CORNEAL ABRASIONS: WHAT DO NURSE PRACTITIONER STUDENTS KNOW?

By

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To the Faculty of Washington State University:

The members of the Committee appointed to examine the clinical project of Travis W. Robbins find it satisfactory and recommend that it be accepted.

Chair

[Signatures]

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Abstract

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This study investigated the family nurse practitioner student’s knowledge of corneal abrasions and current research protocols for their treatment. Thirty-five nurse practitioner students attending the Masters of Nursing program at a research intensive university in the west enrolled in the study. Data were collected using a nine question survey consisting of two questions regarding corneal abrasion diagnosis, three questions regarding differential diagnosis of eye redness, and four questions regarding corneal abrasion treatment. Surveys were completed during Primary Care: Adults and Elders and Primary Care: Family class time during the 2002 Spring semester.

Data were evaluated to analyze differences between scores obtained on the five questions pertaining diagnosis of eye redness (dxscore) and scores obtained on the four questions pertaining only to corneal abrasion treatment (revscore). The hypothesis of higher scores being obtained by students with ER/Urgent care experience, ER/Urgent care clinical experience, and personal experience with corneal abrasion treatment were explored and no statistically significant difference were found.
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Chapter 1 - Introduction & Background

Statement of the problem

Nurse practitioner students rely on their classroom experience, preceptors, and clinical faculty to impart current treatment knowledge to them. Such expectations put a large burden on the students and preceptors to keep up on the latest research treatment trends. In the competencies portion of Domain Six of the Curriculum guidelines & program standards for nurse practitioner education, 1995 guidelines, it specifies that nurse practitioner students should, "Critically evaluate and apply research studies pertinent to client care management and outcomes" (Boodley, 1995). Are nurse practitioner students learning current research guidelines for treatment of corneal abrasions?

Corneal abrasion treatment is controversial. There is strong evidence that treatment of corneal abrasions with routine eye patching has no significantly better outcome advantage over not patching. In 1995, Kaiser reported that “patients with traumatic corneal abrasions healed significantly faster, had less pain, and had fewer reports of blurred vision when they were not wearing a patch” (p.1936). Patching does not come without risk. Flynn et al. (1998) point out that, “Theoretical disadvantages of eye patching include decreasing corneal oxygenation, thereby delaying healing and increasing risk of infection by occluding the eye, as well as loss of binocular vision and a resulting lack of depth perception.” (p.264). The risk associated with patching may outweigh the benefits believed to come from patching.

Statement of the Purpose

The primary purpose of this study was to evaluate nurse practitioner student knowledge of the current treatment and diagnosis of corneal abrasions. Upon graduation, many of these students will be working independently or practicing in a rural setting. In these settings, these new
graduates may be required to do emergency room coverage. Flynn et al. estimate, "corneal abrasions, defects of the normal epithelium usually caused by trauma or resulting after removal of a foreign body, account for approximately 10% of the visits to eye hospital emergency departments". (p. 264) If throughout the student’s clinical rotations they have no experience in Emergency room(ER)/Urgent care settings, it is unlikely that the student will receive this, learning opportunity.

Corneal abrasions were chosen as the focus of the study because it is a common eye problem. It is also thought that due to the persistent controversy of treatment, nurse practitioner students may not have been exposed to the research guiding the most current research treatment or that their educational program included eye care.

Organizational Framework

The organizational framework used for the analysis was developed by the author and was designed specifically for this study. The framework was developed based on the researcher’s personal experience with learning. Referred to as the Lifetime Knowledge Framework(LKF), Appendix A this framework looks at the overall knowledge an individual has about specific diagnosis and treatment of any particular health condition. The knowledge of an individual will be called the Treatment Knowledge. Treatment Knowledge leads to improved patient outcomes, and is derived from three major sources: personal experience; formal education; and clinical experience.

1. Knowledge is gained from personal experience with a particular diagnosis. It is believed that once an individual is personally treated for a particular diagnosis that they gain knowledge in treating that particular diagnosis for future encounters. 2. Knowledge is gained from formal education. It is expected that if an individual attends formal education in treatment of a specific
diagnosis they then gain treatment knowledge. 3. Individuals gain treatment knowledge through clinical experience. For example, if an individual gains clinical experience, and is guided by their preceptor through the diagnosis and treatment of corneal abrasions, in the future the individual will have increased knowledge of treatment of corneal abrasions.

