

**Implementation of a Menstrual Cycle Health Education Program for the University of
Mary St. Gianna School of Health Sciences: An Evidence Based Practice Project**

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NUR 940 DNP Project & Nursing Scholarship IV

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April 2, 2023

Abstract

Purpose: The purpose of this project was to determine how student development is impacted by the implementation of a menstrual cycle health curriculum at the SGSHS.

Method: Four recommendations were generated for this project: 1) develop evidence-based, menstrual cycle health educational sessions for the students of the SGSHS; 2) provide students with resources that are available if an abnormality in their menstrual cycle health is identified during or after the educational session; 3) evaluate the effectiveness of the educational sessions that were implemented; 4) collaborate with and support the project chair and organizational champion in developing a menstrual cycle health educational program that will be sustainable.

Findings: Results of the study were based on 67 post-implementation questionnaires (n=67) completed by attendees of two educational sessions. Out of the total attendees surveyed, 78% (n=52) were students of the SGSHS, while the remaining 22% (n=15) were not pursuing healthcare-related degrees, but still chose to attend as they were interested in the information. Of the attendees, 99% (n=66) found the information beneficial for personal use, and 87% (n=58) found it beneficial for future professional use. The majority of attendees 72% (n=48) expressed interest in taking a course on this topic as an elective with attached credits that count towards their degree.

Conclusion: Overall, the findings suggest that the educational sessions were beneficial and provided both personal and professional growth. Additionally, most attendees expressed interest in more information delivered over the span of a semester in the form of an elective course. The project's leaders recommend that future efforts by the project setting and champion should focus on curriculum development by utilizing feedback from attendees. This feedback can then be used in the preparation of a proposal to the academic counsel to foresee an elective course on campus.

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Chapter I: Introduction to the DNP Project

Recent evidence suggests that ovulation should be viewed as a sign of health and may even be considered the “fifth vital sign” (Vigil et al., 2017b). The “fifth vital sign,” or ovulation, is a natural biological health indicator that should be appreciated and monitored. Since the first identifiable abnormality in a menstrual cycle is typically anovulation followed by irregular menses or amenorrhea, reproductive awareness can help women identify an underlying problem (Vigil et al., 2017b). Moreover, women may believe that they have a regular cycle; however, regular cycles can be anovulatory and go unrecognized in women who are not able to identify the naturally occurring biomarkers of ovulation (Vigil et al., 2017b). Menstrual cycle irregularities with ovulatory dysfunctions are most commonly related to hormonal abnormalities such as hypothalamic, pituitary, thyroid, adrenal, ovarian, and metabolic disorders (Vigil, 2017b). These hormonal abnormalities can lead to several chronic conditions including type 2 diabetes, irritable bowel syndrome, mental health conditions, and infertility (Kim et al., 2018). It is also important to note that ovulatory dysfunction usually begins early in life and worsens as a woman matures if left untreated. Therefore, monitoring menstrual cycles should begin at the start of menstruation and continue throughout the lifespan.

It is often assumed that a higher educational level correlates with greater health literacy in regard to menstrual cycle health. However, literature negates this fact as research demonstrates that educational level is not a definitive indicator of health literacy (Vila-Candel et al., 2020). Research regarding the successful implementation of menstrual cycle health literacy on university campuses is scarce (Szucs et al., & Shin et al., 2020). Currently, there is limited menstrual cycle education provided on a university level; however, a study completed by Shin et al., (2020) revealed that students desire to receive this education. Therefore, the Doctor of

Nursing Practice (DNP) leaders identified a gap in current practice and sought to find a proposed solution.

The aim of this project was to determine how student development is impacted by the implementation of a menstrual cycle health curriculum at the SGSHS. Therefore, the goal of this project was to integrate menstrual cycle health education into university curriculum and increase menstrual cycle health education availability. Additionally, these long-term goals may improve menstrual cycle health literacy, increase the identification of menstrual cycle dysfunction, and lead to appropriate medical management with a trained healthcare professional.

Problem Introduction, Statement and PICO Question

The current standard of practice among healthcare providers is to focus on regulating patient's bleeding patterns rather than focusing on ovulation in women of reproductive age (Vigil, 2017a). Neglecting to identify regular ovulatory menstrual cycles can be detrimental as the first sign of an underlying health problem that women may experience is an abnormality in ovulation followed by irregular menstrual cycles and/or amenorrhea (Vigil, 2017a). To improve understanding of reproductive health and promote changes in medical practice through knowledge translation, it was necessary to thoroughly investigate the clinical issue and acquire expertise. Additionally, the problem's background and significance were examined, including identifying knowledge gaps and proposing potential solutions.

Problem Statement

Together, the American College of Obstetricians & Gynecologists (ACOG) Committee for Adolescent Health Care and the American Academy of Pediatrics (AAP) Committee on Adolescence have recommended that the ovulatory menstrual cycle should be considered as a vital sign when assessing a woman's overall health (Roux et al., 2019). Moreover, as highlighted

by ACOG (2015), just as clinicians identify irregularities in vital signs such as heart rate and blood pressure to diagnose serious health conditions, identifying irregularities in menstrual patterns in young women can lead to early detection of potential health issues they may encounter later in life. Studies have demonstrated that even individuals with higher education and socioeconomic status have low levels of menstrual health literacy (Chawloskwa et al., 2020). In an online survey consisting of 673 participants answering questions related to fertility, only 2.8% provided the correct response to all six questions (Ford et al., 2020). Furthermore, the average score was merely 3.1%, equivalent to approximately 50% (Ford et al., 2020). This is a concerning issue because women are less likely to discuss their reproductive health concerns with healthcare providers if they are unaware of any irregularities in their menstrual cycle (Roux et al., 2019).

Background to the Problem

The World Health Organization (WHO) defines health literacy as “the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health” (Roux et al., 2020). Vila-Candel et al., (2020) mentioned health literacy is an important factor in individual use of health services. Having a low health literacy is linked to poor health outcomes, inadequate self-care, and failure to seek healthcare information (Vila-Candel et al., 2020). Literature demonstrated that women who have adequate health literacy can obtain, understand, and apply personal health information to recognize abnormalities and detect disease to benefit their health (Roux et al., 2020).

Adequate ovulatory menstrual health literacy increases the likelihood that women will engage in health promotion and prevention activities that will in return benefit both her and her

current and/or future family. Lacking reproductive health knowledge impairs one's ability to make informed health-care decisions that lead to satisfactory healthcare outcomes (Shieh & Halstead, 2019). Thereby, ACOG recently announced a Committee Opinion that outlined the need for providers to consider the health literacy of their patients when delivering health promotion and clinical care activities (Kilfoyle et al., 2016).

Problem Scope

Reproductive age is defined by the WHO (2022) as ages 15 through 49. In the United States, there are approximately 76.1 million women who fit into this demographic (WHO, 2022). Worldwide, 14.3% to 25% of women of reproductive age experience menstrual cycle irregularity (Kim et al., 2018). Additionally, women currently outnumber males on university campuses. The U.S. Department of Education reported in the fall of 2019 that 57% of undergraduate students were female which translates to 9.4 million students (National Center for Education Statistics, 2022).

It is often assumed that individuals with higher levels of education have a greater understanding of health and well-being. However, the literature revealed that women with higher educational levels lacked health literacy. A quantitative cross-sectional study performed by Mu et al. (2019) which included women with a college education revealed that the participants believed they were more knowledgeable about ovulation and menstrual health than they actually were. Therefore, it cannot be assumed that education is a definitive indicator of health literacy (Vila-Candel et al., 2020). Female university students are the creators of the next generation alluding to the necessity of fertility education in the development of emotional maturity, sexual identity, and identification of reproductive health (Shin et al., 2020).

Problem Consequences

Women with a solid foundation of knowledge of ovulatory and menstrual reproductive health are more likely to have satisfactory health outcomes. It is important to consider the impacts of women lacking reproductive health literacy and the consequences that are associated with this worldwide issue. Irregular menstrual cycles tend to be overlooked and are associated with an increased risk of chronic diseases such as type 2 diabetes, migraines, cardiovascular disease, breast cancer, ovarian cancer, and infertility (Kim et al., 2018). For example, insulin resistance, commonly seen in conditions such as polycystic ovary syndrome (PCOS), can lead to hyperinsulinemia. Hyperinsulinemia increases androgen production by the ovaries, which can cause menstrual cycle disturbances and reduce fertility rates due to the disrupted balance of hormones required for normal ovulation and pregnancy (Shim et al., 2011). Additionally, the menstrual cycle alone can worsen other existing conditions such as acne, and irritable bowel syndrome highlighting the key role of reproductive health awareness (Roux et al., 2020).

In addition, chronic conditions associated with cycle dysfunction may be overlooked and may continue to worsen over time (Roux et al., 2019). In the absence of a diagnosis and treatment of conditions associated with cycle dysfunction, the underlying pathology can interfere with individuals school attendance, relationships, and overall well-being (2019). Furthermore, poor health literacy in women has been linked to increased hospitalizations and emergency department use, poor overall health status, and higher mortality (Kilfoyle et al., 2016).

Knowledge Gaps

Research has undoubtedly illustrated the fact that there are significant gaps in both men's and women's knowledge of fertility and menstrual cycle health, including university students and those with a college education (Szucs et al., 2017). Works published by both Szucs et al.

(2017) and Shin et al. (2020) concluded not only with the notion that knowledge on the menstrual cycle should be increased in university students, but that this education is also heavily desired by the students. However, there is limited research available regarding the successful implementation of interventions to improve menstrual cycle health literacy on university campuses.

For instance, most of the research available on this topic is focused on increasing reproductive health literacy in young adolescents, women in general, and pregnant women (Villa-Candel, 2020). While this information may be generalizable, a knowledge gap still exists regarding successful interventions for this project's target population of university students as this group is frequently identified as having low menstrual cycle health literacy. Identifying effective teaching interventions and strategies is a vital step in addressing menstrual cycle health literacy.

Proposed Solution

This project aims to find a solution to the discussed problem. Professional organizations, such as the American Academy of Family Physicians (AAFP) have done extensive research on the effects of low health literacy and thus recommend addressing health literacy in all individuals across the lifespan. In addition to the AAFP, educators within school systems report the incorporation of health literacy education into curriculum as beneficial in increasing health values (Nunokawa, 2019). Furthermore, educators found value in utilizing input from healthcare professionals in the development of the curriculum (Nunokawa, 2019). Adolescents receive minimal sex education during middle and high school years and then are reliant on their peers or the media to supplement knowledge gaps. The university setting plays an important role in the continuation of this education as individuals spend several years immersed in coursework.

Evidence suggests that incorporating fertility awareness education into curriculum will increase individual health literacy, access to healthcare, reduces health care costs, increase adherence to provider recommendations, and improve health outcomes related to chronic disease, health status, and mortality (Roux et al., 2020). Young adults experience substantial personal development while attending college and developing interventions that increase reproductive health literacy will support their future success.

Many different educational tools already exist and have proven efficacious in increasing health-related knowledge, patient comprehension, adherence to treatments, and improving patient-provider communication. For example, the organization Fertility Education and Medical Management (FEMM) provides tech and educational support to women who seek to understand their body and achieve optimal health. This organization assists with daily charting which tracks hormonal, physical and emotional health; there is also access to FEMM teachers who provide one on one support for any health issues as well as a medical provider who reviews daily charting to assist with diagnosis and treatment. Fertility Appreciation Collaborative to Teach the Science (FACTS) is another organization that utilizes physicians, health care professionals, and educators to provide information and bring awareness to reproductive health (FEMM, 2022). FACTS also educates individuals how to monitor and manage their fertility through webinars, conferences, blogs, and access to research through their website (FACTS, 2022). Although these organizations provide excellent information through online platforms, research reveals the way in which education is delivered is more important than the tools and/or organizations that are utilized (Vila-Candel et al., 2020). Therefore, these organizations should be utilized to increase awareness and literacy; however, careful consideration should be given as to how the information can optimally be delivered.

A variety of educational approaches may be undertaken to increase fertility awareness and health literacy. There are three core skills: functional, interactive, and critical, that have been proven to be most successful when incorporated together. The functional health domain refers to the ability to find and understand information (Roux et al., 2019). AAFP incorporates functional skill in their recommendation by suggesting the utilization of verbal, written, and visual education in a manner that is easily understood by individuals. Information should be presented using bullet points, simple pictures, model, and videos; education is then reinforced using a teach back technique (Nunokawa, 2019).

The next core skill, interactive, relates to the use of personal application and engagement (Roux et al., 2019). This is achieved through personalized face-to-face teaching courses with the addition of interactive, multi-media interaction. Prior studies proved 45-minute educational sessions that included lecture, interactive group discussions, practical exercises, and educational materials most successful (Vila-Candel et al., 2020). These sessions are best provided in person as individuals who received online education were noted to have not maintained the knowledge six months later (Daniluk & Koert, 2015). It is also advantageous to provide in-person education as it allows for small-group discussion which promotes participation and limits embarrassment when discussing individual fertility (Roux et al., 2020).

Lastly, the critical health literacy skill highlights the importance of information appraisal and social awareness (Roux et al., 2019). At the end of every educational session, it is imperative to offer time for questions, confirm understanding, and solicit feedback (Nunokawa, 2019). In summary, there is consensus among researcher that no single intervention will have a great impact on outcomes; rather, a combination of interventions applied at various times across the lifespan are needed to improve the health literacy of women (Vila-Candel et al., 2020). Even a

one-hour educational session on menstrual cycle health has shown to improve menstrual cycle knowledge and change individual attitudes (Kilfoyle et al., 2016). Providing several, multi-dimensional fertility based educational sessions to university students throughout their coursework is thought to revolutionize reproductive health literacy.

Project Setting, Sponsor, Stakeholders, and Participants

The University of Mary, located in Bismarck, ND, serves to meet the religious, academic, and cultural needs of individuals within the region and beyond. This university was, “founded to prepare leaders in the service of Truth . . . and formation of servant leaders with moral courage, global understanding, and commitment to the common good.” Founded in 1959 by Benedictine Sisters, the University of Mary cherishes Christian, Catholic, and Benedictine values.

Reproductive health conversations are challenging both ethically and morally which may result in conflicting views and opinions. At the University of Mary, students are encouraged to seek dialogue between faith and reason while acknowledging proper autonomy of the arts, sciences, and professions. Additionally, professors encourage the free exchange of ideas about faith and convictions as a path to moral integrity and personal holiness (University of Mary, 2022a).

This project aimed to reach University School of Health Science majors; the University of Mary St. Gianna School of Health Sciences (SGSHS) serves as an ethnically based, professionally focused, and nationally recognized project setting. This school was inspired by the patronage of Saint Gianna Beretta Molla with the intent to provide, “an education of excellence for servant leaders who uphold the dignity of human life and will transform health care for everyone at each stage of life (University of Mary, 2022a).” Since this school is dedicated to laying the foundation of virtuous leadership, this is an ideal setting to integrate reproductive health education into the curriculum and affect ovulatory menstrual cycle health literacy.

The Dean of the SGSHS at the University of Mary, Dr. Mary Dockter, agreed to be the project champion: see Appendix A for more details. Dr. Dockter holds a bachelor's degree in physical therapy, PhD in education, and completed a Fellowship in Education Leadership. With Dr. Dockter's exemplary qualifications and her passion for service, she has willingly assisted and provided in project development as well as oversight throughout project implementation and evaluation. Other key stakeholders to this project include the Vice President of Academic Affairs, athletic training staff, and the health professions program directors. These stakeholders are key to this project's success as they have direct contact with university students within the SGSHS. With their direct access to students, they will readily disseminate information about this project and encourage active participation. Furthermore, Dr. Brittany Kudrna who has clinical expertise in fertility awareness as a practicing family nurse practitioner, Marquette Method instructor, and FEMM provider is pivotal to the development and deliverance of this education. These identified individuals are vital to course development, student participation, and the implementation of project recommendations. Finally, students, both male and female, within the SGSHS and the Athletics department are attendees of this project. These attendees will directly receive reproductive health education and thus will be affected by the project's implementation.

