to visit medical facilities for professional help related to these health complications.

Research Question 5

How do demographic aspects (age and sex) of students who had body piercing complications influence the decision to stop repeating piercing activities? Most participants in each group reported that they would repeat a body piercing after learning about medical complications: 83% (n = 5) of male participants and a 75% (n = 9) of female participants. Similar proportions were observed with age: 86% (n = 6) of participants younger than 16 years had health complications and a 73% (n = 8) of participants 16 years and older had health complications. There was no significant difference between body piercing complications and the decision to stop repeating piercing activities by sex and age. Therefore, the null hypothesis was not rejected. In the case of sex, the p value was 0.690; for the variable age, the p value was 0.518.

Findings in the current study were consistent with those reported by King and Vidourek (2007) who found that of the 536 participants in their study, 18% reported having health complications after the procedure, and 67% of these students reported wanting to experiment with another piercing even after having health complications. Even though students had knowledge of health risks of body piercing, they were not intimidated by this information and decided to continue with a piercing. In a similar

study, Grief et al. (1999) found that 45% of the 766 college students reported infection symptoms at the body piercing site, and 78% of these students reported that would repeat the procedure even after having had health complications (Grief et al., 1999).

Limitations of the Study

This study had some limitations. The studied population belong to a small enrolled group of nursing students in the selected university. This happened because at the moment of the data collection, summer had begun and only a few students were studying nursing at this time. Approval from IRB was given in the month where it is summer vacation for many main Universities in Puerto Rico and the selected university that gave letter of approval to realize this investigation had very few nursing students in summer classes. What was done was that to get the most students to participate I visited the university for various days collecting data from the students who decided to answer the survey. It was impossible to find the original amount (191) of students that was desired to do the investigation changing the method of analysis to Fishers exact test. A post-hoc power analysis was realized to determinate the effect of the small sample size on the ability to answer the research question. For this analysis, we considerate the population incidence of a 30% in accordance to previous literature of a similar population, and a 0.05 alpha of a type error. The incidence of health complications of the sample of this study was 73.4%. The result of the post-hoc power analysis indicated a 99% of power.

We used the Fisher's Exact Test, a non-parametric test for categorical variables and it is employed when sample sizes are considerate small. Another limitation was that for this study only nursing students were selected which does not represent all the students at the selected university. The option of selecting nursing students occurred because the selected university for the study was in the disposition to cooperate with the investigation as soon as the study was presented to the president of this university. They immediately showed interest in participating with the investigator and nursing students are the biggest enrolled group in this health-related university. There are other students that belong to other health related programs (paramedics, sonographers, x-ray specialists and medical record secretaries) who can be studied and compared to the nursing students.

Recommendations

Perez et al. (2013) noted that body piercing is a risk factor for Hepatitis C infection in Puerto Rico and the most consistent group with piercings those of age 18-25 years old with a prevalence of 25% to 35%. This is excluding the traditional earlobe piercing in males and females. (Armstrong et al., 2014). This is the first time that there was a study about body piercing health complications among college students in Puerto Rico.

I suggest that this study should continue to be realized among other college students in the island and bigger samples to have a view of the situation presented in this study. The results of this investigation put in perspective the need to promote among the population on the island of Puerto Rico the importance of body piercing health

complications education. Many participants revealed not being notified verbally of the health complications of this procedure nor receiving written information which is a situation that must be addressed as part of public health interventions.

Body piercing complications should be studied with a larger group that includes young teens and young adults from other universities since this study demonstrated that at a very young age, teens are being exposed to body piercing. Another recommendation related with this topic would be continuing investigation that can develop around those cases that had to visit an emergency room because of health complications on piercing. This information can be found in patient records that are saved in the hospital for some years. Results of this study demonstrated that both males and females (in a high percentage) that participated in this study notified having body piercing health complications after the procedure.

Laws on the island of Puerto Rico should be revised and to be in accordance with the actual necessity of the population and start vigilance and prevention activities to decrease victims of body piercers without the correct knowledge. Lawmakers should establish that every person who has a piercing shop should have continued education on aseptic measures to prevent wrong management of their clients. Also, there should be a more effective vigilance that assures that those who decide to perform piercings must receive information (verbally and written) on possible health complications after the procedure and establish a record (electronically) where authorities receive feedback of clients related to the compliance of this education on complications.