Corneal abrasions were chosen as the model treatment for this study. It is expected that nurse practitioner students who have personal experience, formal education, and/or ER/Urgent care treatment experience will have greater understanding of treatment protocols for corneal abrasions.

**Literature Review**

The literature in the subject area of corneal abrasion treatment is limited. Even with this limited body of knowledge the evidence to not patch corneal abrasions <10mm² is convincing. The cornea, as described by Seeley et. al. in Anatomy & Physiology (1995), is an avascular, transparent structure anteriorly continuous with the sclera. The cornea consists of a tissue matrix and two layers of epithelium. The tissue matrix contains collagen, elastic fibers and proteoglycans. The two layers of epithelium consist of an outer layer of stratified squamous epithelium covering the inner layer of simple squamous epithelium. Normal healing of epithelium post injury is between 24-48 hours.

Even with the current literature recommending not to patch corneal abrasions <10mm², Le Sage, et al. (2001) point out that patching corneal abrasions is, “commonly recommended in standard textbooks of ophthalmology and emergency medicine.” (p.130) Review of two commonly used reference textbooks, Current medical diagnosis & treatment (Teirney, 2000) and The 5 minute emergency medicine consult (Gillespie, 1999), revealed that eye patching is controversial but was still being given as a possible routine treatment.
Corneal abrasion treatment has been controversial since 1991 when Anderson et al. researched corneal epithelium healing in a rabbit model. This study used tarsorrhaphy, suturing of the eyelids with 4-0 silk suture with bolsters placed at the lid margins and tied with a releasable bowknot, as a method to simulate eye patching. Corneal abrasions were observed every twelve hours using cobalt blue flash photography to see if healing of the epithelium was faster in patched eyes or not. It was discovered that the overall healing time is no different in patching vs. not patching corneal abrasions, in the animal model.

In 1995 Kaiser researched the treatment of corneal abrasions. This study evaluated the effectiveness of eye patching vs. no patching for corneal abrasions in a human model. The study included two hundred twenty-three subjects who presented to the emergency unit at the Massachusetts Eye and Ear Infirmary. Twenty-two subjects were excluded from the study due to not meeting criteria or dropping out of the study. The two hundred one subjects remaining were randomly assigned to the test group or the control group. The primary focus was to see if not patching corneal abrasions would have significant outcomes in reference to pain, number of days for the abrasion to heal, photophobia, of increased tearing. The overall findings demonstrated no significant difference between patching and not patching in relationship to decreased pain, number of days to heal, photophobia, of increased tearing.

One of the arguments against Kaiser’s research was that the methods used to patch the eye was the cause of the insignificant changes. In the June 1996 publication of Ophthalmology in the “Letters to the Editor” Dr. Stuart Seiff argued, “Perhaps the patching method used in this study produced excessive pressure, inhibiting healing and causing discomfort.” Eyes that were patched were patched using double patch with the first patch folded in half, the second patch placed over the first and taped in place. Patients were then asked if they could blink their eye with
patch in place. If they could blink, patch was removed and reapplied to prevent blinking. Another argument was that the methods used to test for corneal healing were subjective and should have been performed objectively with a slit lamp exam.

In 1999 Le Sage et al. replicated Kaiser's 1995 research with the incorporation of a slit lamp exam at 24 hour intervals to document abrasion healing. One hundred sixty-three subjects were reported in the study, randomly assigned to two groups. All subjects enrolled in the study were retained to completion of the study. Le Sage reported results similar to Kaiser's study. It was found that there was no significant change in pain, healing time, foreign body sensation, eye redness, or local irritation of patching vs not patching corneal abrasions including the use of antibiotic eye drops. In this study, the author estimated that 20,000 cases of corneal abrasions were diagnosed per year in Quebec Emergency Departments where the study was conducted.