Organizational Needs Assessment

Conducting an organizational needs assessment is a crucial step towards initiating quality improvement measures. The overall goal of an organizational needs assessment is to perform a comprehensive analysis that highlights the difference between the organization's current state of being to what could be found in a desired state of being (Moran et al., 2020). An organizational needs assessment conducted in March of 2022 identified a lack of education regarding the

menstrual cycle on campus. Specifically, the SGSHS does not have an elective offering on this topic nor are there any current optional presentations or seminars regarding the menstrual cycle.

Student population admissions data was obtained from the Dean's records and was examined to gain a deeper understanding of the statistics of the target population for this project. The SGSHS is grouped into traditional undergraduate, traditional graduate, online graduate, and online undergraduate students. There are a total of 1,323 students within the SGSHS. Of the total number of students, 79.2% are females. There are 548 traditional undergraduate students and 362 traditional graduate students who are on campus and make up the majority of the grand total which is ideal as the intervention for this project will take place on campus.

SWOT Analysis

The SWOT analysis tool was utilized to help identify the strengths, weaknesses, opportunities, and threats associated with this project. A SWOT analysis assesses both internal and external factors that may influence the project's outcome (Moran et al., 2020). For instance, an example of an internal attribute could be efficient processes put in place at the project setting, while an internal threat could be poor communication among the group members. On the other hand, an example of an external attribute could be the opportunity for collaboration while an external threat could be the withdrawal of funding (Moran et al., 2020). It is important to identify any specific internal and external attributes and threats because neglecting to identify these factors can be devastating to the project outcomes (Moran et al., 2020).

Ultimately, the SWOT analysis helps the project investigators construct a plan on how to best move forward with the project. This strategic plan should include how to maximize or take advantage of the identified strengths and how to minimize or overcome the identified weaknesses or threats (Moran et al., 2020). The SWOT analysis for this project was conducted

by reviewing the SGSHS mission and vision statements, leadership structure, and current elective offerings. Moreover, discussions with the Dean of the SGSHS provided additional insight.

Strengths

There are several identified strengths associated with the implementation of this DNP project. All affiliated members including the leaders, project chairs, and project consultants have a strong dedication to foresee the success of this DNP project. The leaders of this project arise from diverse nursing backgrounds. This diversity allows the leaders to bring unique viewpoints to the project which will assist in achieving optimal outcomes.

This project aligns with the University of Mary's mission to serve the religious, academic, and cultural needs of students (University of Mary, 2022a). At the University of Mary, students receive practical experience and professional training while immersed in the Benedictine values which shapes students into virtuous leaders (University of Mary, 2022b). Providing education on the menstrual cycle to the students of the SGSHA may enhance their ability to practice with moral courage as leaders in healthcare. Additionally, this project may help equip graduates of the SGSHS with the ability to defend the sanctity of life and dignity of the human person.

Moreover, since menstrual cycle health education has not been previously addressed at the SGSHS it is imperative to have input from individuals who have implemented similar education at other universities. Therefore, another strength of this project is the leaders' strong relationship with Anna Halpine, the CEO of the FEMM foundation. The project leaders are also receiving guidance from FEMM ambassadors at Brown University. Furthermore, this project's members are in communication with the research coordinator at FACTS.

Weaknesses

Although this DNP project has the support from the Dean of SGSHS, project chair, and faculty consultants, this is the first execution of a fertility awareness project of its kind at the University of Mary. In addition, practices to promote menstrual cycle health literacy are absent in the educational system today. This education can be seen as unconventional which may have the potential to impede student participation. Furthermore, without appropriate advertising and branding of the menstrual cycle health educational sessions, students may fail to recognize the vast personal health benefits and relevancy to their future careers.

Opportunities

Prioritization of risk includes evaluating opportunity or the probability of positive effects on project outcomes (Reavy, 2016). With the robust support from the Dean of the SGSHS, there is opportunity for this project to be welcomed throughout the university not only by the athletic and health sciences departments, but also by other departments such as catholic studies and student led organizations. In return, this project could reach a larger group of individuals therefore creating a greater good. During the project's organizational needs assessment, it was noted by the Dean of the SGSHS that the University's vision for the future includes incorporating inter-professionalism into the curriculum as elective courses. This project may lay the groundwork for the University of Mary to offer a menstrual cycle education based elective similar to that of Georgetown University School of Medicine who were the pioneers of FACTS (FACTS, 2022). An elective as such would prepare future medical professionals to present their patients with all options, allowing patients to make fully educated decisions based on their needs, lifestyle, and values under the guidance of clinical expertise and medical knowledge (FACTS, 2022).

Individuals receiving this education will enter the workforce after graduation. These professionals can apply what they have learned from this education into their future practices to transform the health care seeking practices and behaviors of their patients. Current literature concerning educating both male and female university students in the manner described is scarce (Shin et al., 2020). This project provides an opportunity for other researchers to utilize what this project uncovers to decrease the knowledge gap and contribute further to the literature. Finally, increasing menstrual cycle health awareness has the opportunity to decrease health care related costs. Chronic conditions such as type 2 diabetes, migraines, cardiovascular disease, cancer, mental health disorders, and infertility may be recognized earlier allowing for prompt intervention and treatment (Kim et al., 2018).

Threats

While performing the SWOT analysis, potential negative effects or threats on the project outcome were considered. Project leaders have considered non-acceptance and/or lack of endorsement by established health science department chairs. These stakeholders are crucial to student engagement as they have the capability to encourage their respective students' participation through incentives such as extra credit or leadership hours. Without acceptance, encouragement, and dissemination from all department chairs including the athletics department, certain students may not have the opportunity to attend the educational session. Additionally, academic workload and associated time demands for both professors and students could hinder eager participation.

As stated previously, this project's outcome relies heavily on the voluntary participation from university students. Without mandated expectations, there is risk that few or no students partake. With minimal participation, the project outcomes will have limited generalizability and

the evaluation of the project's impact may be unreliable based on small population size. In addition, menstrual cycle health education is often perceived as a female dominated topic excluding males from the conversation. Although this project targets both male and female students, there is risk that male students will not find this education applicable and therefore may not attend the educational sessions. Without male participation, the PICO question is inaccurate and project data holds female partiality.

Conclusion

Ovulation has been identified as a key event during the menstrual cycle, signifying reproductive and overall wellness. However, the clinical problem related to reproductive wellness is the widespread low health literacy rate among women of reproductive age, specifically university students (Szucs et al., 2017). The consequences of neglecting to address the clinical problem include the worsening of chronic conditions related to cycle dysfunction (Kim et al., 2018). The main gap identified in the literature is the lack of supporting evidence on the implementation of interventions to improve ovulatory menstrual cycle health literacy specific to university campuses. There are multiple potential solutions to address this gap; however, the most success reported within the literature is through the use of educational sessions incorporating functional, interactive, and critical skills. There is a clear need to implement interventions that are used to promote ovulatory menstrual cycle health education and to support women of reproductive age.

For a DNP project based to be successful, a supportive setting, sponsor, and stakeholders are necessary. As described, the University of Mary SGSHS is an appropriate setting to implement menstrual cycle education as it corresponds with the school's mission to transform healthcare and uphold the dignity of human life. A SWOT analysis helped to create a strategic

plan that capitalizes on identified strengths, addresses the weaknesses, seizes opportunities, and minimizes risks. The strategic plan will aid in decision-making and the viability of the project.

Chapter II: Literature Review and Theoretical Framework

Women of reproductive age are often asked the date of their last menstrual cycle but are rarely questioned about ovulation. Ovulation has been referred to as the fifth vital sign; however, research has shown that women lack the knowledge to identify whether ovulation has occurred (U.S. Department of Health and Human Services, 2021). Furthermore, few women are aware of how ovulation affects their reproductive health and overall well-being (Vigil et al., 2012). To fully understand the impact of fertility awareness and education among women of reproductive age, a thorough literature review was conducted to identify the most current strategies to support an evidence-based question.

PICO Question

A PICO question identifies the Population, Issue of Interest, Comparison Intervention, and outcome of the study; this is an essential step in the process of an evidence-based project. To generate a PICO question, a clinical problem must be identified and described in an answerable fashion (Melnik & Fineout-Overholt, 2019). Questions are asked in the PICO format to “yield the most relevant and best evidence from a search of the existing literature” (Melnik & Fineout-Overholt, 2019, p. 17). The PICO question for this project is as follows: Among the St. Gianna School of Health Sciences, how is student development impacted by implementation of a menstrual cycle health curriculum as compared to current practices?

Literature Search Process

Reliable and accurate external evidence is needed to inform an evidence-based quality improvement project. The databases that were used to find information regarding the topic of fertility awareness include Academic Search Premier and The Cumulative Index to Nursing and Allied Health Literature (CINAHL). When searching the literature, it is essential to use major

search strategies, such as keyword searching, to ensure that the best evidence is not overlooked (Melnik & Fineout-Overholt, 2019). The keywords that were selected for this project as outlined in Table 1 include fertility awareness, fertility education, reproductive health, ovulation health, menstrual cycle health, and university women's health.

The searches in CINAHL were limited by selecting English language articles and human research studies only. All age groups were included in the search to generate a larger database of articles; however, only relevant populations (i.e. reproductive age) were considered during article selection. Additionally, only citations that were published within the last ten years were included in the search. The searches in Academic Search Premier were limited by English language articles and articles published in the last ten years as this search engine has less limiters available. The number of hits generated based on the search terms used in each database is outlined in Table 1.

Table 1

Literature Search Table

CINAHL	Subject Heading Search	Search Results	Limits	Total	Total articles reviewed	Total articles included excluding duplicates
1	Fertility Awareness	217	English; Human, published last 10 years; All age groups	95	95	1
2	Fertility Education	240	English; Human, published last 10 years; All age groups	126	120	1
3	Reproductive health	17,199	English; Human, published last 10	6,127	150	4

4	Ovulation health	16	years; All age groups English; Human, published last 10 years; All age groups	5	5	0
5	Menstrual cycle health	65	English; Human, published last 10 years; All age groups	40	40	2
6	University women's health	181	English; Human, published last 10 years; All age groups	60	60	1
7	1 and 3	134	English; Human, published last 10 years; All age groups	29	29	2
8	2 and 6	15	English; Human, published last 10 years; All age groups	12	12	1
Academic Search Premier 1	Subject Heading Search Fertility awareness	Search Results 300	Limits English; published last 10 years	Total 236	Total Articles Reviewed 175	Total articles included excluding duplicates 2
2	Menstrual cycle health	93	English; published last 10 years	93	93	1
3	Fertility education	629	English; published	369	250	0

4	University women's health	201	last 10 years English; published last 10 years	154	154	1
5	1 and 4	24	English; published last 10 years	16	16	2
6	1 and 3	34	English; published last 10 years	29	29	0
Totals		19,348		7,391	1,228	18

Literature Appraisal

A hierarchy of evidence should always be considered when performing a literature synthesis as higher levels of evidence have less risk of bias and are more generalizable (Melnik & Fineout-Overholt, 2019). Generalizability applies to a broader group of people, meaning that these studies are more likely to provide reliable answers to a specific clinical question. References from multiple levels across the hierarchy pyramid developed by Melnik & Fineout-Overholt (2019) were chosen to inform this project as evidenced by Table 2. The hierarchy of evidence pyramid from Melnik and Fineout-Overholt is a visual representation of the strength of different types of evidence, with the most robust evidence at the top of the pyramid and the weakest evidence at the bottom. The pyramid is divided into five levels, with level one representing the strongest evidence and level 5 representing the weakest evidence. This hierarchy model is credible as it is based on a rigorous and evidence-based approach to evaluating the strength of different types of evidence (Melnik and Fineout-Overholt, 2019). The pyramid has since been widely adopted as a framework for evaluating the strength of evidence across a range

of fields, including healthcare, social sciences, and education. By using this pyramid, practitioners and researchers can ensure that they are using the most robust and reliable evidence available to inform their practice and decision-making (Melnik & Fineout-Overholt, 2019). The different types of studies in this synthesis include but are not limited to a randomized controlled trial, retrospective analysis, quasi-experimental and a comparative study. The inclusion of high levels of evidence in the literature synthesis provides confidence that the intervention will generate a consistent outcome (2019).

Table 2*Literature Matrix Grid*

Reference	Purpose/ problem/ objective/ aim	Study design	Sample (setting)	Data collection/ measures	Analysis/ outcomes	Strengths/ limitations	Study quality	Level of evidence
Başar, F., Yavuz, B., & Yeşildere Sağlam, H. (2021). Evaluation of the effectiveness of reproductive health education for adolescents The Journal of Pediatric Research, 8(4), 469–478. https://doi.org/10.4274/jpr.galenos.2021.99266	To determine the effectiveness of reproductive health education for adolescents	Quasi- experi- mental	196 students	Personal information form, reproductive health information form, and distribution of training booklet entitled "Reproductive Health"	SPSS with parametric tests, chi-square test, and t-test / students who participated in reproductive education had a higher mean knowledge score for reproductive health concluding that reproductive health education is effective	The strength of this study is the effectiveness of the implemented reproductive health education for adolescents will provide important contributions to literature. This study was limited by the inability for randomization by sample selection. Additionally, the study was conducted in one city limiting generalizability and was only seven weeks in duration limiting sustainability	Moderate	III

Berglund Scherwitzl, E., Gemzell Danielsson, K., Sellberg, J. A., & Scherwitzl, R. (2016). Fertility awareness-based mobile application for contraception. The European Journal of Contraception & Reproductive Health Care, 21(3), 234–241. https://doi.org/10.3109/13625187.2016.1154143	Evaluate the effectiveness of a fertility awareness-based method supported by a mobile-based application to prevent unwanted pregnancies as a method of natural birth control	Retrospective analysis	4054 women participated; 1233 completed the survey	Input of basal body temperature recordings, date of menstruation, and LH results into a mobile based application known as Natural Cycles	Pearl Index, life-table analysis, and Kaplan-Meier estimator / Study concludes that mobile applications improve effectiveness of fertility awareness-based methods and can be used to prevent pregnancies	The strength of this study was the ability to detect pregnancy status directly through the application creating a lower recall bias. Limitations include length of study. Being the study ended in less than 5 months the average number of cycles per user was low. The population was limited to ages 20-35 which makes this study irrelevant to other age groups like teenagers.	Moderate	III
Boivin, J., Sandhu, A., Brian, K., & Harrison, C. (2019). Fertility-related knowledge and perceptions of fertility education among adolescents and	To examine fertility knowledge and perceptions of a fertility educational brochure among young people	Qualitative study	19 adolescents, 14 emerging adults (mean age < 24 years)	Focus group discussion guide, and prompts on perceptions of provided fertility education brochure "A guide to Fertility."	Digital recordings were transcribed for analysis, themes extracted using inductive coding and discussed between two researchers, illustrative quotes were used. Comparing age groups showed adolescents lacked	Strengths include utilizing comparison groups between ages and need for specific fertility education to different age groups. Limitations include convenience sampling from diverse sources, one of the focus groups was not	Low	V

emerging adults: a qualitative study. Human Fertility, 22(4), 291-299. https://doi-org.ezproxy.umary.edu/10.1080/14647273.2018.1486514					confidence in fertility knowledge and emerging adults referred to gender and family planning	recorded, technical error		
Chawłowska, E., Lipiak, A., Kryzysztoszek, J., Krupa, B., & Staszewski, R. (2020). Reproductive health literacy and fertility awareness among polish female students. Frontiers in Public Health, 8, 499. https://doi.org/10.3389/fpubh.2020.00499	Explore reproductive health knowledge among Polish female university students	Cross-sectional	456 women aged 18-29, students of higher educational institutions and from rural/urban areas throughout Poland	Survey, interviewed face to face with use of self-developed questionnaire, assessing knowledge of female and male fertility-related physiology and fertility patterns.	General knowledge of the respondents was rated as average, higher levels in women, people of higher education, those having difficulty conceiving, and planned pregnancies. High-quality, equitable, and widely available health education is necessary for making informed choices	Strengths include assessing fertility knowledge in university students, with large sample size. Limitations include lack of standardized questionnaire and use of a convenient sample.	Low	V

