

School Nurse Communication Tool and Efficiency in the High School Setting

Jana E. Rudigier

University of Missouri – Kansas City

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Abstract

In a high school health room, the school nurse will see a diverse population of students with conditions ranging from chapped lips to difficulty breathing. The school nurse must possess the ability to efficiently, and accurately understand the presenting problem, past medical history, and medications to quickly return the student to the classroom where academic learning will resume. The purpose of the quasi-experimental, quality improvement, retrospective study was to determine if the use of a school nurse communication tool over a 16 week semester decreased the time in minutes that the high school student was in the health room in a public suburban high school setting. The participants were the high school students that presented to the health room at a public high school within a suburban Midwest city. The sample size was 1475 students. Using the seven-item communication tool, time spent in the health room by high school students was measured at baseline and intervention. The use of the communication tool did not significantly decrease the time in minutes the student was in the health room. The tool served as a guide for the school nurse to provide compassionate care in a safe environment such that the student was returned to class while empowered to make healthy behavior choices based upon health promotion education.

Keywords: school health or school health services or high school nursing, adolescent, practice guidelines, standards of care, presenting problem, time or time in or length of treatment, communication tool or methods or articulation, assessment or screening or evaluation tool, health education or promotion, empowerment, efficiency, theory of unpleasant symptoms, Maslow's hierarchy of needs

School Nurse Communication Tool and Efficiency in the High School Setting

Student learning cannot occur unless the student is physically or virtually in the classroom and according to the National Forum on Education Statistics (2017), any absence interferes with student learning. The correlation between attendance and achievement is reported by Connolly and Olson (2012) to begin in prekindergarten, stating that absenteeism at early grades is associated with negative outcomes of slow progression and lower future achievement. At the high school level, chronically absent students are more likely to drop out or not graduate on time (Attendance Works, 2014). The Department of Education (2016) links chronic absenteeism to the inability to complete secondary education. Primary prevention activities performed by the school nurse promote physical and mental health according to the National Association of School Nurses (2018).

Local Issue

School nurses practice autonomously along several continuums. General and specialist care are warranted and based on the premise of public health, health promotion, and disease prevention methods (Maughan, Bobo, Butler, Schantz, & Schoessler, 2015). Children and adolescents present to school health rooms in need of acute or complex care, chronic disease management, or mental health counseling. School nurses play a vital role in teaching and reinforcing activities that promote health while providing necessary and appropriate care when needed. At a local, suburban high school, a school nurse communication tool (SNCT) facilitated the transfer of information that assisted the nurse in providing care and health education in an efficient manner. The school nurse additionally used the data to assess needs, guide the plan of care, determine the disposition for the student, and return the student to the classroom for continued learning. Data revealed a predominantly Caucasian middle to upper-class high school

with the number of students chronically absent of 5% (Llopis-Jensesn, 2016) and a decrease in time spent in the health room of 2.09 minutes with the utilization of the communication tool.

(Yano, Rudigier, & Ward-Smith, 2018).

Diversity Considerations

The school nurse functions with a broad array of students from different cultures and ethnic backgrounds. Students face challenges within each culture (American Academy of Pediatrics Policy Statement, 2008) including family crises, homelessness, immigration, poverty, and violence. The school nurse assesses students with an awareness of social determinants of socioeconomic status, support services, transportation, work environment, education resources, housing, and safety (Maughan et al., 2015). Assessments and interventions must align with cultural norms for the students and population to allow care delivery according to cultural needs. A communication tool must be flexible and in a culturally appropriate language to address diverse populations.

The current study site ethnicity is Caucasian 81%, Hispanic 8%, African-American 5%, Asian 3%, and two or more races 3% (National Center for Education Statistics, 2018).

Translation of the communication tool to a native language or having an interpreter was not necessary as all students that presented to the health room were dual language learners. Single-family housing comprises 72% of the housing units, and 28% are duplexes, condominiums or multifamily housing units. The study site was suburban with a median income of \$79,004 for parents of children in the district. Families with incomes below the poverty level is 8.5% and 96.3% of students in the district have health insurance coverage (National Center for Education Statistics, 2018).

Problem and Purpose

The intended improvement of this project was to decrease the time in minutes that the high school student was in the health room by using a communication tool. The tool was intended to provide an efficient method to assess the reason for the visit which fostered more time for the school nurse to spend with the student. The tool provided an opportunity for health teaching and guiding the student toward health promotion and lifestyle choices such that academics were not compromised by health issues. Students present to the school health rooms in need of acute or complex care, chronic disease management, or mental health counseling. A review of the literature did not identify an instrument capable of identifying presenting health concerns of high school students prompting the use of a communication tool to guide the student in articulation of needs, guide care, decrease time in the clinic, and allow more time for health teaching. The purpose of the study was to evaluate the use of a school nurse communication tool during a 16 week semester on a decrease of time in minutes that the high school student was in the health room in a suburban high school setting.

Facilitators and Barriers

The facilitators and champions of sustainability included the school nurse and school principal. The school nurse found the tool easy to use as students presented to the health room. The school principal favored the tool because it would potentially decrease student class absence and increase national testing scores. The students were identified as facilitators as they realized the effects of the change in their level of wellness and cognitive functioning. Potential barriers included school nurses and students. School nurses who developed a system for managing the chaos may have been unwilling to initiate change, but the school nurse was eager to implement the SNCT as part of a daily practice. Students may have been reluctant to answer the questions on the tool, but the students were willing participants each time they were asked to answer the

tool questions. The timing of the project was not a barrier, coinciding with the beginning of the school year when nurses were inundated with paperwork. The anticipated economic component for the inquiry was minimal. Expenses were accrued for printing the tool. The educational training session was completed by the student investigator at no cost. Project dissemination was planned and travel expenses were incurred. Application for grant funding through the University of Missouri-Kansas City was requested to cover the expenses.

Inquiry

In high school students, does the use of a communication tool compared to no communication tool decrease the amount of time a student is in the health room during a 16 week semester in a suburban high school?

Search Strategies

The search engines of the University of Missouri – Kansas City Health Sciences Library and Google Scholar were utilized. Databases included Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed and Turning Research into Practice (TRIP). Keywords initially used in the search were broad and included school health or school health services or high school nursing, practice guidelines, standards of care, presenting problem, length of treatment, communication tool or methods of articulation, assessment or screening or evaluation tool, health education or promotion, empowerment, theory of unpleasant symptoms, and Maslow's hierarchy of needs. As the inquiry narrowed, the keywords included adolescent, time or time in clinic and efficiency. Inclusion criteria were schools with registered nurses, public or private or charter schools and studies published in English in peer-reviewed journals. Exclusion criteria included literature greater than 12 years old as well as a 2003 study that defined an adolescent taxonomy of health. Studies greater than ten years were included and appraised if

relevant to the inquiry due to the limited number of relevant studies.

In considering evidence for the use of a school nurse communication tool in the high school setting, 26 articles were analyzed based on the Rating System for the Hierarchy of Evidence for Intervention/Treatment based upon Melnyk and Overholt (2015, adapted; See Appendix A for Review of Evidence Table; Appendix B for PRISMA Search Diagram). Two studies with level two evidence and three studies with level three evidence were identified. Two of the level three articles included systematic reviews. Four studies were classified as level four evidence and three studies were identified as level five evidence with one of the level five articles being a systematic review. The largest group of evidence was from level six with nine studies. There were five level seven studies, and of these, two were integrative reviews and one was a policy statement from the American Academy of Pediatrics. One additional component of evidence supporting the use of the school nurse communication tool in the high school setting is a manuscript submitted for publication with authors Yano, Rudigier, and Ward-Smith (2018). The value of including this is substantial as the use of the proposed school nurse communication tool demonstrated a time decrease in minutes that the high school student was in the health room.

Evidence by Themes

The search on the inquiry yielded five topics of evidence: symptoms and hierarchy of needs, efficiency, communication tool, health promotion and education, and empowerment (see Appendix C for complete Definition of Terms). Themes common among the studies are (a) the symptom experience related to the theory of unpleasant symptoms (TOUS) and the hierarchy of needs compelling the student to seek care in the health room; (b) efficiency measured as time in the health room; (c) the communication tool as a student articulation guide and as a guide for the school nurse; (d) health promotion and education related to improved

academics, decreased injuries and positive increases in health management; and (e) student empowerment to make their own healthy behavior choices.

Symptoms and Hierarchy of Needs

The symptom complex implores high school students to seek services in the health room. The TOUS is designed to explain multiple symptoms occurring simultaneously and to predict preventive interventions (Lee, Vincent, & Finnegan, 2017). Basic physiological needs are fulfilled before higher-level needs in a hierarchy. Higher-level needs defined by Maslow are not motivating until basic needs are met (McGraw, 1992). The needs are parallel to empowerment (McGraw, 1992) and can be utilized to provide discernment of the unmet needs of adolescents.

Students are compelled to seek care from the school nurse based on symptoms. The literature presented in a systematic review examining 189 studies concluded that none of the assessment instruments used to assess student symptom experiences measured symptom dimensions of intensity, timing, quality, and distress (Von Sadovsky et al., 2018). Without thoroughly assessing symptoms the school nurse is at a disadvantage in providing care that will adequately ameliorate the symptom experience that led the student to the health room, ultimately affecting the student's ability to cognitively function in the classroom. A level 2 randomized controlled trial (RCT) of children aged 7-12 experiencing post-operative pain and emesis (Huth & Broome, 2007) and a level 6 descriptive case study by Tyler and Pugh (2009) report the reciprocal link between pain control and performance or outcome consequences.

Three studies emphasize hierarchical needs and provide insight into the unmet needs of adolescents. McGraw (1992) states that unmet needs motivate actions and behavior.

Adolescents in high school, as well as the juvenile justice system, seek a safe space where they can express concerns and feel like they are loved and belong (Johnson, 2018; Raible, 2017;

Gordon, 2008). Three studies report qualitative or quantitative measurements linking the role of the care provider in setting the stage of trust, safety, and belonging. High school students must feel safe and belongingness to advance from basic needs to higher-level needs where esteem needs of accomplishment and empowerment can take place.