Overall the studies reviewed found no significant difference between epithelial healing time, reduction of pain, or decrease in photophobia with patched or non-patched patients using antibiotic eye drops and mydriatics. The potential risk of anaerobic infection and the impairment of binocular vision outweighs any perceived benefit to eye patching. LeSage et al. point out, "Dressing corneal abrasion with ocular patches has well-recognized negative consequences, such as impairment of binocular vision and reduction of the visual field" also, "potential risks of severe anaerobic bacteria infections have been reported in patients wearing contact lenses". (p. 134) Flynn et al. further point out that, "disadvantages of eye patching include decreasing corneal oxygenation, thereby delaying healing and increasing risk of infection by occluding the eye, as well as loss of binocular vision and a resulting lack of depth perception". (p. 264)

Because of the controversy surrounding treatment of corneal abrasions nurse practitioner students are faced with a difficult decision when treating corneal abrasions. The research available
for the treatment of corneal abrasions is limited, and has not established specific protocols for treatment. This is apparent with the difference of recommendations found with two current text books review in this study for the treatment of corneal abrasions. Nurse practitioner students most use their clinical judgement when deciding how to treat corneal abrasions. If patching is the chosen treatment it is imperative that the patient follow-up in twenty-four hours for re-evaluation to ensure no complications have develop.

**Research Question**

This study evaluates nurse practitioner student knowledge of the diagnosis and current treatment recommendations of corneal abrasions. The research questions were: 1) What do nurse practitioner students know about corneal abrasion treatment? 2) Does experience make a difference in the knowledge of the student? Experience was defined as personal experience, work experience, or clinical experience while attending the nurse practitioner program. The following hypotheses were developed:

- **H1** Nurse practitioner students possess limited knowledge of the current treatment protocols for corneal abrasions. 
- **H2** Nurse practitioner students with greater clinical course experience have greater knowledge of corneal abrasions treatment. 
- **H3** Nurse practitioner students with prior work experience in emergency and urgent care medicine will have greater knowledge of corneal abrasions treatment. 
- **H4** Nurse practitioner students with prior personal experience will possess greater knowledge of corneal abrasion treatment.

**Definition of Terms**

Relevant terms used throughout the study are nurse practitioner student, survey, and corneal abrasion treatment. *Nurse practitioner student* is defined as any student in one of two courses Primary Care: Adult and Elders or Primary Care: Family in the Nurse practitioner
program located at research intensive university in the west. The survey is defined as a author-developed survey which collected demographic data pertaining to what point in the nurse practitioner program students where, the credit level of clinical experience completed, prior work experience, and source of knowledge gained on treatment of corneal abrasions. The survey also consists of general treatment questions pertaining to corneal abrasions as recommended by the research findings by Le Sage et al. in 1999. The final part of the survey required distinction of differential diagnosis for eye redness by case study derived from Current medical diagnosis & treatment (2000). Corneal Abrasion as defined by Flynn et al. is, “defects of the normal epithelium usually caused by trauma or resulting after removal of a foreign body.” (p.264)

Variables for the study are shown in Table 1, Appendix B. The independent variable consist of student nurse practitioner knowledge of corneal abrasion treatment. This knowledge was expected to be gained from personal experience, clinical treatment experience, or formal education gain in classroom setting in the nurse practitioner program. The dependent variable was the knowledge score on the survey. The survey was further segregated into demographic data, differential diagnosis knowledge for eye redness and current research knowledge of corneal abrasion treatment.

Significance to Nursing

The primary significance to nursing was to assess if nurse practitioner students possess the knowledge base about corneal abrasion treatment to function proficiently. The study intended to identify any possible curricular issues of current nurse practitioner students. With knowledge gained, nurse practitioner programs could be appraised of any curricular issues in the current curriculum or if they are adequately preparing nurse practitioner students to enter the workforce, and be able to change or supplement the curriculum as needed.
The current trend in healthcare finds many nurse practitioners working in ER/Urgent care settings. Review of job postings on the internet, at www.nurse.net, 30-40% of nation wide jobs posted are for midlevel providers to work in ER/Urgent care settings. The suspected reason for this phenomenon is the decrease in healthcare reimbursement. It is imperative that nurse practitioners possess basic knowledge of treatment of common ER/Urgent care diagnoses, especially for those who provide health care.