Daniluk, J. C, & Koert, E. (2015). Fertility awareness online: The efficacy of a fertility education website in increasing knowledge and changing fertility beliefs. <i>Human Reproduction</i> , 30(20), 353-363. https://doi.org/10.1093/humrep/deu328	Evaluate the effectiveness of an online approach to fertility education	Cross-sectional	199 childless participants, ages 18-35, 151 women, 48 men, and majority well-educated having completed College/University	Completed sections of “Fertility Awareness Survey,” prior to, and after reading 10 posts from a fertility website. Questions assessed general fertility knowledge	Paired t-tests conducted on pre-post scores of sample to determine if significant differences in beliefs/knowledge scores based on demographic factors. Participant fertility and ART knowledge and confidence significantly improved after intervention	The limitations of the study include a relatively small sample size and recruitment method utilized.	Low	V
Derbyshire, E., & Dancey D. (2013). Smartphone medical applications for women’s health: What is the evidence-base and feedback? <i>International Journal of Telemedicine</i>	Evaluate if smartphone technology use is effective in improving aspects of women’s health and improved health awareness	Systematic review	276 articles were identified and of those 15 meeting eligibility criteria. Inclusion criteria were studies	Literature review was conducted based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Medline and Web of Knowledge databases were searched utilizing human studies from years 1983 to 2013	The number of mobile applications for women’s health is increasing, but there is a greater need for personalized apps. Women tend to seek apps that are user friendly, motivational and evidence-based.	Limitations include small number of articles that met eligibility criteria and focused solely on women’s health	Moderate	III

<i>and Applications</i> , 782074. https://doi.org/10.1155/2013/78074			use of mobile devices, randomized trial, and full-paper access	and limited to studies with key words including: women, weight, diabetes, heart disease, osteoporosis, bone health, breast cancer, nutrition, diet, depression, mental health, pregnancy in combination with smartphone key words				
Ford, E. A., Roman, S. D., McLaughlin, E. A., Beckett, E. L., & Sutherland, J. M. (2020). The association between reproductive health smartphone applications and fertility knowledge of Australian women. <i>BMC Women's Health</i> , 20(1).	Determine the differences between fertility knowledge, based on the use of female reproductive health apps, via an anonymous online survey of Australian women	Comparative study	673 respondents	Online survey, questions regarding general fertility and related factors (age, cyclic fertility, smoking, obesity, miscarriage rate, assisted reproductive technologies), survey was open from March - June of 2018 and advertised on social media, comparison between users and non-app users	Nominal logistic regression was used for multivariable models. The majority of respondents were of reproductive age, and completed a tertiary degree. Approximately forty-percent are smartphone app users. Results demonstrated a significant association between knowledge and app use.	Strength is study provided preliminary evidence for association between fertility knowledge and reproductive health app use. Limitation includes potential response bias occurring due to large proportion of women in survey cohort who used menstrual cycle tracking as a function in their reproductive app,	High	II

https://doi.org/10.1186/s12905-020-00912-y								
Hampton, K., Newton, J., Parker, R., & Mazza, D. (2015). A qualitative study of the barriers and enablers to fertility awareness education in general practice. <i>Journal of Advanced Nursing</i> , 72(7), 1541-1551.	To understand the barriers and enablers to fertility awareness education in general practice. No current in-depth studies have examined the challenges of fertility awareness education in general practice.	Descriptive exploratory qualitative study using deductive content analysis	31 participants. 11 general practitioners and 20 practical nurses in Australia were included in this study.	Phone interviews and focus groups were conducted by the same facilitator using the same schedule of questions. Phone interviews were 20 minutes and focus groups were 90 minutes. Participants were given a \$75 gift card for their time.	Consistent findings included that a lack of time, patient education materials, and remuneration were the main barriers to providing fertility awareness education in general practice. Another barrier was the lack of provider skills or education.	This study included a relatively small sample size from only one state in Australia which could reduce the transferability of the findings. Strengths include that the study included practices with high immigrant and indigenous populations and there was a general agreement among the participants about the main barriers to providing fertility awareness education.	Low	V
Kilfoyle, K. A., Vitko, M., O'Connor R., & Bailey, S. C. (2016). Health literacy and women's reproductive health: A	Systemically identify, investigate, and summarize research on the relationship between	Systematic Review	34 articles reviewed	Data abstracted from selected articles by two study authors using standardized form assessing study design, population, measures, and findings. Quality assessments by	Health literacy is related to reproductive health knowledge from contraception, fertility, prenatal screening, STIs, obstetric health behaviors, and	Study offers strong insight on the relationship between health literacy, reproductive knowledge, and behaviors. Limitations include small sample sizes that fail to	High	I

systematic review. Journal of Women's Health (2002), 25(12), 1237-1255. https://doi.org/10.1089/jwh.2016.5810	health literacy and reproductive health knowledge, behaviors, and outcomes in developed countries			guidelines from Agency for Healthcare Research and Quality (AHRQ) and rated by definition of good, fair, or poor.	postpartum depression. Tailored educational materials can increase understanding of reproductive health topics for patients of limited and adequate health literacy	represent the general population and to evaluate clinical outcomes.		
Kim, T., Nam, G., Han, B., Cho, S., Kim, J., Eum, D., Lee, S., Min, S., Lee, W., Han, K., & Park, Y. (2018). Associations of mental health and sleep duration with menstrual cycle irregularity: A population-based study. Archives of Women's Mental Health, 21(6), 619–626. https://doi.org/10.1007/s00737-018-0872-8	Examine whether the characteristics of mental health and sleep duration, alone or in combination, are associated with menstrual cycle irregularity	Population-based, cross-sectional study	4,445 women aged 19-49	Questionnaires with questions regarding menstrual cycle regularity, psychological stress, depressive mood, and suicidal ideation	Hierarchical multivariable logistic regression analysis / found a positive association of mental health problems and short sleep duration with menstrual cycle irregularity	Strengths of this study are large population size and controlled diverse confounding variables. Furthermore, the study explored the association of the concomitant presence of mental health problems and sleep duration. Limitations include recall bias, simple questionnaires were used instead of validated tools to measure irregularities, and time frame difference across the measurement of each variable.	High	II

Kwak, Y., Kim, Y., & Baek, K, A. (2019). Prevalence of irregular menstruation according to socioeconomic status: A population-based nationwide cross-sectional study. <i>PloS one</i> , 14(3), e0214071. https://doi.org/10.1371/journal.pone.0214071	Examine the prevalence of irregular menstruation by socioeconomic status among South Korean women.	Cross-sectional study	4,709 adult South Korean women, ages 19-54 years	Secondary analyses of data from the Korea National Health and Nutrition Examination Survey (KNHANES V) to evaluate health and nutritional status of Koreans. Staged-clustered probability design was conducted for sampling	Lower educational attainment was associated with higher likelihood of irregular menstruation, and differences based on spousal status, BMI, smoking status, stress status, age at menarches, and childbirth status	The study offers specific analysis of the association between irregular menstruation and socioeconomic status. Weaknesses of study include indeterminated causal relationships, uncontrolled confounding results, and an unclear definition of irregular menstruation	Low	V
Maeda, E., Miyata, A., Boivin, J., Nomura, K., Kumazawa, Y., Shirasawa, H., Saito, H., & Terada, Y. (2020). Promoting fertility awareness and preconception health using a	Evaluate whether a chatbot that provides fertility and preconception health education changes the knowledge levels, health-related intentions	Randomized control trial	927 women, aged 20-34	Participants allocated into three groups: a fertility education chatbot, a document about fertility and preconception health, or a document about an irrelevant topic. Repeated measure analysis of variance assessed fertility	Significant fertility knowledge gains after intervention in the intervention group. Post-test state anxiety scores were lower in the intervention group. Overall, providing fertility education using a chatbot improved fertility knowledge.	Limitation includes use of social research panels may have caused selection bias associated with higher education	High	II

chatbot: A randomized controlled trial. Reproductive Biomedicine Online, 41(6), 1133-1143.	and psychological states amongst reproductive-aged users			knowledge of participants				
Mu, Q., Hanson, L., Hoelzle, J., & Fehring, R. (2019). Young women's knowledge about fertility and their fertility health risk factors. College of Nursing Faculty Research and Publications, 598. https://epublications.marquette.edu/nursing_fac/598	The purpose of this study was to explore the relationships among women's demographic characteristics, their self-perceived and actual knowledge about fertility, and their fertility health risk factors	Quantitative, cross-sectional study	Women between the ages of 18 and 24 years (N= 342)	An online questionnaire consisting of 81 questions on participant demographics and knowledge about fertility was used to collect data	Multiple linear regression was used to analyze data. Study found that participants' self-perceived knowledge and actual knowledge about fertility and their methods of contraception were significantly associated with their fertility health risks. Those who had higher scores of knowledge about fertility and used fertility awareness methods had less self-reported fertility health risk factors	One limitation is that the study included mainly participants who were Caucasian with some form of college education, so results may not be generalizable to women of diverse ethnic or racial backgrounds.	Low	V

Roberts, L., Kudesia, R., Zhao, H., Dolan, S., & Rose, M. (2020). A cross-sectional survey of fertility knowledge in obstetrics and gynecology residents. <i>Fertility Research and Practice</i> , 6(22). https://doi.org/10.1186/s40738-020-00091-2	To evaluate fertility knowledge among current Obstetrics and Gynecology residents using the Fertility and Infertility Treatment Knowledge core (FIT-KS)	Cross-sectional study	177 OB-GYN residents in the United States, ages 26-30, a majority female	OB-GYN residents were recruited through an email to all resident coordinators nationwide that included a questionnaire with the FIT-KS instrument	Statistical analysis was performed to verify variances were equal across the samples. The FIT-KS was calculated by dividing number of questions answered correctly and total number of questions. Significant gaps remain in fertility knowledge among residents, and knowledge does not change throughout residency training	The study provided a newly validated survey, and avoided negative reporting bias. Several limitations are identified such as poor response rate, and small over-representation of women.	Low	V
Shin, H., Lee, J., Kim, S., & Jo, M. (2020). Attitudes towards parenthood and fertility awareness in female and male university students in south Korea. <i>Child Health Nursing Research</i> , 26(3), 329–337. https://doi.org/10.1186/s40738-020-00091-2	To investigate intentions and attitudes towards future parenthood and awareness of fertility among university students	Questionnaire based study with cross-sectional and descriptive design	166 students enrolled in bachelor's degree program of study between ages 18-30	Completion of survey in a classroom or in a place with privacy near the classroom	Descriptive statistics based on parenthood and awareness of fertility in female and male students / Male and female university students lack sufficient awareness of fertility and fertility awareness needs to be included and accurate information regarding fertility should be provided	A strength of this study is that it can provide a basis for providing greater resources for younger adults. Study is limited by generalizability and some participants indicating they were too young to consider becoming a parent.	High	II

0.4094/chnr.202 0.26.3.329								
Szucs, M., Bito, T., Csikos, C., Szollosi, A., Furau, C., Blidaru, I., Kapamadzija, A., Sedlecky, K., & Bartfai, G. (2017). Knowledge and attitudes of female university students on menstrual cycle and contraception. Journal of Obstetrics and Gynecology, 37(2), 210-214. evaluation of	To evaluate the knowledge of female university students about the fertile period within a menstrual cycle, their opinion on the important of menstruation in regard to their health and their attitudes related to contraception	Questionnaire based qualitative research study	2,572 female university students from Romania, Serbia, and Hungary.	The questionnaire consisted of 33 questions. It was completed by the female student during class time after they were given background information about the purpose of the study.	More than 69% of the university students believe that menstruation is a necessary component of health. Moreover, the authors of this study concluded that the general knowledge on the menstrual cycle should be increased.	One limitation of this study is the diverse response rate that results from the questionnaire methodology. Since the questionnaire involved sensitive questions, there were missing values in some areas of the data.	Low	V

Vila-Candel, R., Martinez-Arnau, F., de la Camara-de las Heras, J., Castro-Sanchez, E., & Perez-Ros, P. (2020). Interventions to improve health among reproductive-age women of low health literacy: A systematic review. <i>International Journal of Environmental Research and Public Health</i> , 17(20), 7405. https://doi.org/10.3390/ijerph17207405	To investigate health care promotion interventions and examine their effectiveness on women with inadequate health literacy (HL) through a systematic review of randomized controlled trials (RCT)	Systematic review	Total of 6 articles were included for review out of 292 records identified	Systematic review conducted between October to November 2019, utilizing the Cochrane Handbook for Systematic Reviews of Interventions. Studies were identified from databases, and data extracted by primary and secondary reviewers	Health literacy is a significant factor in women's self-efficacy and optimal care. Interventions should aim to benefit and improve health literacy and allow women to make decisions pertinent about their health.	The study highlights review presented research designs however, lack studies related to public health issues.	High	I
Vizeh, M., Muhidin, S., Moghadam, Z. & Zareian, A. (2021). Women empowerment in reproductive health: A	To introduce, critically appraise, and summarize the quality of the women's empowerment's	Literature review	Fifteen studies included from 5234 identified, utilizing a	A comprehensive literature search was conducted, using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines in	All studies utilized a standardized measure, each scale ranging from 8 to 23. The most common domains assessed were decision-making, freedom of	Studies achieved moderate or high quality meaning validated scales and appropriate methodology for the literature review. Limitation includes	High	I

systematic review of measurement properties. <i>BMC Women's Health</i> . https://doi.org/10.1186/s12905-021-01566-0	measurement properties in sexual and reproductive health		standardized measure	September 2020. Inclusion criteria were related to adoption of existing scales of women empowerment scales in sexual and reproductive health.	coercion, and communication with the partner. Nine of the fifteen studies proved content validity.	potential publication bias as inclusion criteria considered peer-reviewed article.		
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Literature Synthesis

To answer the evidence-based question, a consolidative review of literature was performed. This review laid the foundation to inform the PICO question. In a review of literature, common themes that were discovered include information regarding technology used to deliver fertility awareness education, health benefits of ovulation, and lack of knowledge among women, especially university students. No controversies were identified within the literature, as there was a consensus among authors regarding the benefits of fertility awareness education. The current lack of fertility awareness education being provided to women results in a limited understanding of fertility and inhibits well-educated decision making regarding reproductive health throughout reproductive years.

Online Applications

Dissemination of menstrual cycle education information is imperative, and it must be delivered in a way that is highly accessible and likely to be received by women. A literature review revealed that 99% of 18–29-year-old women possess a smartphone, making this an ideal avenue for the distribution of menstrual cycle education (Ford et al., 2020). Today, smartphones are the most accessible mixed-model communication with higher online growth than personal computers (Ford et al., 2020). Additionally, women feel more comfortable receiving counseling and information from a new technology such as mobile applications over conventional methods like brochures (Maeda et al., 2020). Women's reproductive health applications currently account for seven percent of all healthcare related applications providing women the opportunity to readily monitor their reproductive health (Ford et al., 2020).