Efficiency

Efficiency can be defined as the least amount of input such as costs of labor to achieve the highest level of output (Palmer & Torgerson, 1999). The monetary benefits of a well-organized school health program with a school nurse show stock supply reductions of 48% (Manning, 2011) and a cost-benefit to society of \$98 million (Wang et al., 2014). Every minute the student is outside of the classroom is a missed academic learning opportunity. The presence of a school nurse in the health room to assess, treat and guide care versus no school nurse or unlicensed personnel increases the number of students returning to class (Bergen et al, 2016; Pennington & Delaney, 2008; Hill & Hollis, 2012; Wang et al., 2014). Similarities in the studies determining efficiency include populations from kindergarten to high school with the percentage of students returning to class ranging from 91%-95%. (Bergen et al., 2016; Pennington & Delaney, 2008; Wang et al., 2014).

Communication Tool

The communication tool guided the student through articulation of information that was necessary for the nurse to assess, provide care, promote health education, and engage the student in goal setting (Bergen et al., 2016). Effectiveness can be gleaned from school data, yet this data is currently lacking. Efforts on a national level have revealed that school nurses lack time and initiative to collect information that could assist in the formation of a National Uniform School Data set. The response rate varied from 1%-100% with 37 of 52 states submitting three

requested data points (Bergen, 2016). Of the 991 National Association of School Nurses (NASN) members, 41 school nurses responded to day one of a feasibility study to assess data on care provided. The results, as reported by 90 school nurses, includes school nurses caring for 43.5 students on an average day, giving 14 medications, and conducting 17 daily communications with parents, school personnel, or a health care provider (Bergen, 2016).

Data missing from the literature include the amount of time a student spends in the health clinic. Data from a study conducted at a suburban, predominantly Caucasian, middle to upper-class high school indicated that the use of a communication tool decreased the student time spent in the health room by 2.09 minutes (Yano, Rudigier, & Ward-Smith, 2018). A 45 question health and lifestyle tool utilized by school nurses with adolescents in Sweden facilitated individual-focused dialogues in schools (Golsater, Sidenvall, Lingfors, & Enskar, 2011). As demonstrated by Raible (2017), the school nurse acts as a resource to provide information, in this case on abuse, in the area of healthy relationships and resources in less than one minute. A structured communication tool is a clear and applicable starting place that can be used for goal setting and health promotion.

Health Promotion and Education

American Academy of Pediatrics (2018) issued a policy statement defining the role of the school nurse as a leader in school health policies of health promotion and protection. Studies conclude that school nurses have an impact on academics. In a large sample RCT, Melnyk et al. (2013) showed a health promotion intervention group to have greater physical activity, higher social skills, lower depression, lower body mass index, and higher health course grades than a control group. Similar results of improved academics and improved education outcomes with health promotion efforts were realized in the school setting by Murray, Low, Hollis, Cross and

Davis (2007) and Best, Oppewal, and Travers (2018). Additional studies specific to vaccinations display that the school nurse had a positive influence on vaccination rates and management of health concerns (Baish, Lundeen & Murphy, 2011).

The school nurse as a health educator and care coordinator is instrumental in promoting asthma health (Hennessy-Harstad, 2012). Results of the United States High School Youth Risk Behavior Survey (Centers for Disease Control and Prevention, 2017) indicate that 30.4% of students surveyed were obese according to the Centers for Disease Control growth charts. A correlational study by Burns, Murrock, and Heifner (2012) disclosed a relationship between injury severity and body mass index in adolescent males. School nurses can reduce injury severity through primary education of ideal body weight in adolescents. Adolescents were asked open-ended questions of how to define health and what healthy means (Buck & Ryan-Wenger, 2003). Responses included six categories of health-promoting behavior, physique, absence of illness, health risk avoidance, holistic integration, and health-promoting behavior, and functional ability (Buck & Ryan-Wenger, 2003). An adolescents' definition of health can be a motivator to make healthy lifestyle decisions. Health promotion and education by the school nurse should be focused on aspects of health that are meaningful to the student.

Empowerment

Empowerment, as defined by Tremblay and Richard (2011), is a process in which an individual attains control over health behaviors and decisions by participation in the behaviors that affect health. High school students are in the process of learning the ramifications of behavior on health (Spencer, 2014). Students can be empowered to make their own healthy behavior choices based on health education provided by the school nurse.

School nurses work to make a positive impact on students' well-being. The school nurse strives to provide care and education, empowering student participation in their lifelong individual health process. Adolescents define wellness in terms of feelings of happiness (Spencer, 2014). Similarly, in a cross-sectional study, positive outcomes were found when adolescents were involved in organizing physical activity along with adult support (Haapala et al., 2014). Adolescent involvement in empowerment efforts has revealed positive outcomes. Empowerment was enhanced when the nurse collaborated with the student to support health and learning in what was viewed as a reciprocal relationship based on trust, reliability, and support of a healthy life rhythm (Larsson, Bjork, Ekebergh, & Sundler, 2013). The school nurse is in a central position to provide individual health education based on information obtained from the communication tool.

Theory

The TOUS was first published by Lenz and Pugh in 1995 and was revised in 1997. It is derived primarily from practice by combining known practice with research information about symptoms (Lenz, Suppe, Gift, Pugh, & Milligan, 1995). As described by Hugh and Broome (2007), the concepts are symptoms, the symptom experience, and performance outcomes. Symptoms can be viewed by the individual as alterations in normal functioning (Hugh & Broome, 2007). Symptoms, one or multiple, are at the center of inquiry (see Appendix D for Theory to Application Diagram). The symptom experience including influencing factors are seen as the reason the high school student presents to the health room. Physiologic factors, situational factors, and psychological factors influence the symptom experience (Hugh & Broome, 2007). The symptom experience and performance is affected by four factors of intensity, timing, quality, and distress (Hugh & Broome, 2007). Performance outcomes are the consequences of

the symptom experience and can impact the student's ability to function cognitively (Lenz & Pugh, 2014). Cognitive performance defined in the TOUS includes learning, comprehension, problem-solving, and concentration (Lenz & Pugh, 2014). These outcomes as perceived by the student can influence the symptom experience and modify the influencing factors (Lenz & Pugh, 2014). Unpleasant symptoms can impair the student's ability to cognitively function in the classroom. The TOUS can be utilized to modify symptom producing factors and identify preventive interventions (Lenz et al., 1995). The TOUS has been used in a variety of areas including maternal care, cardiac patients in emergency department settings, dyspnea in COPD patients, lung transplant patients, and pediatric post-tonsillectomy patients (Lenz, Pugh, Milligan, Gift & Suppe, 1997; Hugh & Broome, 2007, Lee et al., 2017) yet has not been utilized in the adolescent school population.

Methods

IRB and Ethical Issues

The University of Missouri–Kansas City Institutional Review Board (IRB) determined the project to be a quality improvement activity not requiring IRB approval (see Appendix E for IRB approval letter). The population consisted of minors. In compliance with the Family Educational Rights and Privacy Act of 1974, identifying information was not requested. School nurse training in the use of the communication tool was on an individual basis. The risk to students related to this project was minimal. Data collection involved the transfer of de-identified data from the IT department of the school district to the student investigator for data analysis. Data results were shared with the school nurse, the school principal, and district health manager. The student investigator did not have conflicts of interest. The cost of the school nurse communication tool evidence based practice project was expected to be minimal and

included expenses accrued for the printing of the material. The educational session was completed by the student investigator at no cost. Dissemination of this project was anticipated and estimated costs for travel, lodging, and conference expenses were considered. Two grants from the University of Missouri-Kansas City were received to cover the costs (see Appendix F for Cost Table for Project).

Setting and Participants

The setting for this project was a public high school in a suburban Midwest city. The inclusion criterion were students presenting to the school health room. Exclusion criteria were students receiving routinely prescribed medication and non-English speaking students that are not dual language learners for which there is not an interpreter. Consecutive sampling was used during designated time periods for students that meet the criteria upon presenting to the health room. The study was retrospective in nature with deductive methodology analysis that was used to describe the school experience in terms of time spent in the health clinic, primary reasons for seeking healthcare, grade level, gender, and disposition. Results are be generalized with caution as demographic variables of socioeconomic status, including income, hunger, and the availability of medications, influence the need and desire to access services. Data was collected for a full week during September, October, November, and December for 2018 and 2019. The school nurse sees an average of 252 students in one week (Yano, Rudigier, & Ward-Smith, 2018). It was estimated that approximately 1000 records would be analyzed over the data collection period.

Evidence Based Practice Intervention

The student investigator solicited the support of the school district health coordinator.

The purpose of the project and the role of the participants were reviewed with the district health coordinator. The district health coordinator was given pilot study statistics to utilize when seeking approval from the District Superintendent of Student Services. Upon approval from the District Superintendent of Student Services and the Assessment and Research Supervisor, the student investigator met with the high school nurse to introduce the project. The high school nurse was eager to utilize the tool beginning August 12, 2019 (see Appendices G and H for Project Timeline Flow Graphic and Intervention Flow Diagram).

The de-identified data were reviewed from the preceding 2018 school year database. Specific data points included high school student grade level, gender, time in and time out of clinic, disposition of return to class or home, and presenting problem. The same data was collected after the use of the school nurse communication tool for school year 2019. Time in minutes the student is in the health room is calculated by the electronic health record.

Upon entering the health room, high school students were asked by the school nurse to verbally answer the questions on the School Nurse Communication Tool. The SNCT used a combination of seven dichotomous and open-ended responses (Appendix J for Data Collection Template).

Change Process and Evidence-Based Practice Model

The Change Curve Model by Duck (2002) was the change process theory utilized for the inquiry. The five-stage model aligned with the projected organizational atmosphere starting with stagnation as school nurses often have few resources and become comfortable with current practice, lack of a communication tool. The second stage of preparation is essential for school nurse buy in and getting the nurses excited about a straight-forward and easy to use communication tool. In the implementation stage, the school nurse realized how the

communication tool made life easier by focusing on the presenting problem as health promotion areas presented from the communication tool utilization. The fourth stage of determination is challenging as fatigue will set in if success is not evident. The student investigator was on site to assist with questions and redirect to the long-term outcome. The last stage of fruition was where the outcome of time in the health room was to be realized.