Chapter 2 - Method of Study

Introduction

A good study requires preplanning and a good design. Improper design selection can deter from the end result of the study. Poor design selection can weaken the overall generalization of the study. With any design there are risks to internal validity. Care must be taken to insure that internal validity does not weaken the outcome of the study results. Generalization of a study requires safeguarding against possible uncontrolled threats to internal validity.

Type of Design

The design chosen for this study was the one-group posttest-only design shown in Table 2.

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<th>Prior Experience</th>
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Table 2

This design allowed for all nurse practitioner students enrolled in two courses and available during class time to be included in the study. The prior experience was the course work and clinical...
rotations offered by the nurse practitioner program. The prior experience also includes personal experienc and prior ER/urgent care experience. With this design there are five threats to validity. The five threats to validity as outlined by the 2001 publication of *The practice of nursing research: Conduct, critique, & utilization* (Burns) are: no link between treatment and change; no control group; maturation; undetected confounding variables; and inability to access threats to validity.

The study was designed to take in all currently identified treatments that would affect the outcome of the survey. The major treatment for the study is knowledge. Knowledge is gained from personal experience, formal education and clinical experience. It is believed that the changes in the survey results are directly linked to the treatment. This should reduce the risk of no links between treatment and change.

This type of study does not allow for a control group. It would not be educationally ethical or sound to incorporate a control group into the study. Outcomes are based on different knowledge levels of nurse practitioner students. Adding a control group would require additional training and clinical experience for nurse practitioner students and would cloud overall outcome of the study. Also with the limited numbers of nurse practitioner students attending the nurse practitioner program a control group would reduce the number of students in each group and possibly reduce the statistical power of the study.

Maturation is the major premise driving the study. It is believed that increased experience and time will increase the total knowledge that nurse practitioner students possess. This study design uses a one time survey. By using a one time survey, maturation is from the point a student enters the nurse practitioner program to the time of the survey. This will limit the amount of maturation occurring during the study.
In order to detect confounding variables, the survey, (Appendix C), attempts to identify variables influencing outcome results. Demographic information included age of student, number of credits completed in the nurse practitioner program, number of credits of clinical experience, prior work experience, and where students learned about treatment protocols for corneal abrasions. These variables should include all contributing variables which may influence outcome results.

**Setting for Study**

The primary setting for this study was the main classroom at the university campus and three distance learning sites. Students from two different courses were invited to participate. Instructors for the two classes were contacted and asked for approval to use their class time to complete the required survey data. The classroom used was connected to outlying sites through the interactive distance learning opportunities offered to nurse practitioner students.

**Population and Sample**

The population consisted of male and female nurse practitioner students, ages 22-50, enrolled in Primary Care: Adults and Elders, Primary Care: Family, or both. No students enrolled in either course were systematically excluded from the study.

The sample method used for the study was convenience sampling of students enrolled in one semester at a nurse practitioner program. Using a convenience sample does limit the ability to generalize the results. Broad demographic data was collected in an attempt to evaluate biases of the sample.

**Data Collection Procedure**

The data was collected by the researcher during scheduled class time. The students were read a verbal consent approved by the university's institutional Review Board for Human
Subjects. Students then received the research survey and were given time to complete the survey if they chose. The time estimated to complete the survey was 10-15 minutes. Surveys were then placed in a manila envelope and collected by the researcher. Students enrolled in both N567 and N569 concurrently were asked to only complete the survey form once. Confidentiality of the subjects was ensured throughout the study. Surveys were not reviewed until all data had been collected.

**Instrumentation: Reliability and Validity**

The instrument consisted of a nine question survey testing current knowledge of corneal abrasion treatment and diagnosis of eye redness. The questions were derived from *Current medical diagnosis & treatment* (Tierney, 2000) and from the research of Le Sage et al. (2001). The survey was reviewed and approved by project chair who is a faculty member of the family nurse practitioner program. The survey was reviewed by the project chair and the author to be a valid testing tool for treatment of corneal abrasions and diagnosis of eye redness.