There are many advantages of utilizing online applications for women's reproductive health such as cost effectiveness, reduction in human error, and informed conversations with

healthcare providers. A recent study found that women identified many reasons for tracking menstruation using apps; one of those reasons being the ability to engage in informed conversation with health care providers (Ford et al., 2020; Scherwitzl et al., 2016). Reproductive health applications allow the patient to give their provider accurate objective data about their menstrual cycle without having to rely on memory which results in a more individualized management plan.

Maeda et al. (2020) found that women who used technology to learn about fertility significantly increased their fertility knowledge and modified their intentions to optimize their preconception health immediately after being exposed to the information as compared to women who learned from traditional materials (Maeda et al., 2020). Application users were more likely to be younger, typically ages 18-24, and reported usefulness and benefit from the health or medical-type apps utilized (Ford et al., 2020). In addition, women who used reproductive health apps were more likely to be knowledgeable and correctly identify the most fertile time in the menstrual cycle compared to non-application users. However, regardless of application use, women's fertility knowledge is still mediocre which indicates the need for further education (Ford et al., 2020).

Health Benefits

Menstrual cycle irregularity is a problem that up to 25% of women face worldwide (Kim et al., 2018). In addition to monitoring the menstrual cycle, research reveals that ovulation is a key indicator of health that every woman should be monitoring (Vigil et al., 2012). Women who monitor ovulation can identify fertility and in return possibly detect ovulatory or gynecological dysfunction that may occur at any point in their lifetime (Vigil et al., 2012). There are a multitude of health benefits to being aware of one's fertility; this includes early detection and

intervention of ovulatory and menstrual dysfunctions, accurate diagnosis of mental health conditions, and disturbances such as endocrine and metabolic disorders.

One of the benefits of menstrual cycle awareness is early detection and intervention. Research demonstrates that young women who are taught to keep a record of their fertility and infertility signals can detect ovarian dysfunctions in their early stages. Women who identify dysfunction will seek medical attention early, which is crucial in the prevention of several chronic diseases (Vigil et al., 2012). Recognizing and treating chronic diseases early serves as fertility preservation and limits the development of associated diseases like Type 2 diabetes, cardiovascular disease, migraine headache, breast cancer, ovarian cancer, and infertility (Kim et al., 2018).

Menstrual cycle awareness is typically seen as a method used for achieving or preventing pregnancy however, many overlook its benefits in identifying chronic conditions associated with ovulatory dysfunction. As endocrine and metabolic disorders are the most frequent cause of ovulatory dysfunction, irregular cycles and abnormal cervical mucus patterns should be addressed (Vigil et al., 2012). The majority of disturbances are endocrine related such as hypothalamic, hypophyseal, adrenal and/or ovarian, thyroid disorders, and inflammatory processes.

Investigating menstrual patterns and presence of ovulation in women of reproductive age who have complaints of insomnia and/or mental health concerns is often overlooked or forgotten. Menstrual disturbances are linked to sleep disorders like insomnia and are often accompanied by mental health conditions (Kim et al., 2018). A lack of provider and/or patient education regarding fertility may lead to a misdiagnosis of a mental health condition. Many studies have found a positive correlation between irregular menstrual cycles and psychological stress (i.e.

depression, anxiety, and suicide attempts) (Kim et al., 2018). Having a deeper understanding of this connection might prompt further investigation into the relationship between mental health, sleep disturbances, and menstrual cycle regularity (Kim et al., 2018).

Knowledge of University Students

In the last decade, 75% of females ages 15-34 have completed a bachelor's degree (Szucs et al., 2017). As a large portion of women within reproductive age can be found on university campuses, assessing menstrual cycle awareness and providing necessary education among this population is critical in helping women make informed reproductive decisions. There is a clear need for more menstrual cycle health education among this population because it is estimated that only 38% of women can identify fertility (Szucs et al., 2017). Moreover, a study conducted by Szucs et al. (2017) revealed that 60% to 75% of university students believed that it is necessary to have a regular menstruation pattern to be healthy; however, many identified that they did not know the reasoning behind this or how to identify an irregular cycle. Additionally, surveyed males and females indicated they would like to have children in the future but were unable to identify signs of infertility. University students are considered prospective parents but show a clear lack of knowledge as to how fertility monitoring helps develop self-identify, mature emotionally, and build intimacy with their partner (Shin et al., 2020).

There are various barriers to educating young adults such as the inability to access services, embarrassment, stigma, lack of tolerance, and negative attitudes/behaviors when faced with reproductive problems. These obstacles often lead individuals to seek inaccurate information through informal means (i.e. media, internet, friends), increasing risky sexual behaviors and the under detection of reproductive health disorders. Thus, increasing knowledge

of reproductive health among university students will lead to improved health outcomes and positive attitudes in terms of fertility (Basar et al., 2021).

There is an eagerness for more education about menstruation, ovulation, and fertility awareness among adolescents and young adults. In a quasi-experimental study, participants reported they desired counseling on reproductive and sexual health at their school or within health institutions (Basar et al., 2021). When this education is provided in school curriculum, adolescents reported increased knowledge of reproductive health and a decrease in reproductive health problems when compared to those who did not receive this education. Boivin et al. (2018) also examined the knowledge of young people who were provided with a menstrual cycle health education brochure and their awareness of menstrual cycle health. As adolescents and emerging adults were shown to have poor knowledge of menstrual cycle health, the participants had several perceived benefits to the education provided. Learning new information and reinforcing vaguely known content with the use of a brochure increased awareness of menstrual cycle health, comfort on the subject, and assisted in informed reproductive health decisions (Boivin et al., 2018).

Theory Overview

Theory is inextricably linked in the way nursing knowledge is developed and used. For this reason, project leaders sought to identify an appropriate theory to guide the DNP project. In choosing a theory, it was essential to identify one that would serve to describe, explain, predict, and/or control the defined phenomenon (Peterson & Bredow, 2017). Furthermore, advanced practice nurses who utilize nursing theory, “achieve higher quality in their care while simultaneously elevating nursing’s professional standards, accountability, and autonomy” (Zaccagnini, & Pechacek, 2021, p.12) Leaders of this project identified The Conceptual

Framework for Reproductive Empowerment, (CFRE) to postulate structure and direction of the DNP project.

The International Center for Research on Women (ICRW) developed the CFRE in 2018 with a goal to clarify reproductive empowerment and to provide evidence for program development that enhances reproductive empowerment thereby improving the lives of women, men, and their families (ICRW & MEASURE Evaluation, 2018). ICRW has defined reproductive empowerment as:

both a transformative process and an outcome, whereby individuals explain their capacity to make informed decisions about their reproductive lives, amplify their ability to participate meaningfully in public and private discussions related to sexuality, reproductive health and fertility, and act on their preference to achieve desired reproductive outcomes, free from violence, retribution, or fear (Edmeades et al., 2018, p. 2).

Although the CFRE was recently developed, authors used decades of in-depth thoughts about empowerment and reproductive rights literature across diverse economic, sociology, anthropology, demography, and public health settings. In the past, women's empowerment and reproductive rights has been disproportioned when compared to men; however, this framework was intentionally designed to be applicable to any group or individuals whom reproductive behavior is of importance regardless of gender or sex (ICRW & MEASURE Evaluation, 2018). CFRE focuses on an individual's ability to express their desire for childbearing, participate in meaningful conversations, engage in shared decision making, and shape desired outcomes related to reproductive health with their partner, provider, and peers (Edmeades et al., 2018).

Fundamentally, reproductive empowerment is an individual concept but the way in which is it expressed is dependent on relationships at multiple levels that interact with each other. The CFRE has six key components, depicted in figure 1, that comprise reproductive empowerment and distinguish it from other models of empowerment (Edmeades et al., 2018).

1. Agency, including the critical elements of voice, choice, and power;
2. Individuals as embedded in a wide range of social structure, including friends, family, and state;
3. Agency and empowerment as inherently relational concepts, experience and expressed in relationships at different social levels;
4. Empowerment as a process that fluctuates over the life course, as individuals pass through various life stages;
5. Resources as enabling factors' that act as catalysts for empowerment within specific relationships; and
6. The expression of reproductive agent in three keyways: SRH decision-making, leadership, and collective action

(Edmeades et al., 2018)

The outer circle of the CFRE encompasses agency and is depicted as three interrelated processes: voice, choice, and power. Agency refers to an individual's aptitude to make deliberate choices with their reproductive preferences in mind. Agency acts as the "mediator" between individual desires for their reproductive lives and the capability of achieving those desires through utilizing voice, choice, and power (ICRW & MEASURE Evaluation, 2018). Voice is the ability to articulate opinions, thoughts, and desires whether in a public space with health care providers for example or privately in interpersonal relationships. Utilizing voice gives

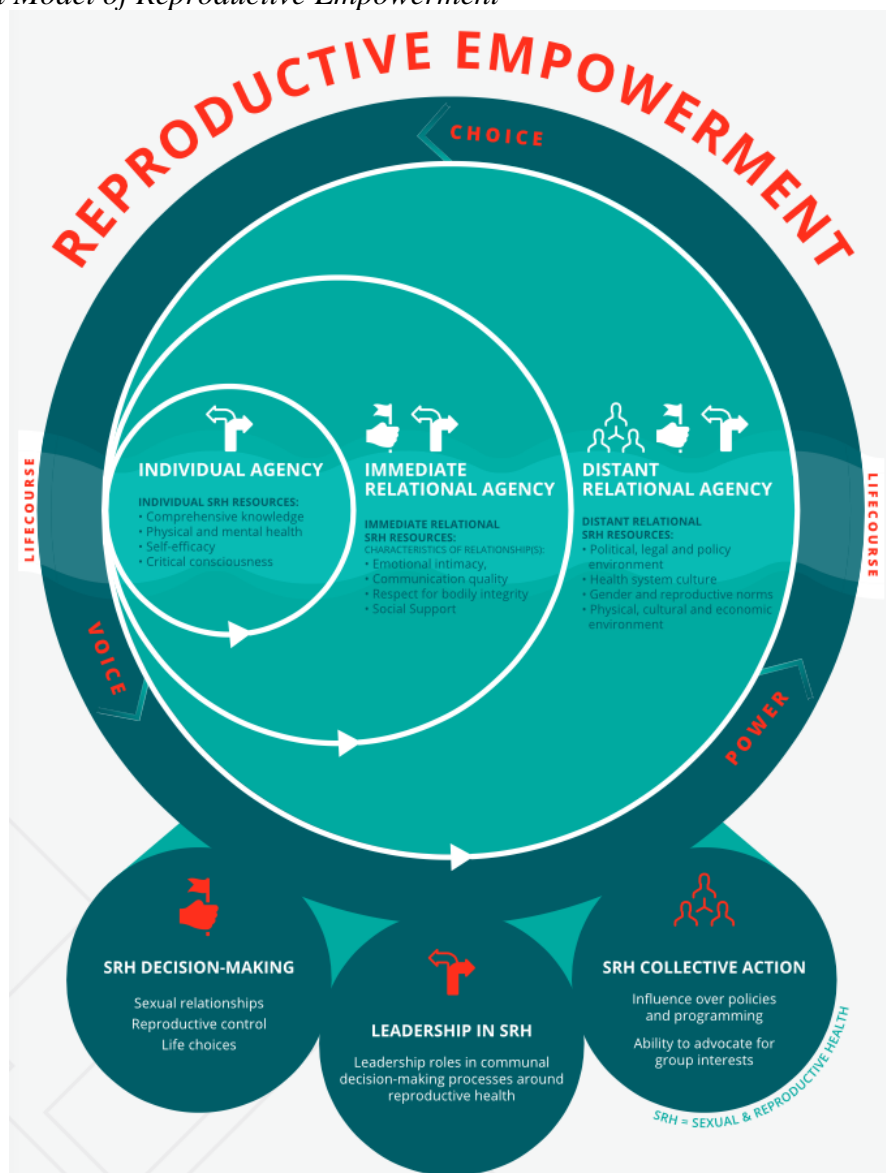
individuals the ability to advocate for their reproductive health (Edmeades et al., 2018). Choice refers to an individual's ability to make reproductive health decisions. This can be constrained by lack of viable alternatives and/or social, economic, and emotional costs. Lastly, power reflects influence from others. Influence can present as the application of social, economic, emotional, or physical force (Edmeades et al., 2018). Because power is present in all social interactions, it is a crucial enabler to both voice and choice.

CFRE inner circle visually portrays an empowered individual having agency at three distinct levels. The first level, individual agency, is defined as a person being able to define what their reproductive goals and desires are and thereby being able to develop a plan to pursue those goals. Secondly, empowered individuals have the ability to exercise their right to choice and voice in regard to their reproductive desires with those close to them (i.e. family members, spouse, partner), this is immediate relational agency. Finally, distant relational agency, is the ability to exert voice, choice, and power outside of immediate relationships. This refers to an individual feeling empowered when discussion reproductive health with the health care providers, political leaders, or institutions (Edmeades et al., 2018).

The CFRE has three circles at the bottom of the framework that focuses on the expression of agency. The first circle is decision-making; this is the ability of an individual to make decisions either in private or public spheres and individually or collectively that are meaningfully to both themselves and others specific to the relationship. Leadership, the second circle, can either be formal or informal, private, or public, and individual or collective. Leadership creates a space that challenges power and expands choice. Finally collective action does what is impossible to achieve alone by exciting current structures to expand the degree of choice (Edmeades et al., 2018).

Lastly, the “life course” wave is easily overlooked yet critically important. This wave exemplifies that empowerment is a dynamic, changing process that is experienced across the reproductive life span. Power and voice can be negotiated and renegotiated throughout life. This then shapes choice in different ways allowing for either greater or lesser levels of empowerment. The degree of reproductive empowerment can also vary by different factors like age and family formation (Edmeades et al., 2018). Therefore, CFRE is based on an understanding that empowerment is, “a multilevel, dynamic process that connects individuals, couples, households, communities, and systemic/structural actors throughout a network of relationships and interactions” (ICRW & MEASURE Evaluation, 2018, p. 11).

Figure 1
A Conceptual Model of Reproductive Empowerment



Adapted from *A Conceptual Framework for Reproductive Empowerment: Empowering Individuals and Couples to Improve their Health* (p.2), by J. Edmeades, L. Hinson, M. Sebaby, & L. Murithi. Copyright 2018 by International Center for Research on Women

Theory/Clinical Fit

Both men and women experience few events more consequential than those tied to reproduction. Project leaders feel that the CFRE aligns seamlessly with this project due its focus on addressing informed reproductive health decision making, providing education on menstrual

cycle health, and the right to access appropriate health care services (Edmeades et al., 2018). Additionally, this theory was intentionally chosen because of its inclusion of all gender identities and sexual orientations. The model design provides project leaders with an understanding of how agency impacts individual empowerment as well as how voice, choice, and power influence multi-level relationships. With a primary focus on reproductive empowerment, the use of CFRE will assist leaders of this project in examining individual, immediate, and distant relational agency and its effect on sexual and reproductive health decision making, leadership, and collective action (ICRW & MEASURE Evaluation, 2018). Furthermore, ICRW's theory will help tailor interventions to meet the unique needs of both men and women by recognizing reproductive empowerment is a dynamic process that changes over the reproductive life course (Edmeades et al., 2018). This theory was identified and utilized to help project leaders encourage reproductive empowerment, remove perceived barriers, and foster self-efficacy.