The Stetler model was the EBP model utilized for the inquiry. The emphasis was at the individual nurse level (Gawlinski & Rutledge, 2008; Schaffer, Sandau & Diedrick, 2012; Stetler, 2001) and the focus on care delivery by the individual school nurse. The Stetler model considered internal factors applicable to the inquiry such as individual school nurse characteristics, data from quality improvement, and external factors including consensus and standards of school nurse practice (Gawlinski & Rutledge, 2008; Schaffer, Sandau & Diedrick, 2012; Stetler, 2001). The revised model consists of five phases (Schaffer, Sandau & Diedrick, 2012). Phase 1, preparation, is the definition of the purpose and evidence search. Phase 2 is the validation of the evidence. Phase 3 is the comparative evaluation or synthesis of the evidence with the consideration of both external and internal factors, the individual school nurse as well as supporting 21st Century Framework for School Nurses. Phase 3 also consists of decision-making about what to use based upon the evidence. Phase 4 processes include the implementation and translation to put the plan into practice and phase 5 is the evaluation stage of whether outcomes were met. The Stetler model aligned with the utilization of a school nurse communication tool to decrease time in the health room due to the individual practitioner approach with emphasis on critical thinking skills, and problem-solving abilities.

Study Design

A retrospective quasi-experimental quality improvement project was designed to assess the impact and effectiveness of the school nurse communication tool on the primary outcome of decrease in the amount of time that the student is in the health room. The results describe the relationship between the two variables, the use of the communication tool as the independent variable and time spent in the health room as the dependent variable.

Validity

The impact of the School Nurse Communication Tool was used to generate pre and post time in minutes the high school student is in the health room. It was anticipated that the use of the tool would result in a decrease in time, the dependent variable, measured in minutes.

Selection bias was minimal, and the participants were all students seeking the services of the school nurse during the school day. The data was compared from the previous academic year 2018, same month within the same high school, to the 2019 academic year. At the beginning of the year with new freshmen students, the nature of allergies and flu season were potential concerns impacting the volume of students seen in the health room. The sample size was approximately 1000 student visits to the health room. Historically, there were no identified events outside such as a natural disaster or incident of violence in school year 2018 or 2019 that affected student presentation to the health room. Each academic year consisted of freshmen through seniors, and the threat of maturation to internal validity was not a factor.

The instrument to measure time in minutes was the time displayed on the school nurse's office computer. In the electronic health record, the school nurse recorded the student time in and time out of the health room. Refusal of student participation and repeated articulation leading to familiarity of the questions for students that frequent the office was a potential

concern to the integrity of the data. Attrition and mortality were not factors or a threat to the integrity of the data. The school nurse encouraged students to utilize the tool with each visit.

The population for this project was high school freshmen, sophomores, juniors, and seniors, culturally homogenous within each high school of same school district. The results of this project are transferable to school districts with similar demographics. Demographic variables may influence the desire of high school students to visit the school nurse in urban and rural settings. Socioeconomic status including income, food insecurity, and access to medications are reasons high school students access the school nurse in urban and rural settings. Timing was not a threat to external validity, and the analysis is from two consecutive fall semesters.

Primary Outcome

School nurses work in a fast-paced environment and are responsible for health maintenance and promotion and a competing goal is classroom attendance. The school nurse communication tool provides a timely and efficient method to assess the reason for the visit which fosters more time for the school nurse to spend with the student. The tool provides an opportunity for health teaching and guiding the student toward health promotion and lifestyle choices to the extent that academics are not compromised by health issues. The primary outcome measured was time in minutes the student spent in the health room pre and post utilization of the school nurse communication tool.

Measurement Instrument

The measurement is minutes for each visit as summated by the school nurse computer. The school nurse communication tool has been utilized in a pilot project in one high school setting. The tool was developed by a high school nurse with the goal of efficiently improving care so that time can be spent teaching the students about their body, staying healthy and

choosing remedies carefully (school nurse, personal communication, October 13, 2017). The school nurse communication tool is not in the public domain. The student investigator received permission from the author to use the tool (see Appendix K for permission to use tool). As relates to content validity, the author of the tool and the student investigator agree that the tool with seven questions provides the information necessary for the school nurse to efficiently provide care and health education. Tool reliability will be established as the tool is used in studies.

The tool consists of seven questions. The high school student upon presenting to the health room was given a laminated copy of the SNCT and asked to look over the questions. The nurse asked the student to answer the questions. The first question is a request for the student name, enabling the school nurse to look up the student in the electronic health record and determine if parental consent has been attained for medication administration. Question two inquired about a chronic health condition and identification of that condition. Question three is a two-part question, an inquiry about the reason for coming to the clinic and the class the student was currently attending. Verbalization of the class the student is missing allowed the nurse to determine if the student is missing an elective course or a core course. The next three questions were dichotomous and ascertained if the student wanted to stay at school, if the student had eaten, and if the student had or had not seen a doctor about the presenting condition. The last question is an inquiry as to medications already taken.

Quality of Data

Using G power 3.1 statistical computer-based program with presets of A priori, and one tail test, the effect size d after calculation was .876, the alpha probability was .05, the power (1-B err probability) was .80, and the allocation ratio was $N_2/N_1 = 1$. The actual power was 0.8168,

non-centrality parameters 2.59, critical t 1.68, Df 40, sample size group 1 of 21, sample size group 2 of 21, and total sample size of 42 (Faul, Erdfelder, Buchner, & Lang, 2013; Statistics Solutions, 2016). Baseline demographic data with student time in the health room in minutes prior to the use of the tool was collected as a retrospective review. Comparison of demographic data and student time in the health room in minutes was collected and analyzed for descriptive frequencies and inferential analysis to compare time in minutes pre and post use of the communication tool. No published studies were identified which align with this inquiry.

Analysis

Data were collected for a full week in September, October, November, and December of 2019. The de-identified data was compiled by school district services personnel and electronically sent to the student investigator for input into Statistical Package for Social Sciences (SPSS). Descriptive statistics plus inferential statistics convey the data findings. The number of student visits per month, the number of student visits by day of week, the number of student visits by academic year, the number of student visits by gender, student disposition from health room, presenting problem, and mean time in minutes student is in the health room is reported pre and post tool with the difference between the baseline and intervention collection period. The independent samples t -test was used to determine if there was a significant difference in time in minutes the high school student was in the health room prior to the use of the school nurse communication tool and with the school nurse communication tool (see Appendix L for Logic Model).

Results

Setting & Participants

The setting was a public high school in a suburban Midwest city. Data for the baseline portion of the project was analyzed from 16 weeks of fall 2018. The time frame for implementation of the intervention of the project fall 2019 was approximately 16 weeks from completion of training of study site school nurse by the student investigator to the last data collection period of the semester. Participants were English-speaking high school students that presented in need of care as a convenience sample to the health room. Of the students that presented to the health room academic year 2018 without the SNCT, 54% were females and 46% were males. During the academic year 2019 with the SNCT, 52% were females and 48% were males. The grade levels for academic year 2018 and academic year 2019 with the SNCT were as follows: ninth grade 34% and 33%, tenth grade 24% and 27%, eleventh grade 26% and 22%, and twelfth grade 16% and 18%, respectively (see Appendix M for Statistical Analysis Tables). The top three reasons for seeing the nurse excluding medication administration were headache at 10% of student visits, female protection and/or menstrual concerns for 6% of student visits, and pain of an unspecified nature in 4% of the student visit for the data collection period in 2019.

Actual Intervention Course

The intervention was implemented by the school nurse and the health aide. The intervention consisted of utilization of the SCNT by students as they presented to the health room during the 16 week implementation period. Number of participants for the full weeks per each month of data collection was 753 for the baseline period and 722 for the intervention period.

Outcome Data

An independent *t*-test was conducted to compare the means of student time in the health room prior to the use of the SNCT and post-use of the SNCT (see Appendix N for Statistical

Analysis Results table). The result of this project showed a 1.39 minute increase in student time in the health room. Statistical analysis found that there was no significant difference in time in minutes that the student is in the health room with the use of the SNCT $t(38) = -1.50, p = 0.142$.

Data sets for time in the health room were complete.

Discussion

Successes

The school nurse verbalized increased student articulation, dialogue, and student identification of activities that enhance health with the use of the SNCT (study site school nurse, personal communication, February 24, 2020). Upon questioning the school district health coordinator, with the use of the SNCT, time is shifted from asking multiple questions to helping the student focus on what their role is in their health. Further thoughts from the health coordinator include the use of the SNCT as a mechanism to force students to answer questions about what they already know about their condition and how they have contributed to it as well as what to do differently to avoid the condition (study site director of health services, personal communication, February 24, 2020).

Strengths

The setting of this project was in a suburban Midwestern city and a school district with 8.5% of families below the poverty level and specific to the school 45% of students qualified for free or reduced meals (National Center for Education Statistics, 2018). The school provides resources in the form of food, counseling, and episodic and generalist healthcare. The organizational culture promoted collaboration and respect in all aspects of mental and physical care delivery. The use of the SNCT was supported by the organization at all levels within the school district and the school level during all phases of implementation. The school nurse that

participated in this project stated a 90% administration rate of the SNCT. The 10% of cases where the tool was not utilized was due to the population of students that have non-communicative behavior disorders and students who presented to the health room for follow up of a previous addressed healthcare concern.

Results Compared to the Literature

School nurses utilize instruments to detect abuse (Kraft & Eriksson, 2014) and bullying (Skrypiec, Askill-Williams, Slee, & Lawson, 2018). Yet, a literature review did not produce an assessment tool which identifies generic health concerns of students. There are no published studies to compare with the project results. Student time in the health room is not measured and not reported in the literature. The results of this project are compared to a pilot study by Yano et al. (2018) not published. Yano et al. (2018) investigated the use of the SNCT in a suburban Midwest City with a varying demographic with families below the poverty line at 2.2% and free or reduced meals at 12% (National Center for Education Statistics, 2018). The SCNT in the pilot study showed a 2.09 decrease in minutes the student was in the health room with the use of the SNCT. The result was not statistically significant in the pilot study. The result of the current project showed a 1.39 minute increase in time in the health room which was not a significant effect.