Guttman’s analysis was performed on all data obtained from survey results. Initial analysis demonstrated a reliability of 0.63 with a residual (error term) of 34. Removal of non-contributing questions was completed and analysis was re-performed. Questions retained were numbers 2, 3, 5, and 8 see (Appendix C). Reevaluation by Guttman’s analysis demonstrated a reliability of 0.80 with a residual (error term) of 11. After completion of second analysis, reliability was considered adequate. No further testing of reliability or validity were done. Due to the limited number of questions remaining and that three of the four questions primarily focused on treatment of corneal abrasions it was decided to use the entire test for data analysis. Performing a trial of the survey prior to starting the study would have aided in tool development, a stronger survey, and more reliable study results.
Data Analysis

Data was analyzed using SPSS version 10.0. Descriptive statistics were performed for subject age, total test score, test score of questions 2, 3, 4, and 5 which focus primarily on corneal abrasion treatment (revscore), and test score of questions 1, 6, 7, 8, 9, which focus primarily on corneal abrasion diagnosis (dxscore). Frequency statistics were performed on sex of subjects, number of clinical rotations completed, experience of subjects prior to attending masters program, and where knowledge gained about corneal abrasion treatment was obtained.

Nonparametric testing for independent samples, primarily the Kruskal-Wallis test, was performed to compare possible relationship between revscore and number of clinical rotations completed, experience prior to attending masters program, and where knowledge was gained about corneal abrasion treatment. The sample size was 35, with as few as 1 in some groups to 14 in others.

Human Subjects Considerations

The Human Subjects Form was submitted to the Institutional Review Board (IRB) for Human Subjects in January 2002. Final approval for the study was given without restrictions, as an exempt study. The only risks to participants was confidentiality. Survey forms excluded any identifying information about students enrolled in the study. This ensured that participants could not be identified based on the data collected.

Chapter 3 - Findings

Introduction

The findings of the study were limited due to the sample size. All findings are expected to be general in nature and further studies would be warranted attempting to gain greater sample size and mixture of prior nursing experience. The topic of corneal abrasions was chosen because it is a
frequently encountered ER/urgent care diagnosis. The general assumption of the study was that nurse practitioner students who lack ER/urgent care experience prior to attending nurse practitioner school or those that do not obtain this type of experience while attending the program will have a decreased knowledge base for treating common ER/urgent care diagnoses, particularly corneal abrasions.

**Sample Characteristics**

The sample consisted of students attending the Family Nurse Practitioner program. There were thirty-five students who completed the survey. Of the thirty-five completed surveys, two were males and thirty-two were females. One survey did not distinguish between gender. The age range was twenty-four to forty-nine with a mean age of thirty-six and standard deviation of 7.92. Credits completed by students surveyed were between zero and thirty-seven or more. Of the students completing the survey, (Graph 1) two had completed zero to twelve credits, nine completed thirteen to twenty-four credits, six completed twenty-five credits, and seventeen completed thirty-seven or more credits. Total clinical rotations completed ranged between zero and two with one to five internship credits. Of the students surveyed, (Graph 2) seven had completed one clinical rotation, one had completed one clinical rotation and one to five internship
credits, thirteen had completed two clinical rotations and one to five internship credits, fourteen students marked “other” on the survey. The other category was assumed to be zero clinical rotations completed.

Students were further asked what their primary focus in nursing was prior to attending the nurse practitioner program and where they had gained knowledge about treatment of corneal abrasions. Primary Nurse focus prior to entering the nurse practitioner program, (Graph 3) indicated nine having medical/surgical hospital experience, five having ER/urgent care experience, four with ICU/CICU experience, two with community based/home health experience, six with women and children hospital experience, and eight with some other focus. In regards to knowledge gained of corneal abrasions treatment, (Graph 4) fourteen students reported gain of knowledge from a graduate school course, nine from ER/urgent care experience, three from clinical/internship rotations, two from medical office experience, and seven from past personal experience with a corneal abrasion.