Theory Evaluation

There are a plethora of models, frameworks, and theories that can be used to guide nursing research. However, without critical evaluation and analysis of the selected theory, the applicability and utility of the identified theory may hinder rather than guide the DNP project. When appraising a theory, Peterson & Bredow (2020) state the design and intention of the theory must be compatible with the project. To evaluate the appropriateness of the CFRE to this project, the following subsections will explore theory operationalization, application, performance, relationship, congruence, and tools that are pertinent to the clinical problem.

Theory Operationalization

The CFRE heavily focuses on what reproductive empowerment is and the development of greater methods to measure it (Edmeades et al., 2018). This framework provides a precise

definition of reproductive empowerment whereas traditional theories of empowerment are poorly conceptualized and vary considerably on whether empowerment is process or an outcome (Spencer, 2014). The CFRE model emphasizes the critical elements of voice, choice and power in the influence of reproductive behaviors. Therefore, in operationalizing this theory, individuals may achieve their desired reproductive goals by augmenting their ability to participate in meaningful private and public discussions about reproductive health (Edmeades et al., 2018). Lastly, the CFRE identifies decision-making, leadership, and collective action as appropriate measures of reproductive empowerment (Edmeades et al., 2018). This is critical to the goals of this project as project leaders seek to enhance the expression of reproductive agency.

Theory Application

The CFRE has been applied in qualitative studies that focus on female empowerment of sexual and reproductive health (SRH). Karp and colleagues (2018) utilized the framework to understand what shapes and motivates preferences for childbearing and contraception in sub-Saharan African women. Females were interviewed and participated in group discussions to explore how external pressures and internal motivations impact expectations of family planning preferences and fertility control (Karp et al., 2018). The CFRE helped researchers assess societal, community, family, couple, and individual influences on women's reproductive goals and preferences. The application of this theory was key in understanding psychosocial processes such as personal aspirations, couple dynamics, community norms, and how they shape women's reproductive choices and their ability to exercise these choices (Karp et al., 2018).

Theory Performance

A systematic review was conducted by Vizeh et al. (2021) that appraised scales to measure female empowerment that were created using various frameworks. One tool included in

the study was developed from the CFRE. Using Cronbach's alpha, Vizeh et al. (2020) found that the internal consistency of the scale developed using the CFRE was 0.6416, meaning that it is a reliable theory to guide the development of scales that measure female empowerment.

Furthermore, other frameworks that were the basis for tool development in the study such as The World Bank's Empowerment Framework and the SRH empowerment framework had lower internal consistency scores further validating the performance of the scale developed using the CFRE (Vizeh et al., 2020). Since the CFRE was recently developed in 2018, there is limited research studies that utilized this theory to describe, predict, and explain the phenomena of reproductive empowerment. It is possible that current researchers are utilizing this validated framework to assist their research but have yet to publish their work.

Theory Relationship

The ICRW acknowledges that reproductive health is strongly related to an individual's overall empowerment (Edmeades et al., 2018). This idea is closely related to the clinical problem of minimal education opportunities and understanding of the ovulatory menstrual cycle among university students. If individuals are not knowledgeable about their reproductive status, they are less likely to meaningfully participate in conversations with their partners and/or providers. Therefore, their ability to make informed decisions regarding their reproductive health may be hindered (Ford et al., 2020). These concerns are associated with the overarching goal of the CFRE, which is to assist in developing interventions that will strengthen the reproductive empowerment of men and women so that they are better equipped to have important conversations and make informed decisions about their reproductive health (Edmeades et al., 2018).

Theory Congruence

An assumption of a theory is a principle that is accepted as true based solely on logic or reason, sets the foundation of the theory, and must be accepted to use the theory (Polit & Beck, 2021). One assumption of the CFRE is that reproductive empowerment is not static (Edmeades et al., 2018). Rather, reproductive empowerment is a dynamic and changing process that is experienced and influenced throughout the many stages of life and has different meanings depending upon the stage of life an individual is experiencing. Additionally, reproductive empowerment peaks in early adulthood when individuals start forming relationships and begin to think about their reproductive goals (ICRW & MEASURE Evaluation, 2018). This is congruent with information obtained from the literature as it was identified that there is a significant desire for education and knowledge regarding the ovulatory menstrual cycle among university students entering adulthood (Basar et al., 2021).

Theory Tools

The Reproductive Empowerment Scale (RES) is associated with this theory. This multidimensional scale was recently developed to standardize the measurement of reproductive empowerment (MEASURE Evaluation, 2020). There are five subscales and a total of twenty items within the RES that measure women's communication with healthcare providers, communication with partners, decision-making, social support, and social norms on issues related to reproductive health (MEASURE Evaluation, 2020). The items in each subscale are scored on a four level Likert scale. While the RES is a validated tool that is used to measure reproductive empowerment, it is not applicable to this project as it was specifically developed to assess women who currently have a spouse or partner (MEASURE Evaluation, 2020). The

beneficiaries of this project are both male and female university students who may or may not have a partner, making the RES inappropriate for use on this project.

Conclusion

Ovulation has been identified as a key event during the menstrual cycle, signifying reproductive wellness. A literature review revealed the benefits of online applications for menstrual cycle awareness which include cost effectiveness, reduction in human error, and informed conversations with healthcare providers. Additionally, women who are aware of changes in their own menstrual cycle can detect abnormalities in the early stages which is essential in preventing chronic diseases (Vigil et al., 2012). Finally, a large population of women in their reproductive years are on university campuses. Therefore, incorporating menstrual cycle education into university curriculum may help women make informed reproductive health decisions (Szucs et al., 2017). Overall, the most evidence-based research supports the clear need for menstrual cycle education in women for enhanced reproductive health outcomes.

The leaders of this project chose a conceptual framework to ensure that the DNP project aligns with findings from the literature review and synthesis. The CFRE was selected and discussed at length, as it is most congruent with the clinical problem. Utilizing this framework will help mitigate potential barriers to the success of the project.

Chapter III: Knowledge Translation and Outcome Planning

The implementation of a project is a systematic process that requires an analysis of a clinical problem, well-planned strategies, and a selected target group (Wensing et al., 2020). Therefore, effective implementation relies on a planned process for effective dissemination, transfer of knowledge to practice, and attitude change (Wensing et al., 2020). The following sections will define project recommendations, applicable determinants of change, a change theory chosen to guide the implementation plan, implementation planning, work breakdown, budget, and evaluation planning to foresee the success of the implementation of the DNP project.

Project Recommendations

Project recommendations as defined by the World Health Organization's *Handbook for Guideline Development* "provide information about what policy makers, health-care providers, or patients should do. It implies a choice between different interventions that have an impact on health and that have implications for the use of resources (Reavy, 2016, p. 143)." These recommendations are intended to assist providers, recipients of health care, and key stakeholders in making informed decisions by providing them with written guidelines or recommendations for practice. For this reason, project leaders developed recommendations that are comprehensive and objective based on evidence-based findings uncovered during an exhaustive literature synthesis. Leaders utilized the feasibility, appropriateness, meaningfulness, effectiveness (FAME) acronym that was created by the Institute of Medicine to assist the writing process (Reavy, 2016). This acronym ensured all factors were considered when developing guidelines and rationale. Project recommendations can be found in the subsequent paragraphs and establish the intent of this project prior to the implementation phase.

Project Recommendation One

As previously stated, only 38% of women can correctly identify signs of fertility (Szucs et al., 2017). Literature supports an eagerness among young adults to receive education on menstruation, ovulation, and fertility (Szucs et al., 2017). Therefore, the first project recommendation is to develop evidence-based, menstrual cycle health educational sessions for the students of the SGSHS. Two identical 45-minute educational lectures will be offered in one academic semester to the students of the SGSHS. The educational lectures were developed in collaboration with the project chair, project consultant, organizational champion, and current evidence-based resources (FEMM & FACTS) to ensure accuracy. Currently, the University of Mary is striving to grow the School of Health Sciences to meet the needs of the nation by providing exceptional health sciences education with a respect for medical ethics and the dignity of every human person. Thus, project recommendation one aligns with the vision of the SGSHS which is to provide “revised and new programs rooted in ethical teaching in respect for the future of health care” (University of Mary, 2022, p.12). This recommendation supports the DNP project's goals.

Project Recommendation Two

Approximately 25% of adult women ages 19-54 have menstrual irregularities, which could be related to a multitude of underlying causes (Kwak et al., 2019). Therefore, a significant number of women experience some form of menstrual irregularities, and it is imperative when identified these are followed and managed appropriately. Thus, our second recommendation is to provide students with resources that are available if an abnormality in their menstrual cycle health is identified during or after the educational session. If an abnormality is recognized, the next appropriate step is to refer students to a provider who is trained in identifying the root cause

of menstrual cycle abnormalities such as a FEMM trained provider or a local provider who specializes in women's health. In addition, students can continue to monitor their menstrual cycle health by utilizing mobile applications to provide their health care professionals with objective menstrual cycle data (Derbyshire & Dancey, 2013).

Project Recommendation Three

The third recommendation is to evaluate the effectiveness of the educational sessions that were implemented. The data necessary for this recommendation will be collected after participation in the educational sessions. The post implementation data will help project leaders evaluate whether the students appreciated the education and if they would be interested in similar opportunities at the University of Mary in the future such as through an elective course. Additionally, the post implementation feedback will aid in identifying if any changes to the educational sessions should be made to support systems change within the SCSHS.

Project Recommendation Four

The fourth and final recommendation is to collaborate with and support the project chair and organizational champion in developing a menstrual cycle health educational program that will be sustainable. Through post- implementation questionnaires, project leaders will utilize this project's data to support the need for education among university students and assist in curriculum change to ensure longevity. Additionally, the project leaders will be available after project completion to answer questions, assess progress, discuss challenges, and offer ideas for program improvement.

Determinants of Change

After developing project recommendations, the next appropriate step is to identify determinants of change. Determinants of change are also referred to as "barriers or enablers" as

they may either hinder or strengthen the impact of project implementation (Wensing et al., 2020, pp. 157). Determinants of change are categorized into six different groups: individual health professionals, patients, professional interactions, incentives and resources, capacity for organizational change, and social, political, and legal aspects. Project leaders considered the various determinants and the potential impact of specific determinants on project implementation (Wensing et al., 2020).

Wensing et al., (2020) noted that an important step in implementation is identifying the skill set and motivation of healthcare professionals. Individual health professional factors include the knowledge, motivation, and skills of the individuals leading the change (Wensing et al., 2020). The project leaders possess a range of individual factors including knowledge of evidence-based practice guidelines and clinical experience in evaluating and treating women of reproductive age. For example, Dr. Kudrna, the project chair, is a DNP in primary care with a large women's health population. She became certified in the Marquette Method in 2015 and in 2022, became a FEMM trained provider. The project leaders have also done an extensive literature review on this topic which helped build a knowledge base that is necessary to implement the DNP project. Moreover, as healthcare professionals implementing the project, the project leaders are passionate about menstrual cycle health.

The capacity for organizational change is another determinant that indirectly impacts the adoption of new processes (Wensing et al., 2020). Specifically, leaders within an organization play a major role in influencing change as their support can enable others to readily accept innovation (Wensing et al., 2020). The Dean of the SGSHS, Dr. Mary Dockter, has an appreciation for new ideas and has expressed an eagerness to contribute to change within the organization by supporting the implementation of the project. Additionally, Dr. Dockter has

access to resources necessary for project implementation that would otherwise be unavailable without her support.

Finally, project leaders recognize a major determinant of change involves patient factors, or specific to this project, student participation. Wensing et al. (2020) stated, “Patients’ beliefs, knowledge, preferences, motivations and behaviors can also influence the uptake of innovations” (p. 163). Thus, the students must recognize that menstrual cycle health is an essential component to their individual overall health. Therefore, encouraging robust attendance and participation in the offered menstrual cycle health educational session addresses this determinant of change.

Change Theory

Kotter and Cohen’s Model of Change is an organizational change model used to stimulate evidence-based practice in health professions (Melnik & Fineout-Overholt, 2019). This model suggests that individuals are more likely to change their behavior when they are shown truths that influence their feelings versus when given facts or analyses (Melnik & Fineout-Overholt, 2019). To influence the feelings of individuals within an organization, Kotter & Cohen’s Model suggests that those initiating change within an organization must “communicate their vision and make their points in compelling and emotionally engaging ways” (Melnik & Fineout-Overholt, p. 434). This theory was chosen to guide the implementation of this DNP project and is outlined in eight steps: urgency, team selection, vision and strategy, communicating the vision, empowerment, interim successes, ongoing persistence, and nourishment (Melnik & Fine-Overholt, 2019).

The first step in Kotter and Cohen’s Model to create change in an organization is to give a sense of urgency (Melnik & Fine-Overholt, 2019). For this project, a sense of urgency was established by delivering a presentation on the importance menstrual cycle health with the Dean of the SGSHS and expressing concern over the need for this type of education program at the university. The second step, team selection, involves selecting members with a shared

enthusiasm to guide change (Melnik & Fineout-Overholt, 2019). The project champion Dr. Dockter, a respected and influential leader, supports the implementation of evidence-based practice change. In addition, the project chair, Dr. Kudrna is a faculty member of the university and an actively practicing provider in family medicine who advocates for menstrual cycle health. The third step in the model, vision, and strategy, is achieved by establishing a clear vision and implementing a reasonable yet realistic time frame for the project (Melnik & Fine-Overholt, 2019).

The fourth step, communicating the vision, is the stage in which individuals begin to see and accept the change as “worthwhile” (Melnik & Fine-Overholt, 2019). Upon IRB approval and the development of a menstrual cycle health education program, collaboration amongst members of the project will aid in the process of “buy-in.” The fifth step of Kotter and Cohen’s Model is empowerment. During this step, leaders must remove any barriers that may hinder successful change (Melnik & Fine-Overholt, 2019). The following step, interim successes, includes “creating short-term wins” and building momentum to help reduce frustration amongst those involved with the change (Melnik & Fineout-Overholt, 2019, p. 435).

The seventh step in Kotter and Cohen’s Model, ongoing persistence, is especially important to be mindful of as challenges may arise throughout the process (Melnik & Fine-Overholt, 2019). Project leaders must continue to be persistent throughout the process of change to be successful. The last step, nourishment of the new culture, is essential for change to last (Melnik & Fineout-Overholt).

Implementation Planning

Planning is an essential step in the implementation of practice recommendations. The process of implementation planning provides direction and useful guidance, helps with strategizing and decision making to achieve the best outcomes, and is necessary for effective and efficient implementation (Reavy, 2016). Other elements to be included in implementation planning are assessing economic costs, creating a budget, and strategizing for sustainability

(Reavy, 2016). Collaborating with key stakeholders when creating the implementation plan helps promote productive implementation. The tasks and personnel identified for project implementation are defined in the following sections.

Project Tasks and Personnel

Eleven tasks to be completed by the DNP project participants were identified when developing a work plan for the project. These tasks are described in detail in Table 3. The DNP project participants included three project leaders, a project chair, project consultant, and project champion. The three project leaders acted as facilitators of the project and ensured that the project timeline was followed. The project chair, Dr. Brittany Kudrna, DNP, provided guidance to the project with her extensive knowledge in the field of women's health. As previously mentioned, the Dean of the SGSHS, Dr. Mary Dockter acted as the project champion and offered her full support to the implementation of the project at the University of Mary. The faculty consultant from the University of Mary, Dr. Annie Gerhardt, DNP, also provided support to the DNP project. Project team meetings were held both online and in-person to discuss the work plan, answer questions, and address any concerns throughout the project.