Limitations

Internal Validity Effect

Possible sources affecting the internal validity of the project may include the unintended bias of the school nurse in efforts to maximize the use of the tool, resulting in increased time of students through the health room through increased dialogue. A confounding factor is the school nurse's individualized approach to student healthcare needs. The school nurse as an autonomous

practitioner has the ability to perform a focused assessment or a comprehensive assessment. The type of approach utilized may impact student time in the health room. The sample size was higher than anticipated, 753 student visits for the pre-intervention period and 722 visits for the post-intervention period without variability in visits and without an influx of students at times of the academic year when allergies or flu season could impact volume. The time frame for the collection period did not experience natural disasters or school violence. The number of students presenting to the health room consisted of freshmen through seniors and maturation was consistent for the pre and post-intervention periods. The electronic health record did not experience any malfunction as the school nurse recorded student time in and time out to the health room. Each communicative English speaking high school student that presented to the health room agreed to utilize the SNCT and familiarity with the tool did not deter verbal responses to the questions of the tool.

External Validity Effect

The high school students presented by convenience, consecutive sampling were freshmen, sophomores, juniors, and seniors and culturally homogenous for the pre and post-intervention period. The results are transferable to high schools with similar demographics and resources. The study site is suburban, yet 45% of students receive free and reduced meals indicating some degree of food insecurity (National Center for Education Statistics, 2018). The availability of resources, including medications, may be limited in this suburban school district based upon 8.5% of households below the poverty line (National Center for Education Statistics, 2018). Student demographics are factors that will limit the generalizability of the findings to school settings of similar composition.

Sustainability and Maintenance of Effects

Utilization of the SNCT by high school students occurred as students were asked to verbally answer questions from a laminated poster or hand out. Continuation of this practice may reduce over time if students are not provided this tool to complete or if new school nurses are not oriented on use of the SNCT. Incorporating the SNCT as a part of the assessment process across the district will occur with pilot school nurse discussion of SNCT experience at the yearly back to school meetings before the start of the fall semester. School nurse buy-in will be in the form of realization of the benefits of the SCNT on an individual basis. Each school nurse is an autonomous provider of healthcare within the school and can structure the assessment process according to what is perceived to work well within each setting.

Study Limitations Minimization

Efforts to minimize the impact of the limitations on application of results included verification, versus estimation of 10% student utilization by school nurse, of the actual number of student utilization of SNCT. The generalizability of findings to a school district population of similar poverty level is a limitation of the project. The method of consecutive sampling versus true random sampling may be a limitation.

Interpretation

Expected and Actual Outcomes

The anticipated results of this project were a decrease in time in minutes the student was in the health room with the use of the SNCT. There was not a significant effect for use of the SNCT $t(38) = -1.50, p = 0.142$. There is no statistically significant difference between the mean time in minutes high school students were in the health room with the use of the SNCT pre and post use of the SNCT. Based upon comments from the school nurse, the time in the health room was potentially increased as the SNCT initiated a dialogue with the student that may not have

previously occurred in the visits. The school nurse verbalized increased student articulation ability and enhanced student participation in health care with the use of the SNCT.

Intervention Effectiveness

The SNCT is simple and easy to utilize. The high school nurse in the suburban setting was willing and eager to implement the tool and always amenable to the student investigator's presence, suggestions, and encouragement in the school health room. The support of the district health coordinator, research team, and school principal was present throughout all phases of the project. The students were 100% willing to answer the questions on the tool when asked. The floor plan of the health room was physically congruent with the utilization of the SNCT as student flow went from the door, to the SNCT poster, to the chairs to ponder the questions and then the nurse's workspace. Not uncommon to all school health rooms is the inability to provide privacy, yet the school nurse in the study was very cognizant of the need for privacy and able to escort students to a private room if there was a perceived need. The settings in which the SNCT intervention is most likely to be effective are health rooms in which the school nurse is supported by district and school administration.

Intervention Revision

The outcome of the SNCT to decrease time in the health room in minutes was not realized. Modification to the intervention to decrease time in minutes that the student is in the health room is to decrease the number of laminated handouts and limit the SNCT to two oversized posters on the wall. The student, instead of being given a copy of the handout, would turn to the poster upon entry into the health room, read and answer the questions out loud if privacy permits. This revision may decrease the time in minutes instead of having the student sit and think of answers before verbalizing the answers to the nurse.

Impact to Health System, Costs, & Policy

The expected impact of the use of the SNCT is to decrease high school student time in the health room. The seven-question SNCT requires students to verbalize the status of their current health state. Students will have a familiarity with their health status as a result of verbalization during high school health room visits and be able to verbalize this same information when they seek out health care. The actual impact of the project is limited to the presented findings.

The SCNT evidence based quality improvement project was a low budget project (see Appendix – for estimated costs). The actual cost to copy and laminate 18 copies of the SNCT was \$49.49. Dissemination costs for travel, lodging, conference registration were estimated to be \$1150. Actual expenses for the virtual poster presentation at Midwest Nurse Research Society (MNRS) annual conference were \$265 and this cost was covered through two funding awards, University of Missouri-Kansas City Women’s Council Graduate Assistance Fund and University of Missouri-Kansas City Graduate Travel Fund. Replication of the SNCT is inexpensive and economically sustainable.

Conclusion

Through the use of the school nurse communication tool, high school student time spent in the health room is not significantly impacted. The student is able to articulate their needs by using the tool as a guide (see Appendix M for Logic Model). Information from the tool can help the nurse to assess presenting symptoms, guide care, and identify ways to promote health such that the student becomes empowered to be a participant in their own health decisions. The tool is practical and easy to implement in the proposed high school setting.

Future studies must consider the outcomes of health promotion education by the school nurse in a longitudinal study. The tool should be modified for use in the early adolescent middle school setting giving the nurse a platform to begin health promotion, health education, and empowerment at an earlier age. Also to be measured as an outcome is the potential increase in school nurse job satisfaction with the use of the communication tool. In a phenomenological study by Smith and Firmin (2009) school nurses found their accomplishments to be successful when they assisted students with making lifelong healthy choices and found high job satisfaction when they were able to foster students' well-being. The school nurse communication tool should be utilized in urban and rural settings to provide health promotion interventions and empower students that have barriers including limited access to care.

Dissemination of the project included a virtual poster presentation at the MNRS Annual Conference in April 2020. The project results will be submitted for publication to *The Journal of School Health Nursing*. Nurses nationwide are in a unique position to efficiently provide care while empowering adolescents to become engaged in lifelong health practices for future generations with the adoption of the school nurse communication tool.

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Appendix A: Review of Evidence Table - School Nurse Communication Tool

| | Purpose | Research Design, Evidence Level & Variables | Sample & Sampling, Setting | Measures & Reliability (if reported) | Results & Analysis Used | Limitations & Usefulness |
|---|--|--|--|---|--|---|
| SYMPTOM EXPERIENCE (TOUS & HIERARCHY) | | | | | | |
| Gordon (2018). “I see so much in them”: Australian chaplains telling an alternative narrative of adolescents in the justice system | To provide insight into the impact of chaplaincy on incarcerated adolescents | Qualitative Descriptive Level 6 Variables: Themes related to the role and impact of the chaplain | 6 chaplains and managers Snowball sampling Juvenile justice system Australia | Interviews with open-ended questions. Four levels of data analysis- six themes, analysis using Maslow’s as a framework | The themes from chaplain interview align with Maslow’s Hierarchy of Needs: Establish safe/trust relationship, convey love/belonging, engagement and self-actualization | Small sample of chaplains, does not include the adolescent’s view. To empower students, school nurses must be aware of hierarchy of needs. |
| Johnson (2018). Full coverage sports physicals: School nurse’ untapped role in health promotion among student athletes | Exploration of roles with pre participation physical exams (PPE) and addressing health risk behaviors in adolescents | Mixed methods Level 6 Dependent variable: school nurse role and attitude about addressing at risk and health promotion behaviors Sample description, rated barriers to addressing health risk behavior | 208 school nurses surveys 10 key informant interviews Purposive sampling Urban, rural and suburban districts in Central Texas adolescents | Triangulation design, Descriptive frequencies | 69% of school nurses felt under utilized as a resource for addressing health-risk behaviors in adolescents. | Lack of confidentiality, time for nurses to be present at PPE’s Nurses perceive themselves to provide a safe space to talk about sensitive topics, nurses see themselves as trusted and in a position to promote health of potential at risk behaviors |

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|---|--|--|--|--|---|---|
| <p>Raible (2017). School nurse-delivered adolescent relationship abuse prevention</p> | <p>Describe nurse delivered adolescent abuse intervention in the nurse’s office</p> | <p>Descriptive Qualitative Level 6 Dependent variable: intervention to discuss healthy relationships</p> | <p>Five rural urban public school sites in Pennsylvania Convenience sampling 4 high, 1 middle school</p> | <p>School nurse survey pre and post training. Student anonymous survey after visit.</p> | <p>School nurses adopted healthy relationship intervention: brochure, palm size card to 96% students.</p> | <p>Safe space to seek relationship guidance and information on abuse. School nurse as a resource to provide information takes less than one minute</p> |
| <p>vonSadovsky, V (2018). A systematic review of pediatric self-report symptom measures: Congruence with the theory of unpleasant symptoms</p> | <p>Examine the comprehensiveness of current self-report symptom measures designed to assess symptom experiences.</p> | <p>Level 5 Systematic review</p> | <p>29 of 189 articles met inclusion criteria</p> | <p>Frequencies Measures analyzed for characteristics and conceptual congruence with intensity, timing, distress, quality</p> | <p>Instruments assessed: pain, fatigue, Respiratory, Vestibular, Multiple physical symptoms None of the tools assessed measured four dimensions</p> | <p>Symptom assessment tools do not measure 4 dimensions. Reflects a gap in current research and practice in the use of theories to guide assessments.</p> |
| <p>Tyler (2009). Application of the theory of unpleasant symptoms in bariatric surgery</p> | <p>To describe factors unique to the patient that overlapped creating post-operative complications</p> | <p>Case study Descriptive Level 6 Variables: symptoms of nausea/emesis, fatigue, pain</p> | <p>Single case study 29 year old female post op Roux-en-Y</p> | <p>Descriptive of symptoms post operatively and management of symptoms based on TOUS No measures reported</p> | <p>Once situational and psychological factors were addressed, physiological symptoms were ameliorated</p> | <p>Single case study that shows the interaction of factors as defined by TOUS. School nurses can assess by considering 4 measures of symptoms.</p> |