Research Questions

H1 Nurse practitioner students possess limited knowledge of the current treatment protocols for corneal abrasions. It was assumed that treatment knowledge of corneal abrasions
was limited for nurse practitioner students. Descriptive statistics for the five questions focusing primarily on diagnosis of eye redness (dxscore) and four questions focusing primarily on treatment of corneal abrasions (revscore) were performed. The test score of the five questions focusing primarily on diagnosis (dxscore) demonstrated a minimum score of 60% with a maximum score of 100% and a mean score of 95% with a standard deviation of 0.10. The test score of four questions focusing primarily on corneal abrasion treatment (revscore) demonstrated a minimum score of 0% with a maximum score of 100% and a mean score of 64%. This demonstrates a statistical difference between dxscore and revscore with the use of pair T-test with a t-value = (-5.78), a p-value = (<.01) and a decrease of the mean by 31%. This shows that nurse practitioner students have adequate knowledge of diagnosis of corneal abrasions, however, they have a limited knowledge of current treatment protocols for corneal abrasions.

H2 Nurse practitioner students with greater clinical experience have greater knowledge of corneal abrasions treatment. Krushal-Wallis test was performed to evaluate differences between total number of internship credits complete and number of clinical rotations completed against revscore. Students were place in three groups: 1) One clinical rotation completed (n=7). 2) One clinical rotation and 1-5 internship credits completed (n=1). 3) Two clinical rotations completed and 1-5 internship credits completed (n=13). 4) Other, which was presumed to be no clinical rotations completed (n=14). Mean rankings were 18.36 for one clinical rotation completed, 31.00 for one clinical rotation and 1-5 internship credits completed, 17.73 for two clinical rotations and 1-5 internship credits completed, and 17.14 for other. Further grouping was performed combining students responding other and one clinical rotation completed (n=21) and one or two clinical rotation with 1-5 internship credits completed (n=14). Mean ranking were 17.93 and 18.11
respectively. No statistical difference between groups was noted, even distribution of score on test.

**H3** Nurse practitioner students with prior work experience in emergency and urgent care medicine will have greater knowledge of corneal abrasions treatment. Kruskal-Wallis test was performed to evaluate differences between work experience prior to entering the Masters of Nursing program and revscore. Students were placed in six groups: 1) Medical/surgical (n=9). 2) ER/urgent care (n=5). 3) Community/home health (n=2). 4) ICU/CICU (n=4). 5) Women and children (n=6). 6) Other (n=8). Mean rankings were 19.44 for medical/surgical experience, 17.00 for ER/urgent care experience, 12.50 for community/home health experience, 14.13 for ICU/CICU experience, 17.58 for women and children experience, and 18.50 for other experience. There was no statistical difference noted between different nursing experience prior to entering the Master of Nursing program, partially due to lack of numbers in groups.

**H4** Nurse practitioner students with prior personal experience possess greater knowledge of corneal abrasion treatment. Kruskal-Wallis test was performed to compare knowledge gained for treatment of corneal abrasions and revscore. Students were separated into five groups: 1) Graduate school course (n=14). 2) ER/urgent care clinical course experience (n=9). 3) Clinical course/internship experience (n=3). 4) MD office experience (n=2). 5) Personal experience (n=7). Mean rankings were 17.75 for Graduate school course, 20.22 for ER/urgent care clinical course experience, 3.00 for clinical course/internship experience, 25.50 for MD office experience, and 19.93 for personal experience. Further grouping was performed combining students possessing personal experience (n=7) and combining of the other five groups (n=28). Mean ranking were 19.93 and 17.52 respectively. No statistical difference was noted to indicate personal experience increasing knowledge of corneal abrasion treatment.
Chapter 4 - Summary, Conclusions, Recommendations

Introduction

Corneal abrasion treatment has been controversial since 1995 when Kaiser studied the effectiveness of eye patching on the healing of corneal abrasions. The findings of his study demonstrated no difference in healing time, reduction of pain or photophobia experience by patients with patching or no patching. Since that time even commonly used resources for practitioners still advise eye patching as a treatment for corneal abrasions.

This study was designed to evaluate student nurse practitioner knowledge of current research for treatment of corneal abrasions. It was also thought that prior work experience or clinical rotations performed at ER/urgent care settings would lead to greater knowledge of treatment of corneal abrasions.

Discussion

Nurse practitioner students are required to attend classes and clinical rotation time during their attendance of the nurse practitioner program. It is expected that nurse practitioner students will be able to function in an independent role upon completion of the nurse practitioner program. Nurse practitioners may find themselves working in many different settings upon graduation. One possible setting could include ER/urgent care practice. In this setting corneal abrasions are more likely to be encountered. It is expected that nurse practitioner students should know the current research pertaining to patching vs. non-patching for corneal abrasion.