Work Breakdown, Milestones, and Critical Events

To ensure that the DNP project is structured, organized, and is completed within the allotted time, a work breakdown tool should be utilized (Zaccagnini & Pechacek, 2021). Project leaders utilized the work breakdown structure (WBS) tool to chronologically organize the steps necessary to complete the DNP project. The WBS identifies all tasks as milestones or critical events with subtasks necessary to complete the project, identifies individuals responsible for each task, predicts when work may be completed, and acts as a communication tool for all

members of the project team (Zaccagnini & Pechacek, 2021). Table 3 outlines the work breakdown, milestones, critical events, and timeline for the DNP project.

Table 3

Work Breakdown, Milestones, and Critical Events

Task	Subtask	Start date	End date
Review evidence-based research regarding menstrual cycle health awareness and education (Critical Event)	Identify evidence that supports the need for menstrual cycle health education in general and in the University setting	1/3/2022	4/29/2022
Propose the DNP project idea and gain approval (Milestone)	Present project idea to both the project chair and faculty consultant	1/28/2022	1/29/2022
Establish project team (Critical Event)	Present project idea to key stakeholders	3/17/2022	3/18/2022
Obtain information from the SGSHS regarding current needs for menstrual cycle health education (Critical Event)	Conduct a needs assessment to determine how to best implement menstrual cycle health education at the SGSHS	3/20/2022	4/4/2022
Outline the plan for the DNP project (Critical Event)	Formulate a plan that describes the steps required to complete the DNP project	5/9/2022	5/29/2022
IRB approval (Milestone)	Submit the appropriate IRB applications	9/1/2022	10/23/2022
Develop a menstrual cycle health education program (Critical Event)	Collaborate with the project chair to create educational materials to present to the students of the SGSHS	9/10/2022	10/23/2022
Develop advertisements to assist with recruiting students to attend the education sessions (Critical Event)	Collaborate with the project chair to develop creative advertising materials that can be sent to the department chairs of the SGSHS to be disseminated to the students	10/25/2022	11/1/2022
Implement two menstrual cycle health education sessions at the SGSHS (Milestone)	In collaboration with the project chair, provide education on campus during scheduled sessions to the students of the SGSHS	11/14/2022	12/1/2022
Evaluate effectiveness of the systems change (Critical Event)	Analyze and interpret the pre- and post-implementation data to evaluate the effectiveness of the DNP project	12/5/2023	3/5/2023

Disseminate results of the DNP project (Critical Event)	Disseminate results of the project to project sponsor, key stakeholders, organizational leaders, and University of Mary DNP faculty	3/23/2023	4/28/2023
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Budget

Defining the project budget is a crucial step in project management (Zaccagnini & Pechacek, 2021). Healthcare organizations will factor in the expected budget of the DNP project proposal prior to making important business decisions that include either rejecting or accepting the proposal. Therefore, organizations should be given a budget proposal that consists of a breakdown of the estimated costs, expenses, revenues, and resources over a specified time frame (Reavy, 2016). Within the project budget, the leaders must also outline planned direct, indirect, and in-kind costs to assist the organization in deciding whether to proceed with implementation. When the budget is specified, key stakeholders and organizational leaders can plan for and allocate funds to enhance project performance if the organization accepts the proposal (Reavy, 2016). The anticipated budget for the implementation of reproductive health education is discussed in the following sections and demonstrated in Appendix B.

Direct Costs

Direct costs are expenses that can be “specifically attributable to the project” (Zaccagnini & Pechacek, 2021, p.376). An example of this type of expense can be categorized as related salaries, supplies, project training, and marketing. The menstrual cycle health educational sessions are being developed by the DNP project leaders, who are students at the University of Mary, as well as the project chair, who is currently employed by the university. Therefore, there are no additional financial responsibilities related to salary placed on the organization. Initial, subsequent, and follow-up education regarding project implementation will occur during scheduled business hours with the organizational champion. Thus, project development and

implementation require no additional expectations outside allotted business hours. The DNP project leaders, and the project chair have previously received reproductive education negating the need to allot for the cost of further project training. It is projected that no further expense will be accrued for supplies or equipment as the University of Mary already has lecture halls equipped with the appropriate technology to deliver educational sessions. Another important element to the success of this project is advertising. Because the University of Mary currently employs a marketing specialist and a social media manager, hiring a marketing specialist will not be an additional expense to this project. For these reasons, there are no direct costs associated with the project.

Indirect Costs

Indirect costs are less specific, harder to identify, and are often shared by several different entities within the organization (Reavy, 2016). When calculating indirect costs, leaders should consider administrative tasks, internet access, utilities, office space, internal communication systems, and technology services (Reavy, 2016). Although these expenses are not directly attributed to the project, they must be included in the cost analysis. It is projected that the organizational champion will spend 10 hours assisting with project implementation; therefore, \$827.90 is included in the budget. Furthermore, the project chair is expected to spend approximately 75 hours supporting the leaders as well as pursuing the system change by attending meetings and assisting in the development of project content. This is projected to cost the organization \$3,421.50. Furthermore, the marketing and social media specialist is expected to spend 10 hours of time, accounting for \$221.11 of the budget. The organizational champion, project chair, and marketing/social media specialist are employed by the University and no additional time is expected to be spent outside allotted business hours. Therefore, indirect costs

of this project are fictionalized. Additionally, indirect costs such as internet, lecture hall, utilities, and internal communication systems are minor and therefore not significant enough to calculate.

In-Kind

In-kind costs to consider include time, labor, equipment, and services given to the project free of charge to assist in project success (Bringing Theory to Practice, 2020). The time spent researching, developing, and facilitating the DNP project by these project leaders is considered an in-kind cost and incorporated into the budget. The average hourly wage of a doctoral prepared nurse practitioner is approximately \$52/hour according to Zip Recruiter. Each project leader (three) is expected to spend a minimum of 200 hours working on this project. Project development cost is calculated to be \$31,200; however, this is a non-reimbursable expense as all project leaders are in partial fulfillment of DNP degree requirements. Since project leaders will spend the greatest amount of time on this project, a majority of the project budget will be comprised of in-kind expenses or free of charge.

Evaluation Planning

Reavy (2016) defines evaluation planning as, “a structured process for systematically collecting information about activities, processes, attributes, and outcomes for the purpose of learning, decision making, and improvement related to a specific context” (p. 188). It is imperative that project leaders develop a plan for project evaluation. Evaluation planning during project development helps leaders track progress, demonstrates transparency and accountability for stakeholders, provides useful information about processes and activities, and enhances understanding of the target population (Reavy, 2016). After implementation of the project, evaluation of the project recommendations helps leaders understand how the outcomes were achieved, efficacy of resources, and plans for sustainability (Reavy, 2016). Therefore, the DNP

project leaders have strategically developed a careful and thorough evaluation plan to determine the efficacy of project outcomes and inform the decision to continue the project.

Project Recommendations and Outcome Measures

The goal of this project was to assess how menstrual cycle health educational sessions affected the knowledge of university students. Each of the project outcomes in relation to individual recommendations are listed below.

1. Develop evidence-based, menstrual cycle health educational sessions for the students of the SGSHS at the University of Mary for both personal and professional use.
 - a. Development of menstrual cycle health educational sessions that are multi-dimensional and incorporate different components from the three core educational approaches as described on page 10.
2. Provide students with a list of resources that are available if an abnormality in an individual's menstrual cycle is identified during or after the educational session.
 - a. Include abnormal findings in the presentation that would necessitate referral to a trained health care professional such as FEMM telehealth providers, women's health specialists within the community, and/or their primary care providers. Additionally, provide students with printed handouts that contain important takeaways from the presentation.
3. Analyze the students' knowledge on menstrual cycle health using post- implementation questionnaires.
 - a. Evaluate the data from the post-implementation questionnaires to ascertain the students' perceptions of the information and to determine the effectiveness of learning that occurred from participation in the educational sessions.

4. Collaborate with and support the project chair and organizational champion in developing a reproductive health educational program that will be sustainable.
 - a. Provide the project chair and organizational champion with the educational session materials and data collected from questionnaires to help support sustainability.

Outcome Measurement Sources and Collection Process

Qualitative and quantitative data will be collected from the attendees to evaluate the effectiveness of project recommendations. The Fertility and Infertility Treatment Knowledge Score (FIT-KS) is a validated, 29-item questionnaire that was created “to measure fertility awareness and infertility treatment knowledge in the general population and among medical trainees” (Peterson, 2017, p. 606). This tool contains 29 questions to assess knowledge of natural fertility and eight questions to assess infertility treatment (Roberts et al., 2020). Good faith efforts were made to contact the copyright holder of the FIT-KS for permission of use including detailed information concerning the DNP project; however, correspondence was not achieved. Therefore, after exploring a risk-benefit analysis, project leaders created their evaluation tool while adopting eight questions from the FIT-KS to assess the attendee’s knowledge of natural fertility to help support future student development at SGSHS. Questions from the FIT-KS tool regarding knowledge about infertility treatment were omitted as this information is not relevant to the DNP project.

At the end of the 45-minute educational lecture, attendees will be provided with the post-implementation questionnaire that was developed from the FIT-KS tool as previously described. Additionally, the questionnaire also contains six outcome measurement questions intended to help develop a teaching strategy plan for future course development. The post implementation

questionnaire will not include personal questions such as their name, allowing project attendees to remain anonymous and the data collected to be de-identified. However, demographic data such as age, gender, and field of study will be included. See appendix E for the post implementation questionnaire used for this project. The course evaluation enables attendees to provide feedback on how project leaders helped meet their learning needs as well as provide insight into how to improve or modify the educational session. These various methods of collection processes are intended to allow project leaders to assess project effectiveness and offer recommendations for project continuation.

Outcome Measurement Analysis Plan

Descriptive statistics, “the traditional method for bringing meaning to data” will be utilized to assess the project outcomes (Zaccagnini & Pechacek, 2021, p. 456). The qualitative and quantitative data obtained from the implementation questionnaire will be analyzed by project leaders. The findings will then be presented using visual tools such as charts, graphs, and diagrams as suggested by Zaccagnini & Pechacek (2021). The visuals tools will be utilized when presenting findings from this pilot study to the project chair, project sponsor, and organizational champion to determine the efficacy of the systems change.

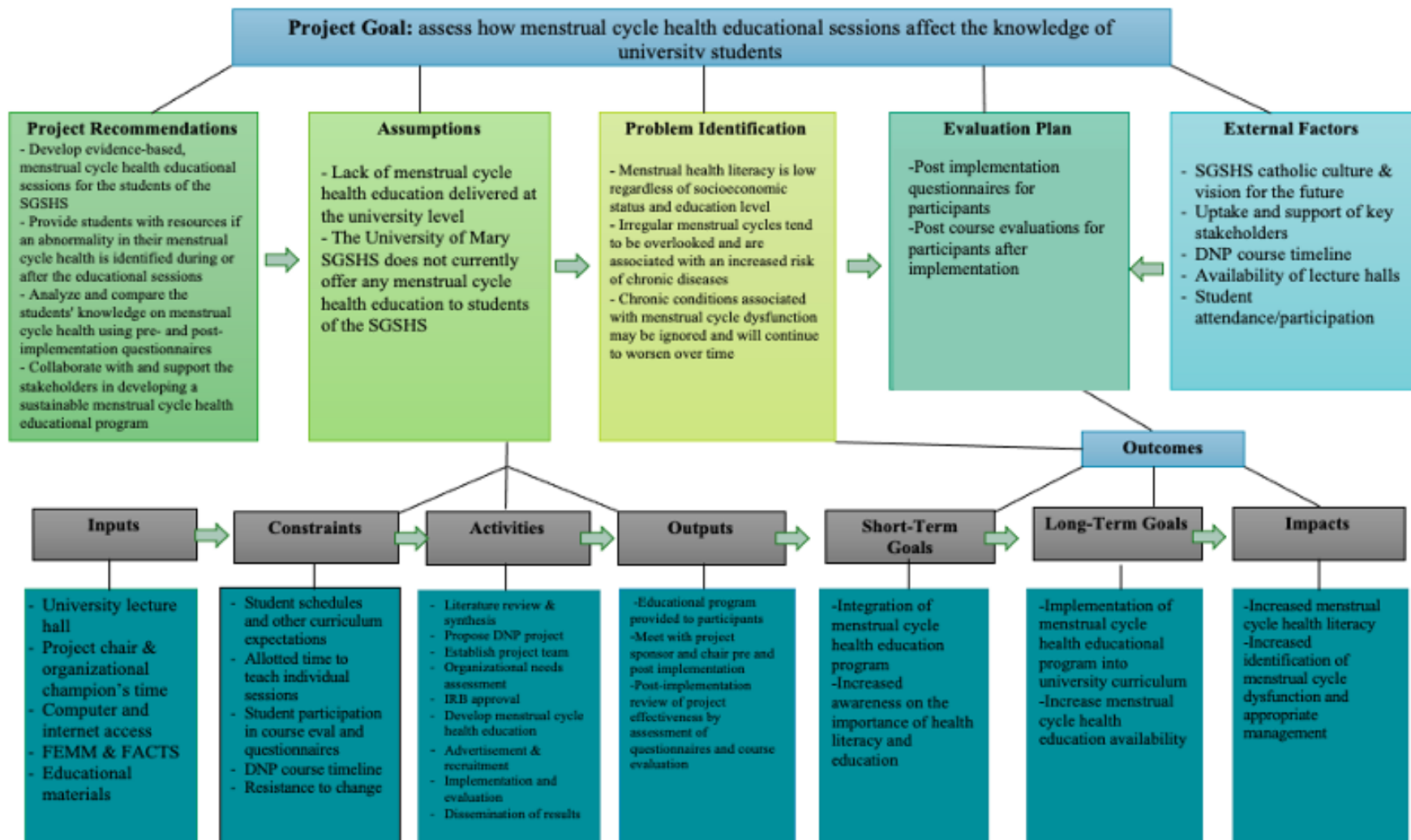
Logic Model

Another tool that assists in the process of implementation planning is a logic model. A logic model, also referred to as a “roadmap” or “flowchart” of an implementation plan, visually narrates decisions and strategies for planning and communicating the goals of the project (Reavy, 2016). Moreover, logic models are a key component of systems change planning as they outline how each smaller component of the project relates to the project as a whole (Reavy, 2016). The model should include assumptions, identified problems, recommendations, possible constraints,

goals, and anticipated impacts of the project. Figure 2 illustrates the logic model constructed for the proposed DNP project.

Logic Model Visual Representation

Figure 2
Logic Model Visual Representation



IRB Process

The project leaders followed the Institutional Review Board (IRB) application process at the University of Mary to ensure that ethical research practices were followed. To begin, the project leaders completed the IRB application form which required detailed information about the study's purpose, methodology, participant recruitment, and data analysis. Once the application was complete, it was submitted to the appropriate office for review. After the University of Mary IRB reviewed the application, it was determined that the project did not meet the definition of human subject research and approval to move forward with the project was granted on October 23, 2022. The IRB approval form can be found in Appendix G.

Conclusion

Adequate planning and preparation are the preconditions for the successful introduction of new changes in any type of organization (Wensing et al., 2020). To assist in this process, four recommendations were presented to uphold the vision of the University of Mary SGSHS by promoting menstrual cycle health educational sessions within the school. Kotter and Cohen's Model of Change was selected to guide the implementation and shape the recommendations of the DNP project. In addition, a timeline which included a breakdown of the major milestones, critical events, and budget were outlined. Finally, evaluation planning was completed by selecting outcome measurements, sources, and collection process.

Chapter IV: Project Evaluation

Reavy (2016) defines project evaluation as the process of generating information to understand activities and processes, and to address questions about the feasibility and effectiveness of a project. The ultimate objective of project evaluation is to demonstrate improvement or change in the project outcome measurements. In this chapter, project leaders will detail the implementation of the project, present significant findings, interpret data, and discuss project succession.