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|---|--|--|--|---|---|---|
| <p>vonSadovsky, V (2018). A systematic review of pediatric self-report symptom measures: Congruence with the theory of unpleasant symptoms</p> | <p>Examine the comprehensiveness of current self-report symptom measures designed to assess symptom experiences.</p> | <p>Level 5 Systematic review</p> | <p>29 of 189 articles met inclusion criteria</p> | <p>Frequencies Measures analyzed for characteristics and conceptual congruence with intensity, timing, distress, quality</p> | <p>Instruments assessed: pain, fatigue, Respiratory, Vestibular, Multiple physical symptoms None of the tools assessed measured four dimensions</p> | <p>Symptom assessment tools do not measure 4 dimensions. Reflects a gap in current research and practice in the use of theories to guide assessments.</p> |
| <p>Tyler (2009). Application of the theory of unpleasant symptoms in bariatric surgery</p> | <p>To describe factors unique to the patient that overlapped creating post-operative complications</p> | <p>Case study Descriptive Level 6 Variables: symptoms of nausea/emesis, fatigue, pain</p> | <p>Single case study 29 year old female post op Roux-en-Y</p> | <p>Descriptive of symptoms post operatively and management of symptoms based on TOUS No measures reported</p> | <p>Once situational and psychological factors were addressed, physiological symptoms were ameliorated</p> | <p>Single case study that shows the interaction of factors as defined by TOUS. School nurses can assess by considering 4 measures of symptoms.</p> |
| <p>Huth (2007). A snapshot of children’s postoperative tonsillectomy outcomes at home</p> | <p>To describe outcomes 24 hours post op using the TOUS as a conceptual framework</p> | <p>Initial RCT was Descriptive Prospective Randomized Un-blinded Level 2</p> | <p>Outcomes of self -report pain, emesis analgesic use, fluid intake in 76 Children 7-12</p> | <p>Oucher Pain Scale & validated Facial Affective Scale, Hierarchal Linear Modeling Wilcoxin rank alpha .05</p> | <p>Children in moderate pain receive less than recommended analgesia from parent/caregiver.</p> | <p>Less than recommended doses of analgesia likely resulted in poor fluid intake and vomiting. Supporting the reciprocal link between symptom pain and performance of fluid intake.</p> |

| EFFICIENCY | | | | | | |
|--|---|--|---|--|--|---|
| Bergren (2016). The feasibility of collecting school nurse data | To assess the feasibility of collecting school nurse-generated data on child health and education outcomes | Prospective Quantitative Descriptive Qualitative Level 6 Outcome variables: data collection | 90 school nurses Convenience sample | Data collection via Survey Monkey. Raw numbers and percentages for results | Takes 6-15 to collect average daily data on numbers of visits-43.5, meds-14, Communications-17/day. | Low participation from nurses-32 of 991 school nurses participated. Qualitative response-nurses want to justify their presence in the school |
| Bergen (2016). What’s up with “Step Up”? Step up and be counted | To advocate for the health needs of children where they live learn and play by building a National Uniform School Nurse Data Set. | Retrospective Quantitative Descriptive Level 6 Measures workforce, health office disposition, chronic conditions | Participating nurses from 37 states 16,439 registered nurses. Participation within states varied from <1% to 100% Purposive sampling | Outcome measures from NASN Research Committee and National Quality Forum Child Health Outcome measures. Data collection via Survey Monkey. Raw numbers and percentages for results | Nurses report that 91% of students seen by a registered nurse in the health room were sent back to class. Less than 1% had an emergency or 911 activation and 9% were sent home or to a provider | Many nurses report the responses as estimations. 91% of students returned to academic setting Data not specific to elementary, middle or high schoolers Need for higher level of data collection |
| Wang (2014). Cost benefit study of school nursing services | To assess the economic impact of school health services delivered by full time RNs | Cost benefit analysis Level 5 Variable: Cost vs benefits of having a full time school nurse vs no school nursing services | 933 schools in 78 districts in Massachusetts Retrospective records review of 2009-2010 school year | Standard cost-benefit analysis Multivariate sensitivity analysis. Monte Carlo simulation of 10,000 trails using @ RISK-benefit in 89% | 6.2 % of students sent home by RN vs 11% dismissed without RN. Cost of a health program \$79 million.net benefit of \$98.2 million | Costs/benefits estimated. Nurses provide efficient and beneficial care. Providing health education and promotion was not accounted for |

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|---|--|--|---|--|--|--|
| <p>Hill (2012). Teacher time spent on student health issues and school nurse presence</p> | <p>Quantify time teachers spend on health issues related to instructional time, school nurse presence to keep student in school.</p> | <p>Cross-sectional design, survey of teachers and school nurses Level 4 Descriptive Quantitative</p> | <p>Year 1: 271 teachers, 7 nurse survey in 12 schools Year 2: 286 teachers 7 nurse survey in 13 schools, Western North Carolina rural and urban elementary school</p> | <p>Teacher survey-5 choice Likert scale. School nurse-students that left early and if a student was seen by a nurse prior to dismiss Frequency counts, SD's, percentages and alpha of 0.05</p> | <p>Teacher-Increased communication, less time spent on health issues, more time teaching if school nurse present confidence that students with chronic illness are safe, fewer students sent home early.</p> | <p>No information on what the nurse did to promote health. Teacher didn't always know when the nurse was present. Elementary setting Students are more likely to return to class when the nurse is present, increasing learning.</p> |
| <p>Manning (2011). Working toward improving quality and efficiency in school nursing</p> | <p>Evaluation of the Productive Community Services Program and use to improve quality and efficiency</p> | <p>Level 7 Expert committee: National Health Service in England</p> | <p>N/A</p> | <p>N/A</p> | <p>Organization of work setting (workboxes) easy to use and saves time, easy to restock. Record of student care notes accelerated decision making.</p> | <p>Nurse modules show stock reductions of 48% and 120 hours of saved meeting times with new organizational measures. No time of student interaction reported.</p> |
| <p>Pennington (2008). The number of students sent home by school nurses compared to unlicensed personnel</p> | <p>To determine if a difference exists in number of students sent home based on who assessed student in the health office</p> | <p>Quantitative Descriptive Level 4 Retrospective Case control</p> | <p>Four K-12 Kentucky schools Total health office visits and reports analyzed: 3132</p> | <p>Illness/injury report form completed by school nurse or unlicensed personnel that sent the student home</p> | <p>5% of students seen by school nurse were sent home, 18% of students seen by unlicensed staff sent home</p> | <p>95% of students seen by school returned to class Unknown if district is urban or suburban. All students had access to a school nurse for part of the day</p> |

| COMMUNICATION TOOL | | | | | | |
|--|---|--|--|---|--|---|
| Golsater (2011). Adolescents’ and school nurses’ perceptions of using a health and lifestyle tool in health dialogues | To describe and explore adolescent and school nurse perceptions of using a health and lifestyle tool in health dialogues in schools | Qualitative Descriptive Level 6 Dependent variable: facilitated communication about health and lifestyle | 29 adolescents (age 14) and 23 nurses Focus group interviews Convenience sampling. A school in Sweden | Individual health visits at age 6,11,14,17. Qualitative analysis based on Krippendorff and inductive Elo & Kyngas approach | 45 question tool completed before visit gives structure for dialogue that is focused allowing visualization of topics to reflect and provide further education | Shows that a structured tool is a clear and applicable starting point to be used for goal setting and allow health promotion individually or as a group |
| HEALTH PROMOTION EDUCATION | | | | | | |
| American Academy of Pediatrics (2018). Role of the school nurse in providing school health services | Describe the role of the school nursing in providing preventive services to foster health and educational success | Policy statement Level 7 | N/A | N/A | N/A | Defines roles of school nurse including leader in school health policies of health promotion and protection |
| Best (2018). Exploring school nurse interventions and health and education outcomes: An integrative review | Explore empirical findings for links between school nurse interventions and activities and student health and education outcomes. | Level 7 Integrative literature review Dependent variable is health and education outcomes | 65 studies (50 qual, 9 mixed meth, 6 qual. Public, private Charter schools in 21 states | Engelke-improved quality of life score (p<.05), improved GPA, | Interventions in 17 of 65 studies linked to positive changes in student health or education. Interventions grouped under Care Coordination, QI, Public health | Measures education outcomes. Doesn’t specifically address health promotion efforts/empowerment but this can be incorporated into care coordination activities |

| | | | | | | |
|--|---|---|--|--|---|---|
| <p>McCutcheon (2015). Concept analysis: Health-promoting behaviors related to human papilloma virus infection</p> | <p>Analysis of health promotion (HP) behaviors that are influenced by HPV education</p> | <p>Concept analysis Level 7 The dependent variable is health promotion behaviors</p> | <p>N/A</p> | <p>N/A</p> | <p>Literature shows a gap in HP behaviors and HPV education</p> | <p>Shows need for HP amongst nursing discipline to increase vaccination rates, and apply HP behaviors to other populations (high schoolers)</p> |
| <p>Burns (2012). Body mass index and injury severity in adolescent males.</p> | <p>To examine the relationship between obesity and injury severity based on the Health Promotion Model(HPM)</p> | <p>Descriptive, correlational Level 4 Cross sectional Dependent variable is injury severity</p> | <p>611 adolescent males 11-17 years that sustained injury and received medical care at a 10 day camping event Convenience sample</p> | <p>BMI measure as defined by CDC. Severity of injury measured by ESI version4,</p> | <p>Significant (p=0.04, r=0.4) between BMI and injury severity. Less severe injury with normal weight group p<0.01 than overweight and obese groups.</p> | <p>Shows need for education re relationship between obesity and injury severity. Nurses can reduce injury severity through health education and promotion of optimal body weight in adolescents</p> |
| <p>Hennessy-Harstad (2012). Asthma and adolescents: Review of strategies to improve control</p> | <p>To identify strategies for school nurses to employ with adolescents to foster self-management skills</p> | <p>Integrative review Level 7 Dependent variable is self-management and asthma outcomes</p> | <p>91 research articles, asthma guidelines, National Asthma Education Prevention Program</p> | <p>N/A</p> | <p>School nurses assist adolescents in managing and monitoring asthma to gain control. School nurse role is educator, care coordinator</p> | <p>As health educators, school nurses are instrumental in promoting asthma health, engaging adolescents to foster self-management.</p> |