This study demonstrated that nurse practitioner students are prepared to diagnosis a common eye problem, corneal abrasions. However, the knowledge of the current research treatment protocols for corneal abrasions was limited. Difference in mean test scores between the dxscore score and the revscore was 31% demonstrating a decrease knowledge level of research
treatment protocols. There was no significant statistical difference among groups when evaluating number of clinical rotations, work experience prior to entering the Masters of Nursing program, and personal experience with corneal abrasions with regard to revscore.

**Limitations**

There were some limitations to this study. The sample size was very small (N=35). A larger sample size may show greater statistical difference among different groups based on nursing experience prior to entering nurse practitioner programs. A larger sample size may also show less gap between diagnosis of common eye problems and research treatment protocols for corneal abrasions.

The study was limited to nurse practitioner students attending a single nurse practitioner program at research intensive university in the west. A more global study involving other university's nurse practitioner programs and students may demonstrate more or less variance between groups and test scores. Further evaluation of the survey used to eliminate ambiguous questions could strengthen the outcome of the results. This would give greater strength when evaluating the outcome data.

Further limitations were noted during the oral presentation of the project. Incorporation of the entire committee during the proposal process would have helped to locate shortcomings in the organizational framework and survey prior to starting the study. Incorporation of research of how students learn in the development of the framework would have strengthened the study and survey development. When evaluating where students learned about corneal abrasions there was significant overlap of categories, and the categories were not well defined and clear to the reader. The survey tool needed to be tested and greater tool development performed to increase reliability prior to administration to the study group. The categories for primary nursing focus prior to
entering the masters program, primarily Med/Surg and Women & Children experience, was assumed to be hospital experience. This experience could included medical office experience.

**Implications**

The study demonstrates a significant difference, p-value=\(<.01\) t-value=\((-5.78)\) and a decrease in the mean of the total test score and reversor of 17%, between the ability of nurse practitioner students to diagnosis common eye problems and being current on research treatment protocols for the treatment of corneal abrasions. Further evaluation of this phenomenon should be pursued to establish its significance to the current nurse practitioner curriculum. Review of this data will strengthen nurse practitioner program curriculum and increase competence of newly graduated nurse practitioners. The results of the study are limited. There were many gaps discovered in the survey and the organizational framework after the study was completed. The study results lack reliability and therefore cannot be generalized. Further research needs to be performed to establish if the results of this study are a true phenomenon.

**Recommendations for Further Research**

Future research should be broadened to evaluate complete knowledge of nurse practitioner students. Corneal abrasions served as an adequate platform for this study, however, broader testing of multiple diagnosis and treatment protocols would strengthen the outcome results. Future research needs to incorporate a greater sample size for greater generalization of study results. Using a test-retest tool to test student knowledge upon entering the masters nursing program and upon completion would give greater insight of total knowledge gained while attending the program. Understanding the different methods nurse practitioner students gain treatment knowledge demonstrated by the LKF will aid future research to better fine-tune survey questioners when testing for treatment knowledge of nurse practitioner students. The LKF would
be strengthened by incorporating more research pertaining to how students learn to verify the premises derived.

Conclusions

Nurse practitioner students gain a vast amount of knowledge while attending a formal program. It is inevitable that there may be gaps in the curriculum of the program. These gaps may be due to the course work or to the clinical experience of the students attending the program. This study demonstrated no difference between student’s prior experience and overall treatment knowledge of corneal abrasions. However, there was a difference between the ability to diagnosis versus the ability to treat corneal abrasions. There appeared to be no difference between the location where nurse practitioner students gain their knowledge of treatment of corneal abrasions and survey scores. Poor survey scores appeared to be a random variable.