Implementation Discussion

Throughout the implementation period, it is imperative for project leaders to display strong leadership and maintain control, while also closely monitoring progress in relation to the project's goals, objectives, and evaluation plan. Although it may be impossible to anticipate all potential barriers to implementation, it is crucial that project leaders identify foreseeable threats and develop contingency plans accordingly. Additionally, according to Zaccagnini & Pechacek (2021), project leaders must display sustained enthusiasm during this period as they bring their previous work to fruition and transform concepts into tangible outcomes.

Getting the Project Started

For the implementation of this project, two separate education sessions were conducted at the University of Mary SGSHS. These 45-minute sessions occurred on November 14th and December 1st, 2022. The project leaders collaborated with Dr. Brittany Kudrna to develop the course content, drawing upon the recommendations of Vila-Candel et al. (2020) and Nunokawa (2019). These sources highlight that educational material is optimally delivered in 45-minute sessions that feature a combination of didactic lecture, group discussion, and tactile educational aids/handouts. Furthermore, to capitalize on the trends identified in the literature review

conducted by Ford et al. (2020) and Maeda et al. (2020), which indicated that mobile applications are the preferred and most convenient means for tracking menstrual cycles, the educational sessions incorporated a thorough evaluation of trustworthy and reliable mobile applications. To facilitate maximum engagement and comprehension, ample time was provided for participants to ask questions and share feedback at the conclusion of each session. The project leaders collected data after each session by providing a survey for students to complete before leaving the session. This survey was utilized to gather feedback on the content, delivery, and effectiveness of the menstrual cycle health education sessions.

The protection of data collected during the menstrual cycle health education sessions at the University of Mary was a top priority. The project leaders took measures to ensure that the surveys were anonymous and confidential to protect the privacy of the participants. Additionally, all hard copies of the surveys were stored in a locked cabinet in a secure location.

Influencing Factors

Several factors facilitated the implementation of this project at the University of Mary SGSHS. First, strong leadership and commitment from the project leaders and project faculty played a vital role in the successful implementation of the project. Additionally, the project leaders collaborated with all university department chairs of the SGSHS to promote the education sessions with the goal of enhancing student engagement and participation. Overall, the collaborative efforts and commitment from project leaders, university administration, faculty members, and interdisciplinary departments were essential in facilitating the successful implementation of the project.

During the implementation of the project at the University of Mary SGSHS, project leaders faced some threats and barriers that could have hindered the project's success. One major

challenge was student engagement and attendance, which could have affected the amount and quality of data collected. To address this, project leaders implemented strategies to increase student participation, such as creating and distributing flyers and emails to promote the sessions. Additionally, the dates of the educational sessions were carefully planned so that the educational sessions were not scheduled on evenings that had many conflicts with prescheduled student activities. The project leaders also ensured that the sessions were interactive and engaging by using multimedia and question-and-answer discussions, which helped to maintain the students' attention and interest. Through these efforts, the project leaders were able to increase student engagement and attendance, which ultimately contributed to the success of the project.

Monitoring the Implementation Process

The project chair, Dr. Brittany Kudrna, DNP, delivered both educational sessions and all project leaders were actively present and involved in the delivery of each session. Having the project leaders actively involved and present at the sessions provided a sense of support and leadership for the students in attendance. It also allowed for any immediate questions or concerns to be addressed during the sessions. Additionally, having all three project leaders present during each education session allowed for close monitoring of the entire phase of project implementation.

Interpretation of the Outcome Measurements

The purpose of collecting data in the DNP project is to showcase the effectiveness of the project, rather than meeting strict statistical criteria. To evaluate the results of a DNP project, descriptive statistics are frequently employed, as this is a conventional approach to giving significance to data (Zaccagnini & Pechacek, 2021). An extensive analysis of the data is critical

because how the results are interpreted affects decision-making and subsequent actions linked to implementing evidence-based practice recommendations (Reavy, 2016).

Project Findings

After the implementation of the project, the project leaders retrieved post-implementation questionnaires from a secure location and organized them for statistical analysis. The project leaders utilized descriptive statistics to interpret the gathered data and assess the project's efficacy, based on the project's recommendations. The primary aim of the project was to impact student development and enhance menstrual cycle health knowledge for the students of SGSHS through a menstrual cycle health educational session, for both personal and professional purposes. The project leaders examined both qualitative and quantitative data obtained from the attendees to evaluate the impact of the project and to evaluate the feasibility and/or advantages of implementing an elective menstrual cycle health course at the University of Mary.

The findings of the project were based on 67 post-implementation questionnaires (n=67) that were surveyed from a total of 72 attendants completed during the two educational sessions. It is important to note that 5 attendees left prior to the end of the session and hence were not included in the survey. The project's leaders conducted an organizational needs assessment prior to implementation, which revealed that the SGSHS had a total of 1,323 students. Therefore, the sample size constituted 4% of the SGSHS population. Both sessions were held in the evening at 7:00 pm, with one conducted on a Monday and the other on a Thursday. Attendance did not appear to be significantly affected by the date, as the first session had 46 attendees, while the second session had 28. Of the 67 attendees surveyed, 59 were female and 8 were male. The age range of the attendees was between 18 to 32, with the average age of the participants being 20 years old. For a complete breakdown of the ages of participants refer to figure 3. While the

project's intended audience were students within the SGSHS, all students were allowed to attend. Upon analyzing the data, it was found that 52 of the attendees (78%) were students of the SGSHS while the remaining 15 (22%) were not pursuing healthcare-related degrees. Figure 4 presents a graphical representation of the distribution of attendees based on the degree they were pursuing at the time of the session.

Figure 3

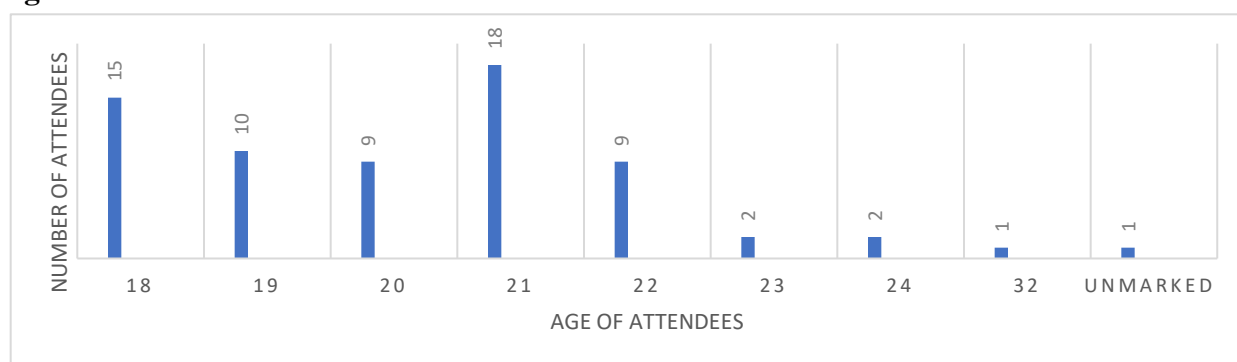
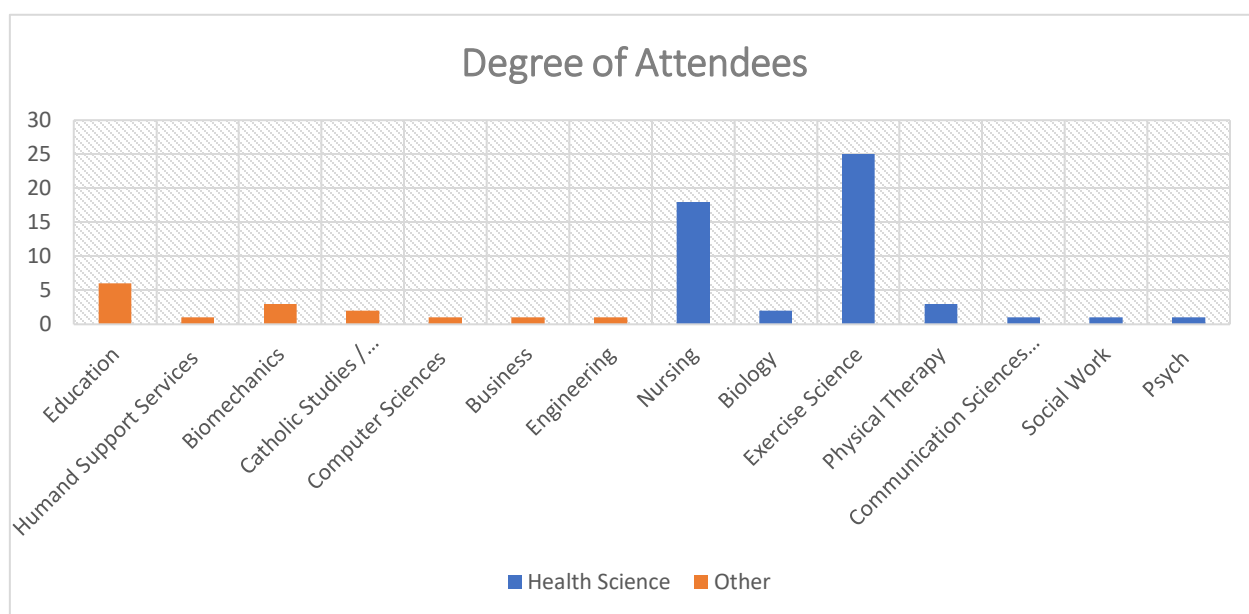


Figure 4



As part of the post-implementation survey, the project leaders used questions adapted from the FIT-KS to evaluate attendees' knowledge of fertility and reproductive health (see Appendix D). The aim was to determine which parts of the educational session were well-

understood by participants and which were not, as shown in figure 6. For instance, question 3 had a high correct response rate of 97%, while question 11 had only a 1% correct response rate. This data highlights that the session adequately covered male and female fertility, but lacked education on modifiable lifestyle choices that impact individual fertility. The entirety of this data will be valuable in developing a teaching strategy plan for future course development.

Aside from collecting quantitative data, the leaders also gathered qualitative data through six outcome measurement questions that consisted of yes/no and short answer responses. The most significant information in determining the impact of this project on student development was related to questions 15 and 18 (see figure 6). According to the results, 72% of the attendees expressed interest in taking this course as an elective, while 16% were not interested, and 12% were undecided. Furthermore, when asked whether this information was beneficial for their personal use, 99% of the respondents replied positively, with only 1% indicating otherwise. Regarding future professional use, 87% of the respondents found the information beneficial, whereas 13% did not. It is worth noting that all respondents that did not find this information beneficial did not belong to the SGSHS.

Figure 5

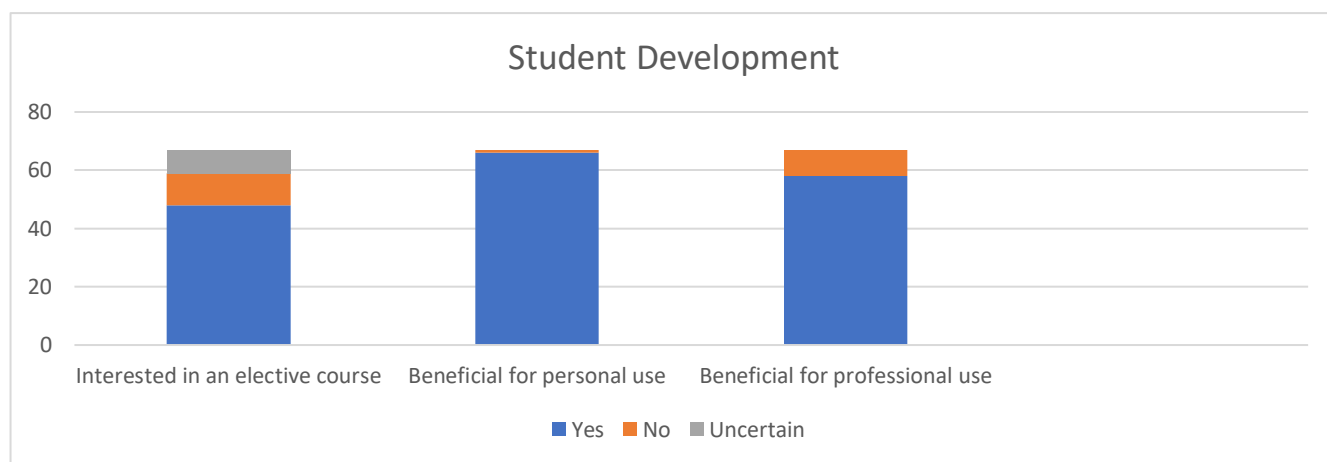
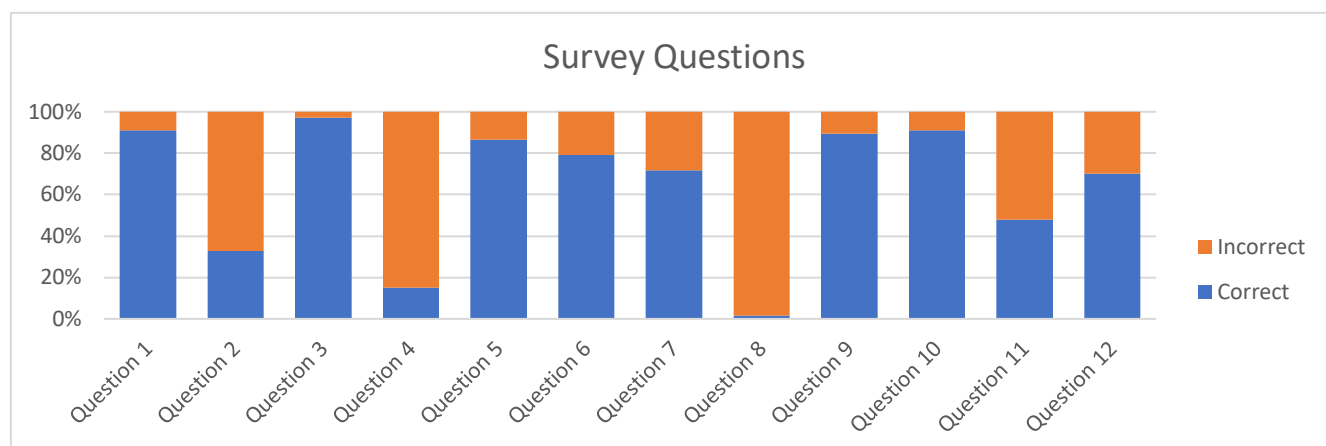


Figure 6

A significant number of attendees went beyond a simple yes or no response and provided more context for their answer. Among those who responded negatively, several stated that the course was not relevant to their degree meaning they were not part of SGSHS. One exercise science major who participated in the course provided a comment stating, "I will work with athletes, and hormones factor into performance," highlighting the relevance and applicability of the course material to their field of study. Another attendee, who expressed an interest in specializing in women's health in the future, mentioned that the course provided a different perspective on the female body that went beyond the standard of care. Even those who were not part of the SGSHS found the course beneficial to their future profession, with one respondent stating, "I am going to be a high school teacher, so knowing this could help my students who come to me with concerns." Many respondents also noted how the education they received equipped them with the ability to advocate for themselves, their friends, family members, and future patients, as well as adopt a more comprehensive approach to women's health. These results are consistent with previous research, as Szucs et al. (2017) and Shin et al. (2020) have

both observed a significant interest among university students in receiving education about menstrual cycle health.