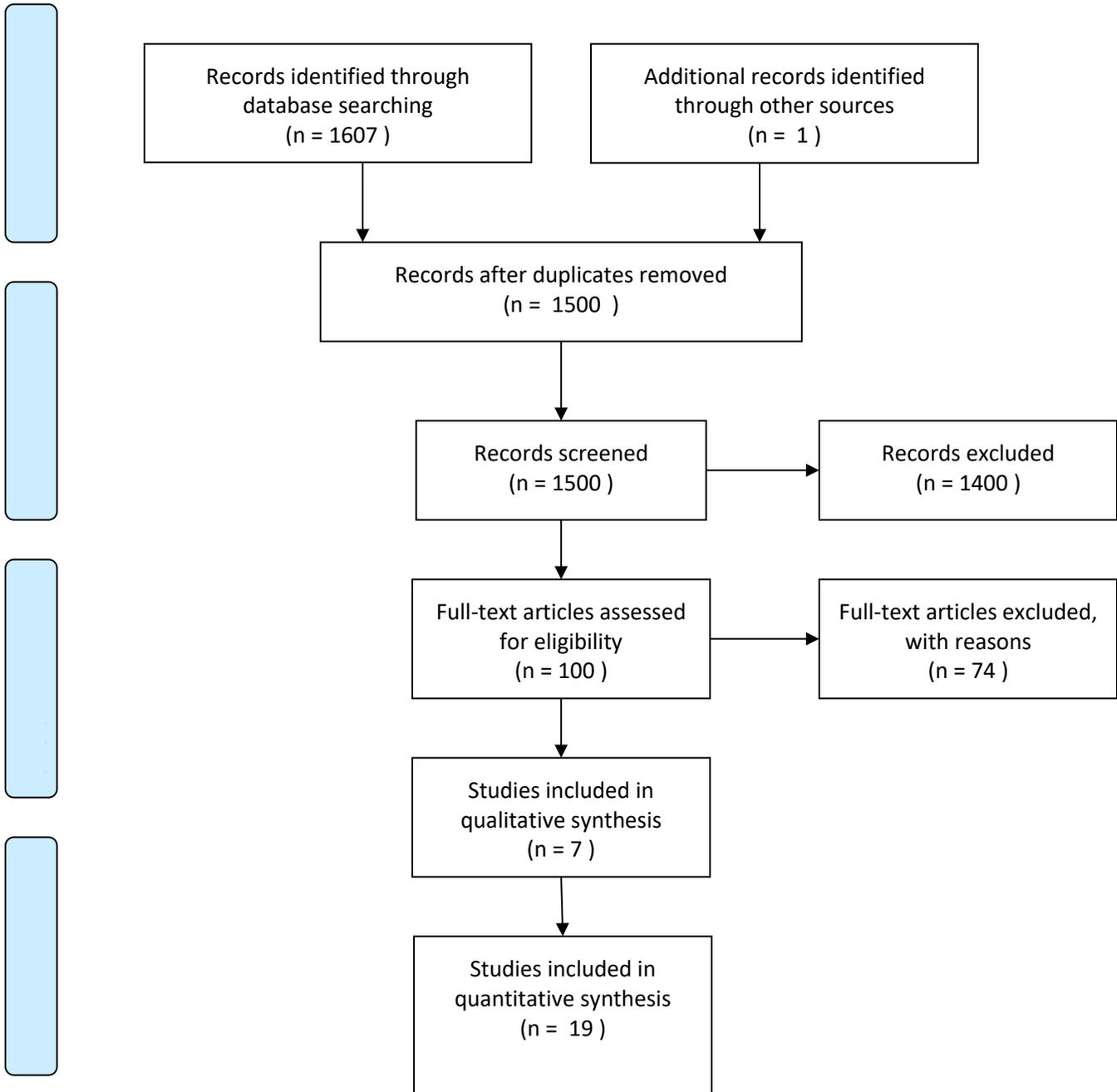
| | | | | | | |
|---|---|---|---|---|--|--|
| <p>Melnyk (2013). Promoting healthy lifestyles in high school adolescents</p> | <p>Test the COPE program vs. attention control program on health promoting outcomes</p> | <p>RCT, Level 2 Cognitive behavior skills building with 20 min physical activity 1x/wk vs attention control 15 week session health topics</p> | <p>779 adolescents Random assignment 11 high schools to COPE or control in the southwestern U.S.</p> | <p>Pedometer, Beck Youth Inventory II, Youth Risk Behavior, Healthy Lifestyles Behavior Scale alpha >0.80, BMI, Social Skills Rating System, course grade</p> | <p>COPE group greater physical activity (p=0.03), lower BMI (p=0.01), higher Social Skills Rating (p<0.05) lower depression (p=0.02), higher health course grades vs. control</p> | <p>Realistic use as it relates healthy promotion efforts to improved academic performance.</p> |
| <p>Baisch (2011). Evidence-based research on the value of school nurses in an urban school system</p> | <p>Evaluate the impact of school nurse on promoting a healthy school environment and students</p> | <p>Level 3 Mixed meth, Cross-sectional Dependent variable is immunizations rates, management of health-related issues</p> | <p>11 schools in a large urban school district of a major Midwestern city. Surveys from school staff – 634. Records - 16595</p> | <p>Student EHR. Survey adapted from satisfaction survey in nurse managed health centers with added question of perception of time spent</p> | <p>Nurses positively influence immunization rates, accurate health records and management of health concerns.</p> | <p>Shows nurse impact on health promotion</p> |
| <p>Murray (2007). Coordinated school health programs and academic achievement: A systematic review of the literature</p> | <p>Review of evidence linking health programming and academic success</p> | <p>Systematic review Level 3 The dependent variable is academic success.</p> | <p>17 reviews presented</p> | <p>Reviewers looked for health services, social services, nutrition services, health promotion for staff, healthy school setting, physical and health education</p> | <p>Improved academic outcomes in asthmatic children with schools that incorporate health education and parental involvement</p> | <p>Greatest evidence in grades 3-5 for asthmatic review. 11 reviews for elementary/middle schools. 5 High school reviews: 4 had health education and 3 showed improved academics</p> |

| | | | | | | |
|---|---|--|---|--|---|--|
| <p>Buck (2003). Early adolescents' definition of health: The development of a new taxonomy</p> | <p>Survey to define how adolescents define health and what being healthy means</p> | <p>Level 6 Descriptive Dependent variable: how health is defined and what being healthy means</p> | <p>98 adolescents surveyed, 2 open-ended ?s Convenience sample Low income urban middle school Midwestern U.S., Kappa coefficients 0.81-1.00</p> | <p>172 responses sorted categories of health: absence of illness(12.2%), physique(20.3%), functional ability (2.9%), health risk avoidance(9.3%), health promoting behavior(42.4%), holistic integration (70%)</p> | <p>42.4 % define health as health promoting behavior</p> | <p>Early adolescents' definition of health acts as a motivator to engage in a healthy lifestyle. Health promotion programs could be focused on aspects of health that hold the most meaning.</p> |
| <p>EMPOWERMENT</p> | | | | | | |
| <p>Haapala(2014). Adolescents' physical activity at recess and actions to promote a physically active school day</p> | <p>To examine changes in adolescents' physical activity(PA) and describe the health promotion actions</p> | <p>Descriptive Quantitative, Self report for correlation Level 4 Cross sectional Dependent variable is physical activity</p> | <p>789 students grades 7-9 at four schools in Finland over a 2 year period</p> | <p>School actions provided by 7 local contact persons. PA measured by WHO's Health Behavior survey with reliability and validity. Chi square test for PA</p> | <p>Organized activities, student activators, equipment provision and sports facilities development had a positive impact on PA.</p> | <p>PA activities track from childhood to adolescence to adulthood, measures to increase health promotion are assessed. Shows student empowerment effects.</p> |
| <p>Spencer (2014). Young people and health: Towards a new conceptual framework for understanding empowerment</p> | <p>Theoretically define the concept of empowerment as relates to adolescent health.</p> | <p>Descriptive, thematic, then theoretical analysis Level 5 Qualitative-data analysis multistage abductive approach</p> | <p>Purposive sampling. 55 adolescents aged 15-16 England school. Group discussions, individual interviews and observation in</p> | <p>N/A</p> | <p>15-16 year olds report empowerment methods need to start with positive aspects vs emphasis on risky behaviors. Youth define wellness happiness</p> | <p>Small sample size, Health promotion dialogues could start with student definition of health in terms of being happy, having fun vs. outcome of drinking and smoking seen as negative.</p> |

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|---|---|--|--|--|--|---|
| <p>Larsson (2014). Striving to make a positive difference: School nurses' experiences of promoting the health and well-being of adolescent girls</p> | <p>To highlight the experiences of school nurses in promoting the health and well-being of adolescent girls</p> | <p>Qualitative Phenomenological study Descriptive Level 6 Dependent variable is improved health of adolescent girls</p> | <p>Interview of 17 school nurses that work with adolescent girls. Urban communities in Sweden</p> | <p>Data analysis following Dahlberg et al. (2008) whole-parts-whole resulting in six constituents</p> | <p>Establish trust, and self insight, support a healthy life rhythm, being reliable, down playing common norms and body ideals, collaborate to support health and learning</p> | <p>Small sample, trust similar to Maslow. School nurses perceive reciprocal relationship between health of the adolescents that influences learning and well-being (TOUS)</p> |
| <p>Morton (2013). Youth empowerment programs for improving adolescents' self-efficacy and self-esteem: A systematic review</p> | <p>Assess state of evidence of impacts of youth empowerment programs (YEP) on outcomes of adolescent self-efficacy/esteem</p> | <p>Identify quasi experimental or experimental trials. Level 2. Secondary outcomes- social skills, prosocial behaviors and positive connections.</p> | <p>3 studies of 8789 from search strategy met inclusion criteria</p> | <p>Study quality systematically appraised with 41 characteristics of study design. Self-esteem assessed by 10-item Rosenberg self-esteem scale</p> | <p>YEP's do not have a significant effect on self-efficacy and self-esteem. Secondary outcomes in some of the studies, social skills, coping skills and problem behaviors.</p> | <p>Small number of studies met inclusion criteria. Inclusion criteria of group interaction. Excluded one on one intervention.</p> |