Effective educational information increases health knowledge as well as changes in attitudes toward healthier behavior (Armstrong et al., 2014). The Health Belief Model states that by having knowledge on the health risks of an action, health risks can be decreased (Rosenstock et al., 1988) which has a direct association with the purpose of this investigation. For every client that must receive medical help on body piercing health complications in a medical office or emergency room, notification of these cases should be accounted and notified to health authorities to establish a closer vigilance and immediate statistics on this situation.

Implications for Positive Social Change

In the last 25 years, body piercing has become a widespread activity (Cohen, 2014). The fact that health standards and regulations vary among different states has negative consequences when young people undergoing piercing, with nonaseptic measures and untrained piercers including piercing themselves, proceed to perform this activity. Not understanding the importance of correct handling of piercing utilities and having the knowledge on sterile measures to perform a piercing can lead to great health issues and repercussions in the community.

The Department of Health of Puerto Rico (2003) recognizes that body piercing is hazardous and dangerous, especially among teens, exposing them to a variety of lesions and infections when the piercing is not done in a clean and sterilized procedure. The research problem identified in this study was meant to fill the gap that exists around the incidence and health complications that result of body piercing among college students

which had not been studied in Puerto Rico.

By studying body piercing activities for the first time in Puerto Rico, there could be better knowledge that can provide useful information to begin assessment, intervention and prevention activities on this matter. For the first time in Puerto Rico is a study related to body piercing among college students to obtain information that could help in the better understanding of scope of this activity and have knowledge of possible medical complications that result after performing this procedure. Despite the risks of piercing in Puerto Rico there is no legislation to regulate body piercing even though there is legislation for tattoo practice for which it is essential to promote a clean environment in body piercing parlors and recognize the importance of promotional activities such as education on health risks and complications.

The results of this study are important to share with general population and health professionals to provide a correct medical approach of complicated cases of body piercing activities, and for educational and preventive purposes among the population being studied. Also, educational and preventive measures can be initiated in elementary school based on the results that many students have their first piercing approximately at the age of 11 years old. By having knowledge on the gaps identified in previous studies, this study can provide answers to these gaps and therefore have a better contribution to investigations on this topic.

Positive social changes can be reached through this study by providing knowledge and useful information about a body art activity that is increasing among the population

and provide the necessary strategies to improve the comprehensive attitude towards the aspects that may surround the act of performing body piercing such as health complications. Through the investigation of body piercing health complications among college students, new information was obtained. There is a questionnaire that was submitted to participants to obtain real information data that afterwards was analyzed to obtain results that guided the investigators to conclusions. These conclusions will be utilized to aware other health professionals and society about the impact of body piercing and those strategies that can be useful to promote safe body piercing activity among young people. Also, different recommendations were created to impulse positive changes through knowledge obtained because of this research.

Body piercing among college students is a problem that is not being taken in consideration at this moment in Puerto Rico. The results of this study will raise a red flag towards a health situation that needs more investigation and that might have a high cost to public health authorities and needs to be addressed to work on solutions at short and long term.

Conclusions

The main purpose of this quantitative non-experimental study was to first, explore the health risks and possible health complications that occurred after a body piercing among some selected college students in Manatí, Puerto Rico. Second, a purpose was to investigate the correlations between different variables such as age, and sex with body piercing and third, compare the participants' willingness to continue with this activity of

body piercing after having knowledge on health risks or a history on health complications. This study was the first study completed on this topic in Puerto Rico which makes this investigation a great contribution to the limited information that exists.

Findings of this investigation can guide health professionals and public health contributors to understand and develop prevention and promotional activities with colleagues and with the population in general related to body piercing health complications. Also, this study serves as a base for other future studies with other selected groups to improve body piercing health complication management.

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Appendix A: **Body piercing experience among college student questionnaire**

The following survey has been realized with the purpose of knowing the quantity of university students that have body piercing and evaluate the health risks that they have confronted due to this procedure.

Instructions: Voluntarily, please answer each question. All completed surveys will be anonymous and kept away in strict confidentiality by the investigator. **Remember that all response remains strictly confidential.**

Socio-demographic aspects

Instruction: Complete the blank with the information or tick (☑ or ☒) the blank as apply.