Overall, nurse practitioner programs impart as much knowledge to students as possible in a very short amount of time. Nurse practitioner students need to seek out as much knowledge as they can outside of the program curriculum. Seeking experience in specialty areas while completing clinical hours could benefit student knowledge. Overall knowledge gained by nurse practitioner students attending nurse practitioner programs becomes an individual responsibility. Concurrently, rigorous academic programs should focus on gaps in knowledge.
References


Gillespie, M. (1999). *The five minute emergency medicine consult*. Lippincott Williams & Wilkins, Baltimore, Maryland


Appendix A
Lifetime Knowledge Framework (LKF)

- Personal experience
- Formal Education
- Treatment experience
- Improved Patient outcomes
Appendix B
### Variables

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Nurse Practitioner Knowledge</td>
<td>Survey</td>
</tr>
<tr>
<td>Personal Experience</td>
<td></td>
</tr>
<tr>
<td>Clinical Treatment Experience</td>
<td></td>
</tr>
<tr>
<td>Formal Education</td>
<td></td>
</tr>
<tr>
<td>Prior Nursing Experience</td>
<td></td>
</tr>
</tbody>
</table>

**Table 1**

### Method

<table>
<thead>
<tr>
<th>Prior Experience</th>
<th>Posttest</th>
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</thead>
<tbody>
<tr>
<td>Nurse Practitioner Course Work</td>
<td>Survey</td>
</tr>
<tr>
<td>Nurse Practitioner Clinical Rotations</td>
<td></td>
</tr>
<tr>
<td>Personal Experience</td>
<td></td>
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<tr>
<td>Prior Nursing Experience</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2**
Appendix C
Demographic information.

Sex  M/F       Age _____

How many credits have been completed in your masters work?
   A. 0-12
   B. 13-24
   C. 25-36
   D. 37-or more

How many clinical rotations have you completed (excluding the current course)?
   A. 1
   B. 2
   C. 1 and 1-5 cr internship
   D. 2 and 1-5 cr internship
   E. Other

What was your nursing focus prior to entering your masters program?
   A. Med/Surg
   B. Emergency/Urgent care
   C. Community based/Home health
   D. ICU/CICU
   E. Women and children
   F. Other

Where did you learn how to treat corneal abrasions?
   A. Graduate school course
   B. Emergency/urgent care experience
   C. Clinical/internship rotations
   D. MD office experience
   E. Personal experience
Please indicate A=true, B=false

1) Diagnosis of corneal abrasions is made with fluoricein staining of the affected eye and visualization with a cobalt blue light.
   A. True
   B. False

2) When treating corneal abrasions routine patching is recommended.
   A. True
   B. False

3) Patching of corneal abrasions decreases pain and speeds healing.
   A. True
   B. False

4) Routine eye patching for corneal abrasions is a benign treatment.
   A. True
   B. False

5) Corneal abrasions will heal in the same amount time with or without treatment intervention
   A. True
   B. False

6) Corneal abrasions lead to future cataracts.
   A. True
   B. False

7) 36 year old female pt present with a 48 hour history of diffuse injection of conjunctiva with heavy to moderate mucopurulent drainage from the left eye. Patients is not having any associated pain in the affected eye. Visual acuity is normal finding. Eye exam is normal findings except for above listed presenting symptoms. What would you expect is the cause of eye redness?
   A. Acute iritis
   B. Glaucoma
   C. Acute conjunctivitis
   D. Corneal abrasions
8) A 68 year old male presents to the emergency room with c/o increased blurred vision in his right eye. Diffuse injection of conjunctiva is noted. Visual acuity, OD=100/20 OS=20/20. Visual acuity of OD is normally 40/20. Eye exam reveals a more dilation right pupil as opposed to the left. Mild tearing of the eye is noted. Measurement of the intraocular pressure of the right eye is elevated. What is the suspected diagnosis?
   A. Acute iritis
   B. Glaucoma
   C. Acute conjunctivitis
   D. Corneal abrasions

9) A 22 year old male presents to the urgent care clinic c/o left eye pain with feeling of sand paper in his eye. Patient states while he was working in his garage a piece of metal flew from the grinder he was using into his eye. He then rinsed the eye for several minutes with water. Diffuse redness of the left conjunctiva is noted. Left eye is tearing excessively. Visual acuity, OD=20/20 OS=50/20. Normal OS vision is 20/20. Eye exam reveals no foreign body in the left eye and is verified by x-ray exam. All other parts of routine eye exam are normal findings. What is the suspected diagnosis?
   A. Acute iritis
   B. Glaucoma
   C. Acute conjunctivitis
   D. Corneal abrasions