Appendix B

PRISMA Search Diagram



Appendix C

Definition of Terms

Cognitive performance- learning, comprehension, problem solving, and concentration (Lenz & Pugh, 2014)

Efficiency- the least amount of input such as costs of labor to achieve the highest level of output, improvement of everyday working practices (Manning, 2011)

Empowerment- a process where an individual attains control over health behaviors and decisions by participation in the behaviors that affect health (Tremblay and Richard, 2011)

Health promotion- an enabling process in which people gain control over their health to improve it (World Health Organization, 2018)

Influencing factors- physiologic, psychologic, and situational factors (Lenz & Pugh, 2014)

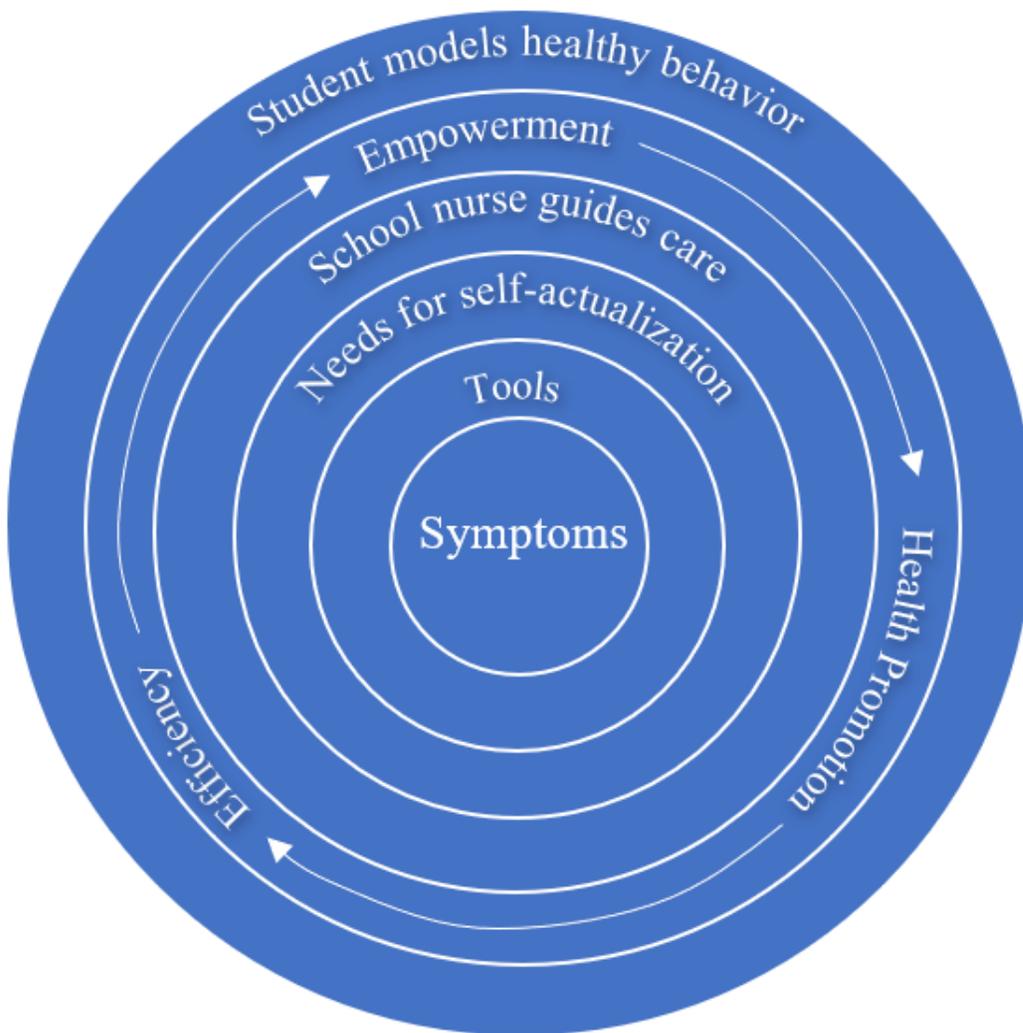
Performance outcomes- functional and cognitive activities, operationally (Lenz & Pugh, 2014)

Symptom experience- an alteration in normal functioning as defined by the person (Hugh & Broome, 2007)

Appendix D

Theory to Application Diagram

Diagram of the Theory of Unpleasant Symptoms and the concepts empowerment, health promotion, and efficiency in relation to the research inquiry. The center of the diagram is the symptom experience as defined by TOUS, encircled by the communication tool. The tool assists in discernment of needs from physical to self-actualization. The nurse uses the tool to efficiently guide care and promote health by empowering the student to model healthy behavior.



Appendix E



**Institutional Review Board
University of Missouri-Kansas City**

5319 Rockhill Road
Kansas City, MO 64110
816-235-5927
umkcirb@umkc.edu

Dear Lyla Jo Lindholm,

A member of the UMKC Research Compliance Office screened your QI Questionnaire to project #2015667-QI entitled "" and made the following determination:

QI Determination: The project has been determined to be a quality improvement activity not requiring IRB review.

If you have any questions regarding this determination, please feel free to contact our office at 816-235-5927, umkcirb@umkc.edu, or by replying to this notification.

Note Regarding Publications: It is appropriate to disseminate and replicate QI/program evaluation successes, including sharing the information external to an organization. This may include presentations and publications. The mere intent to publish the findings does not require IRB review as long as the publication does not refer to the activity as research.

Thank you,
UMKC Institutional Review Board

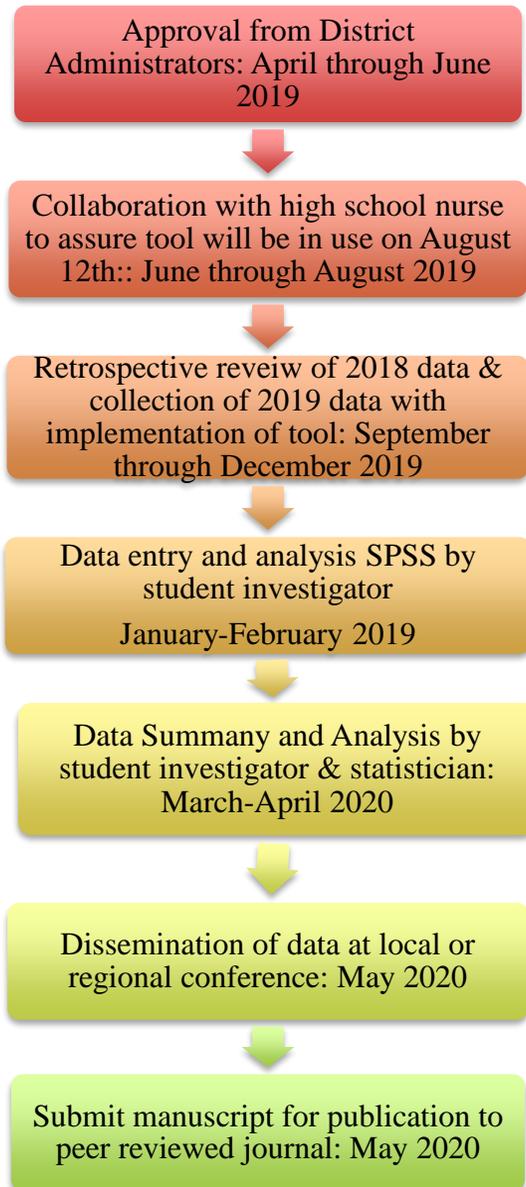
Appendix F

Cost Table for Project

| Item | Item Description | Quantity | Unit Cost | Anticipated Cost |
|-----------------------|---|--|--|-------------------------|
| Print materials | Laminated Communication tool, 2 for each high school | 2 | \$0.08 per sheet black and white printing \$2.11 for lamination 8X10 \$2.19 X 2 | \$4.38 |
| Student Time | Student time is part of DNP project | 600 hours | No cost | |
| Project Dissemination | Dissemination at Kansas Nurse Educators conference or other regional conference | Conference estimated cost for one student investigator | Conference registration approximately \$350 Lodging for 2 nights approximately \$320 Cost to have poster printed \$80 Maximum cost for transportation to conference (drive or air travel) \$400 | \$1150.00 |
| Total | | | | \$1154.38 |