1. What is your age at this moment? _____

2. What is your sex?

☐ Male ☐ Female

3. Level of studies:

☐ First year ☐ Second year ☐ Third year ☐ Fourth year

4. Nursing program you're enrolled in:

☐ Associate ☐ Bachelor

5. Placement of the piercing and age it was performed (Please tick as many boxes as apply and indicate at what age the piercing it was done.)

☐ Ears (not the first time earrings in women) at what age it was done? _____

☐ Eyebrow at what age it was done? _____

☐ Nose at what age it was done? _____

☐ Lip at what age it was done? _____

☐ Tongue at what age it was done? _____

☐ Nipples at what age it was done? _____

☐ Navel at what age it was done? _____

☐ Genital at what age it was done? _____

___Other at what age it was done? _____

Questions about young adults' attitudes and practices towards body art

	Yes	No	Do not know
6. Have you been pierced?	☐	☐	☐
7. If you don't have a piercing, would you consider one in the future?	☐	☐	☐
8. When you decided to do a piercing, did you ask for someone's advice before deciding the procedure?	☐	☐	☐
9. Were you verbally informed about the risks of undergoing a body piercing?	☐	☐	☐
10. Were you informed through written documents about the risks of undergoing a body piercing?	☐	☐	☐
11. Were you verbally and through written documents informed about the risks of undergoing a body piercing?	☐	☐	☐
12. Did the body piercer use sterile/disposable equipment?	☐	☐	☐
13. Did you report any complication after the intervention?	☐	☐	☐

Questions about degree of complications

	Degree of complication			
	Severe	Mild	Poor	None
14. Did you have annoying bleeding when you had your piercing?	☐	☐	☐	☐
15. Did you have pain after your piercing?	☐	☐	☐	☐
16. Did you have redness and tenderness after you had your piercing?	☐	☐	☐	☐
17. Did you have swelling after you had your piercing?	☐	☐	☐	☐
18. Did you have trauma/rip of the skin after your piercing?	☐	☐	☐	☐
19. Did you have infection (redness, discharge of pus, fever) after piercing?	☐	☐	☐	☐
20. Would you repeat the procedure of a body piercing in the future?	☐	☐	☐	☐

21. Where was body piercing complications treated?

☐ Self-care at home ☐ Emergency Room ☐ Medical office

Appendix B: E-Mails from authors of survey utilized as reference for the actual survey to be used in this investigation

Permission for use
Elsie Goicochea
Fri 5/15/2015 11:58 AM

To:
alessia.quaranta@uniba.it;

Hello,
I am a Walden University Student from the Department of Public Health who is pursuing a Doctoral Degree in Public Health. My dissertation is related to body piercing health complications among college students here in San Juan, Puerto Rico.

I would like to use the survey that is presented in the article: Body piercing and tattoos: a survey on young adults' knowledge of the risks and practices in body art. It is my intention to use some questions in this survey related to body piercing for which I ask permission to use. Also, would like to have your approval to change the selected questions to the language of Spanish in order to be answered by Spanish-speaking population.

Thank You,

Prof. Elsie Goicochea, RN, MSN
Universidad Metropolitana
Escuela Ciencias de la Salud
Departamento de Enfermería

From: Elsie Goicochea <egoicochea@suagm.edu>
To: "songumurat@yahoo.com" <songumurat@yahoo.com>

Sent: Saturday, May 16, 2015 2:40 AM
Subject: Permission for use

Hello,
I am a Walden University Student from the Department of Public Health who is pursuing a Doctoral Degree in Public Health. My dissertation is related to body piercing health complications among college students here in San Juan, Puerto Rico.

I would like to use the survey that is presented in the article: **Attitudes and Practices Regarding Nose Piercing: Results of a Questionnaire Survey and Review of the Literature**
It is my intention to use some questions in this survey related to body piercing for which I ask permission to use. Also, would like to have your approval to change the selected questions to the language of Spanish in order to be answered by Spanish-speaking population.

Thank You,

Prof. Elsie Goicochea, RN, MSN
Universidad Metropolitana
Escuela Ciencias de la Salud
Departamento de Enfermería

Re: Permission for use

To:
Elsie Goicochea;
You replied on 7/29/2015 3:06 AM.

Hello,
It's OK. No problem.

Best,
Murat