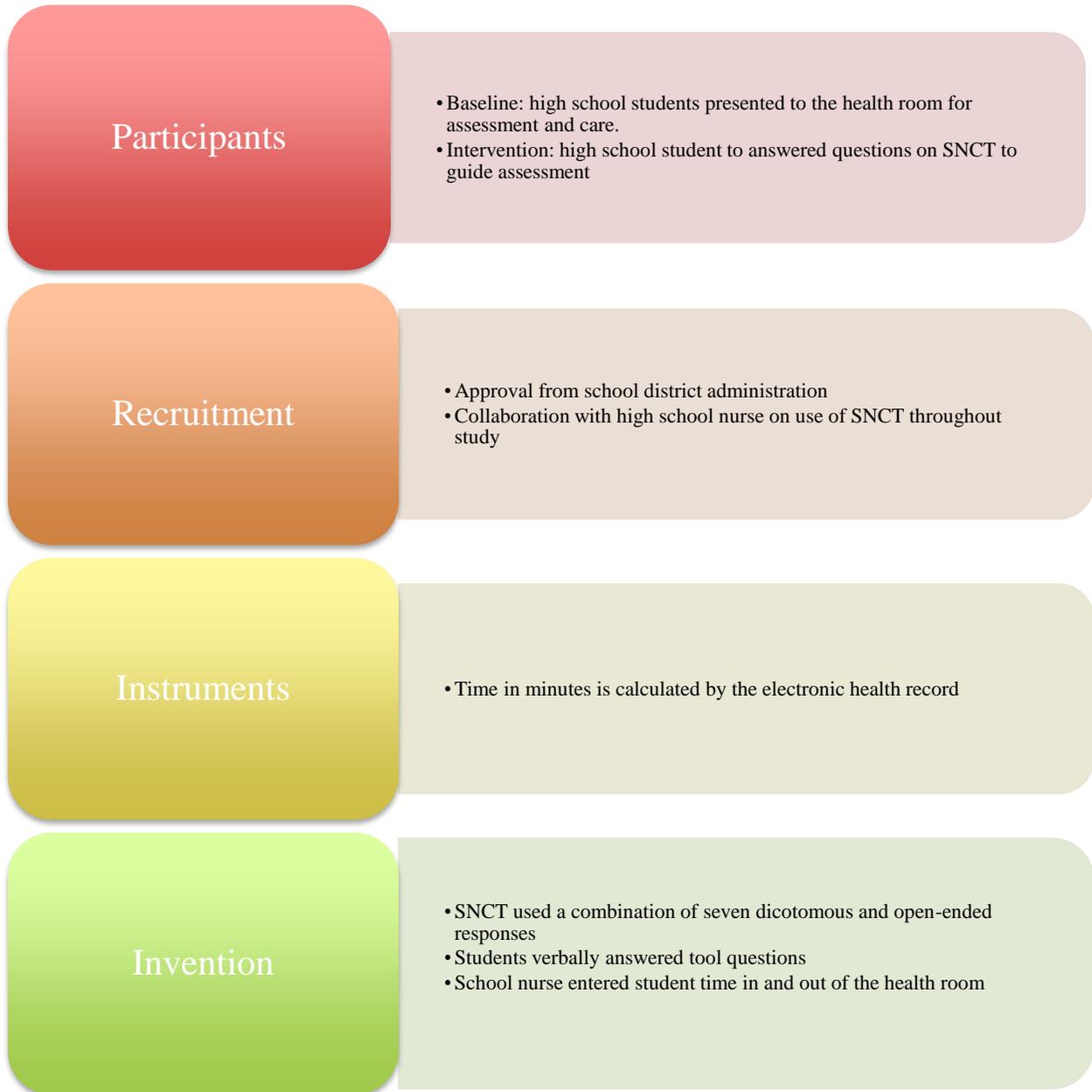
Appendix G

Project Timeline Flow Graphic



Appendix H

Intervention Flow Diagram



Appendix J

Data Collection Template

Data entered into Electronic Health Record by School Nurse for each student visit

| Student number | Name | Time In | Grade | Gender | Reason for visit | Disposition | Time out |
|----------------|------|---------|-------|--------|------------------|-------------|----------|
| 1 | | | | | | | |
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Appendix K

Permission to Use

School Nurse Communication Tool

Tue 4/30, 7:41 AM

Rudigier, Jana

To Whom It May Concern,

My name is [REDACTED]. I created a School Nurse Communication Tool.

I give Jana Rudigier, MSN, RN, permission to use this tool as a part of her DNP project.

[REDACTED], *BSN, RN*
High School Nurse

| Appendix L: Logic Model for DNP Project | | | | | |
|---|---|--|---|---|---|
| Student: Jana Rudigier | | | | | |
| Inquiry, PICOTS: In high school students, does the use of a communication tool compared to no communication tool decrease the amount of time a student is in the health room during a 16 week semester in a suburban high school? | | | | | |
| Inputs | Intervention(s) | | Outcomes -- Impact | | |
| | Activities | Outputs Participation | Short | Medium | Long |
| <p>Evidence, sub-topics</p> <ol style="list-style-type: none"> 1.Symptoms and hierarchy of needs 2.Efficiency 3.Communication tool 4.Health promotion and education 5.Adolescent empowerment <p>Major Facilitators or Contributors</p> <ol style="list-style-type: none"> 1.School nurse enthusiasm, identify drivers 2.Principal support as tool will decrease class absence 3. Students will realize effects of change <p>Major Barriers or Challenges</p> <ol style="list-style-type: none"> 1.School nurse resistance 2.High school student reluctance to articulate 3.Timing of intervention coincides with start of school year | <p>EBP intervention which is supported by the evidence in the Input column</p> <p>School nurse communication tool will decrease time student is absent from class and increase adolescent empowerment</p> <p>Major steps of the intervention</p> <ol style="list-style-type: none"> 1. Preparation: Purpose and evidence shared with district health manager for approval 2.Validation: Appraisal and synthesis of evidence 3.Decision Making: What to use based on fit,feasibility,readiness 4.Translation: Communicated vision and implementation strategy with high school nurse 5.Evaluate: determine if outcome of decreased time in clinic was met | <p>The participants (subjects)</p> <ol style="list-style-type: none"> 1.High school nurse 2.High school students <p>Site: Suburban Midwest school district</p> <p>Time Frame: September 2019 through December 2019</p> <p>Consent or assent Needed</p> <ol style="list-style-type: none"> 1.District health manager 2.School principals 3.UMKC IRB determined to be QI <p>Other person(s) collecting data:</p> <ol style="list-style-type: none"> 1.School nurse 2.District IT staff will provide de-identified data to student investigator <p>Others directly involved in consent:</p> <p>Dr. Lyla Lindholm, DNP-Academic Adviser</p> | <p>(Completed during DNP Project)</p> <p>Outcome(s) to be measured</p> <p>Time in minutes student is in health room</p> <p>Measurement tool(s)</p> <p>High school student time in and time out of the health room entered into the school nurse data base by the school nurse or designated persons</p> <p>Statistical analysis to be used</p> <p>-Mean of number of visits, day of week, academic year, gender, mean time in clinic, disposition, and reason for visit made during the collection period and preceding year per month</p> <p>-Independent t test to compare means of time in clinic pre and post tool</p> <p>- Descriptive statistics</p> | <p>(after student DNP)</p> <p>Outcomes to be measured</p> <p>Means of time in health clinic pre and post tool</p> | <p>(after student DNP)</p> <p>Outcomes that are potentials</p> <p>Increased articulation skills of high school students</p> <p>Increased job satisfaction among high school nurses</p> <p>Improved health outcomes of students through healthy behavior choices presented by school nurse</p> |

Appendix M

Statistical Analysis Tables

Table 1. Number of student visits by month for the data collection week

| Month | Number of Visits 2018 | Number of Visits 2019 | Difference |
|--------------|--------------------------|--------------------------|------------|
| September | 178 | 177 | -1 |
| October | 220 | 155 | -65 |
| November | 177 | 198 | +21 |
| December | 178 | 192 | +14 |
| TOTAL visits | 753 | 722 | -31 |

Table 2. Number of student visits by day for the data collection week

| Day of the Week | Mean Number of Visits 2018 | Mean Number of Visits 2019 | Difference |
|-----------------|-------------------------------|-------------------------------|------------|
| Monday | 150 | 179 | +29 |
| Tuesday | 166 | 155 | -11 |
| Wednesday | 129 | 141 | +12 |
| Thursday | 152 | 124 | -28 |
| Friday | 156 | 123 | -23 |
| TOTAL visits | 753 | 722 | -21 |

Table 3. Number of student visits by academic year for the data collection week

| Academic Year | Mean Total Number of Visits 2018 (Sept- Dec) | Mean Total Number of Visits 2019 (Sept- Dec) | Difference |
|------------------|--|--|------------|
| 9 th | 252 | 236 | -16 |
| 10 th | 184 | 197 | +13 |
| 11 th | 193 | 157 | -36 |
| 12 th | 124 | 132 | +8 |
| TOTAL visits | 753 | 722 | -31 |

Table 4. Number of student visit by gender for the data collection week

| Gender | Mean Total Number of Visits 2018 | Mean Total Number of Visits 2019 |
|--------------|--|--|
| Female | 405 (54%) | 376 (52%) |
| Male | 348 (46%) | 346 (48%) |
| TOTAL visits | 753 | 722 |

Table 5. Disposition of student from clinic for the data collection period

| Disposition | Mean Number (2018) | Mean Number (2019) |
|-----------------|--------------------|--------------------|
| Return to class | 716 (95.09%) | 676 (94%) |
| Home | 36 (4.78%) | 46 (6%) |
| Not specified | 1 (0.13%) | 0 |
| Total | 753 | 722 |

Table 6. Time spent in the clinic for the data collection period

| Mean time in minutes in Clinic, SD 2018 | Mean time in minutes in Clinic, SD 2019 | Difference |
|---|---|------------|
| 8.93, 2.70 | 10.32, 3.12 | +1.39 |

Appendix N

Statistical Analysis Results

Group Statistics

| | group | N | Mean | Std. Deviation | Std. Error Mean |
|------|-------|----|---------|----------------|-----------------|
| time | 1 | 20 | 8.9330 | 2.69942 | .60361 |
| | 2 | 20 | 10.3160 | 3.12090 | .69785 |

Independent Samples Test

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | 95% Confidence Interval of the Difference | |
|------|-----------------------------|---|------|------------------------------|--------|-----------------|-----------------|-----------------------|---|--------|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| time | Equal variances assumed | .254 | .617 | -1.499 | 38 | .142 | -1.38300 | .92268 | -3.25087 | .48487 |
| | Equal variances not assumed | | | -1.499 | 37.227 | .142 | -1.38300 | .92268 | -3.25215 | .48615 |

Appendix O
Faculty DNP Project Letter



July 17, 2019

DNP Project Proposal Approval
UMKC DNP Student

This letter serves to provide documentation regarding Jana Rudigier's Doctor of Nursing Practice (DNP) project proposal. Ms. Rudigier obtained approval for her proposal, *School Nurse Communication Tool and Efficiency in the High School Setting*, from the School of Nursing and Health Studies DNP faculty on July 17, 2019.

If we can provide further information, please feel free to contact us.

Sincerely,

A handwritten signature in black ink that reads "Cheri Barber".

Cheri Barber, DNP, RN, PPCNP-BC, FAANP
Clinical Assistant Professor
DNP Program Director
UMKC School of Nursing and Health Studies
barberch@umkc.edu

Lyla Lindholm, DNP, ACNS-BC
UMKC MSN-DNP Program Coordinator
Clinical Assistant Professor
DNP Faculty

UNIVERSITY OF MISSOURI-KANSAS CITY

2464 Charlotte • Kansas City, MO 64108-2718 • p 816 235-1700 • f 816 235-1701
www.umkc.edu/nursing • nurses@umkc.edu
an equal opportunity/affirmative action institution