Before implementing the project, four recommendations were formulated to guide its direction and evaluation plan, as discussed in Chapter III. After implementation, the project leaders assessed whether these recommendations were achieved, partially achieved, or not achieved. The first recommendation was to create an evidence-based educational session on menstrual cycle health for the students of SGSHS. This recommendation was completely fulfilled as the project leaders organized two identical 45-minute educational lectures during the fall 2022 academic semester (refer to Appendix F). The outline of the lecture, which was created with evidence-based resources, can be found in Appendix C. It was developed through collaboration between the project chair, consultant, and organizational champion.

The project leaders' second recommendation was to offer resources to attendees in case any irregularity in their menstrual cycle health was detected during or after the educational session. Assessing the effectiveness of this recommendation was challenging as the leaders were unable to determine how many of the 67 attendees identified an abnormality and sought medical assistance. To address this, a table containing local providers, online resources, and educational handouts was made available at each session. Additionally, the project leaders' contact information was provided to the attendees, and one individual did contact them to inquire about consulting a healthcare professional and scheduling an appointment. During the session, time was allocated for audience questions as well as one-on-one interactions, and several attendees had queries for the project leaders. Moreover, to question 16 in the post-implementation survey, one student's major takeaway from the session was that she “should investigate her extremely

light period.” Based on these factors, the project leaders concluded that this recommendation was partially fulfilled.

The third recommendation of the project was to assess the efficacy of the implemented educational session and gather feedback from attendees. The feedback collected through the post-implementation survey was utilized to evaluate the level of appreciation of the students towards the education and their interest in taking an elective course. As mentioned earlier, 72% of the attendees indicated an interest in taking an elective course, 99% found the information helpful for personal use, and 87% found it beneficial for professional purposes. The purpose of Question 17 in the post-implementation survey was to gather feedback from attendees and identify any required changes to the educational session. Out of the 67 respondents, 73% did not provide specific recommendations but commented on how informative, educational, and engaging the session was. On the other hand, 18 participants, comprising 27%, provided helpful suggestions for project improvement. Some of the recommendations were related to the presentation itself, such as using clearer medical terminology and more gender-neutral language. However, due to time constraints, the presentation was limited in depth and length, which explains why most of the suggestions pertained to wanting more information. Some of the recommendations included discussing trauma-informed care, cervical mucus, male hormones and their reproductive system, the impact of exercise on hormones, the influence of the cycle on mental health, and greater depth/expansion of female health disorders. Some respondents even expressed a desire for a follow-up session, suggesting that "This was a great introductory presentation, but maybe follow-up information/presentation that is more in-depth," and "In a longer session, there should be more detail about women's health in terms of healthy hormones and finding balance." The project leaders view these recommendations positively and see them

as evidence of the necessity and demand for more education on reproductive health among college students. As a result, project recommendation four has been completely fulfilled.

The project's final recommendation was to collaborate with the project chair and the organizational champion in establishing a menstrual cycle health education program that is sustainable. After the project was implemented and data was analyzed, project leaders held a meeting with the organizational champion, Dr. Mary Dockter, and presented the project's data to advocate for the importance of educating university students and to assist in revising the curriculum. Dr. Mary Dockter received our findings with great enthusiasm, expressing satisfaction with the positive results of the project and recognizing the clear need for educational programs like this in university campuses. She also provided valuable recommendations for the project's sustainability and continuation, which the project leaders will incorporate into their recommendations and sustainability plan. As a result, the fourth recommendation of the project has been fully met.

The success of the project was largely dependent on the willingness of university students to participate voluntarily. As a result, project leaders had concerns that male students would not attend or that there would be a lack of student engagement. Project leaders were delighted and enthusiastic about the high level of participation of both male and female participants. The leaders of the project included Question 14 in the post-implementation survey to gain insight into the motivations of the students who attended the session. While the session wasn't meant to teach students about conception, a male participant expressed that his primary reason for attending was his aspiration to become a father in the future. Additionally, a few students mentioned their desire to learn more about natural family planning and fertility as a form of contraception, which was an unintended outcome of the project.

Project leaders were pleased to discover that many students shared their passion and interest in the subject matter, even male participants. One male student commented, “The way God made women is truly amazing. I feel like it helped me [understand] why women go through this and the beauty of it.” Although project leaders intended participation to be voluntary, a small percentage of respondents mentioned that they attended the session solely to receive extra credit, or they were compelled by their friends or partners. However, even those without the best intentions still found benefit. For example, one student commented, “I attended this session for my class for extra credit. I am very happy that I attended this session though to learn more about myself and for others.”

Interpretation of Project Findings

This project, which represents only 4% of the SGSHS population, still managed to yield significant results. Of the participants, 72% expressed interest in taking the course as an elective, while 99% found it beneficial for personal use and 87% found it beneficial for professional use. Moreover, the quantitative findings indicated that university students have a deficit in their knowledge of basic reproductive health. Additionally, the implementation of this project did not result in any additional expenses for the university. Based on these findings, it is recommended by project leaders that academic institutions include menstrual cycle health education in their curriculum to promote student development and increase reproductive health literacy.

The demographic distribution of the participants provides a better understanding of the group of individuals who would be most receptive to menstrual cycle health educational sessions should an elective course be offered at the University of Mary. The findings of this study suggest that most participants were young adults, with the highest number of participants being female. It is noteworthy that more than three-quarters of the participants were students of the SGSHS,

highlighting the potential benefits of such programs within the school of health sciences. It is worth noting that 22% of the attendees were not affiliated with the SGSHS and were not specifically targeted or promoted to yet still attended. This discovery indicates that all university students, and not just those enrolled in the SGSHS, could benefit from menstrual cycle health education.

The feedback obtained from the attendees through post-implementation surveys can aid in the development and implementation of similar programs in the future. By using this information, project leaders can customize the content and structure of future educational sessions to meet the specific requirements of the intended audience and achieve the greatest possible outcomes. As mentioned prior, time constraints limited the content and specificity of the material presented. Therefore, it is recommended that the material be delivered over the entire academic semester in the form of an elective course to allow for a deeper dive into the complexities of reproductive health.

Since the project's target audience comprises future healthcare professionals, it is not feasible to ascertain the impact of the project on patient care or healthcare outcomes. However, based on the data, the DNP project leaders, project chair, and organizational champion have inferred that integrating a menstrual cycle health elective course into the curriculum would offer numerous personal and professional advantages. These advantages include enhancing student health and wellbeing, empowering them to make informed decisions about their health, encouraging students to seek or refer others to appropriate medical care, reducing the stigma and shame surrounding menstruation, enabling future professionals to feel more comfortable discussing reproductive health with others, and signaling the university's commitment to supporting servant leadership (Basar et al., 2021; Boivin et al., 2018).

Project Succession

To ensure the menstrual cycle health education program can be sustained and adopted by the university's stakeholders, it will be necessary to improve the curriculum of the educational sessions. The project team, along with the project champion, examined the feedback from the post-implementation questionnaires completed by the attendees. Upon review, there were several themes identified such as the need for further information in the education session on male hormones and reproductive system, the menstrual cycle and its relationship to mental health, signs and symptoms of abnormal menstruation, management of reproductive abnormalities and correlation of hormones and exercise. Moreover, in the post-implementation period, project leaders identified the need to expand information in selecting and navigating credible mobile applications to monitor reproductive health as they were very briefly described in the education sessions.

To assist with project transfer, project leaders, chair, and champion met upon completion of the project implementation and reviewed recruitment methods, presentation content, and post-implementation survey results. In addition, the project leaders made the PowerPoint presentation, course outline, and handouts available to the project chair and champion. To ensure project succession, they also have fostered a strong relationship with Dr. Brittany Kudrna, a faculty member of the SGSHS, who spearheaded the educational sessions. This partnership will serve to garner support for the program and contribute to its sustainability and promotion at the university. Also, the project champion and Dean of the SGSHS, Dr. Mary Dockter, has expressed a keen interest in the continuation of the project, with the goal of a professional elective course for future healthcare professionals to count towards their degree. The project

champion verbalized her intent on pursuing the next steps of continuation of this project, with the assistance of the project chair, and potentially with upcoming DNP students.

Conclusion

The implementation of menstrual cycle education sessions at the University of Mary SGSHS necessitated resilience and commitment by project leaders, champion, and chair. Collaboration between project leaders and project chair, Dr. Brittany Kudrna, was critical to develop course content for the menstrual cycle health education sessions as well as to facilitate an adequate lecture, group discussion, and distribution of handouts to attendees. Project leaders anticipated influencing factors that may hinder the project's success including student engagement and attendance for each education session. Strategies were implemented to address these potential barriers such as advertisements and careful planning of sessions. After careful review and interpretation, post-implementation survey results revealed the sessions appropriately covered male and female reproductive health, however, were insufficient of education on modifiable lifestyle choices that impact reproductive health. Based on the feedback received from students, it is clear the educational sessions were viewed as valuable for both personal and professional development, and there is strong support for the inclusion of these sessions as an elective course at the University of Mary.

Chapter V: Dissemination

In recent years, the field of nursing has witnessed an upsurge in the number of DNP projects aimed at improving healthcare delivery and patient outcomes (Abdellah & Levine et al., 2017). However, the dissemination of DNP project findings remains a critical aspect in achieving the desired impact. As highlighted by Reavy (2016), the dissemination of research findings is a crucial step in creating awareness, generating interest for further research, and promoting the implementation of evidenced-based practice. Considering this, the leaders of this DNP project plan to disseminate the outcomes of their menstrual cycle health education sessions at the University of Mary through various means. Chapter V will discuss the strategies employed by the project leaders to disseminate their findings, including a poster presentation and a research colloquium, aimed at reaching a broad audience and creating interest in menstrual cycle health education.

Dissemination and Application of Results

The project leaders have developed a detailed plan for disseminating the project's results. A poster presentation has been developed that highlights important aspects of the project and showcases key findings. This can serve as a tool for the project leaders or their successors to present at conferences and academic events. Project leaders are presenting their project and its findings at the SGSHS Research and Scholarship Colloquium, scheduled for April 28th, 2023. By presenting at the Colloquium, project leaders will be able to share the project's outcomes and recommendations with students, faculty members of the University of Mary, and other healthcare professionals in attendance. Additionally, it offers an opportunity to network with other professionals and receive valuable feedback. The DNP project leaders have created multiple PowerPoint presentations related to their project that would be ideal to use in webinars,

workshops, or educational institutions to distribute findings. The project leaders also intend to broaden the reach of their findings by publishing them in an academic journal. This will enable their research findings to reach a wider audience and serve as a resource for other researchers in the field. With the various dissemination strategies, the DNP project leaders hope to influence practice, generate interest for further research, and contribute to the field of healthcare.

Comparing the results of this project to findings from the literature was challenging as there is limited research regarding the implementation of menstrual cycle health education at the university level. A study conducted by Basar et al. (2021) evaluated the effectiveness of a reproductive health education program given to adolescents ages 11-14, attending a secondary school in Turkey. This study included a total of 161 students, 84 in the intervention group and 77 in the control group, separated as pre-test and post-test control groups (Basar et al., 2021). The reproductive health education program was conducted over 7 weeks, each 2-hour sessions, and covering one module using reproductive health education booklets, and a PowerPoint presentation for instruction. These modules reviewed adolescent period, reproductive system anatomy and physiology, risky behaviors in the adolescent period, sexually transmitted diseases and prevention, and reproductive health and rights (Basar et al., 2021). The primary findings of the study revealed students who participated in the reproductive health program had significant increase in knowledge level in reproductive health, in comparison to those who did not participate in the program, verifying that the reproductive health program is effective (Basar et al., 2021).

Another study conducted by Gomathy et al., (2022) assessed the impact of health education on menstrual hygiene among urban school-going adolescent girls ages 11 to 17 years in Thiruvallar, Tamilnadu. Throughout this study, two public high schools randomly selected a

total of 250 adolescent girls who had attained menarche. A pre-intervention questionnaire was completed encompassing 30 questions with four domains including socio-demographics, knowledge, practices and attitudes in regard to menstruation and hygiene (Gomathy et al., 2022). The adolescents underwent a one time, 2-hour session, health education intervention comprised of interactive learning sessions using PowerPoint presentations, placards, posters, videos, and detailed handouts on menstruation and hygiene practices. Three months following the education intervention, the participants repeated the questionnaire using the same preliminary questions in the pre-test. The primary findings of this study showed pre-test level of knowledge, attitude, and practices regarding menstruation and hygiene among subjects was 37.6%, 37.6% and 40.1% then improved to 69%, 79.9%, and 76.9% after the health education intervention. In addition, it was found that pre-intervention, 37.6% of participants had good practices related to menstrual hygiene in comparison, 77% had good practices related to menstrual hygiene post-intervention (Gomathy et al., 2022). Overall, the level of knowledge and attitude regarding menstruation and hygiene improved upon completion of the health education among the participants. Thus, the study results solidified the need and benefit for implementing further health education strategies to encourage adolescent girls to adopt safe menstrual health practices.

Both studies by Basar et al. (2021) and Gomathy et al. (2022) implemented menstrual health education to adolescents, each had a slightly different focus of content and methods to application, however yielding similar results. The primary findings from the studies suggested the benefit and positive impact menstrual cycle health education have on adolescents such as significant increase in reproductive health knowledge. In contrast, this project assessed knowledge only post-implementation of the education session, so project leaders were unable to assess whether there was an increase in reproductive health knowledge. Although the primary

population of these studies included adolescents in comparison to this project which included university students, project leaders believe these concepts can be translated to various ages.

This quality improvement project was implemented at the University of Mary SGSHS and all students at the university were welcome to attend the sessions. Fortunately, a diverse group of attendees were present for these sessions, varying from ages 18-32 as well as, encompassing various degrees within the SGSHS and other professions. Therefore, the introduction of a menstrual cycle health education program could be introduced to other university settings with diversified attendees. In addition, this type of education program could be integrated into secondary schools, and colleges at any local, regional, and national level. As menstrual cycle and reproductive health play a major role in one's life, despite age, gender, or degree, the implementation of an education program signifies means to increase reproductive health knowledge for many.

Future Directions

To foresee success and continuation of this project at the University of Mary SGSHS, efforts by the project setting and champion should focus on quality improvement of curriculum content, utilizing feedback from attendees to guide development, and identifying a clear plan of action for the education program. The project champion identified her next major step in assuming the project is to begin the process of preparing a proposal to the academic counsel to foresee an elective course on campus. In addition, two doctoral nurse practitioner students from the University of Mary graduating class of 2024 have conveyed interest in continuing this project. Upon completion and closure of these project leaders' efforts for this project, an update was provided to these students. The project leaders' recommendations for continuing and building upon this project were shared via a meeting with these students. Additionally, the

project leaders informed these students that they are available as mentors if needed for the continuation of this project and contact information was shared. This will allow for continuance and longevity of implementing a menstrual cycle education program such as an elective course, at the university. Overall, there is strong support from the students and faculty following these sessions in favor of the development of an elective course related to menstrual cycle education at the university.

Conclusion

Menstruation is a complex physiological process that occurs in women of reproductive age. While menstrual irregularities are common, they can have significant consequences on a woman's health and quality of life. Menstrual cycle abnormalities are linked to a variety of conditions, including infertility, endometriosis, PCOS, and various cancers (Vigil et al., 2017a). In addition, menstrual cycle abnormalities can be indicative of underlying health issues such as thyroid dysfunction or autoimmune disorders (Vigil et al., 2017b). Considering the importance of menstrual health, there has been a growing movement to recognize menstruation as the fifth vital sign. Similar to pulse rate, blood pressure, respiratory rate, and body temperature, menstrual patterns can provide important clues about a woman's overall health (ACOG, 2015). The lack of knowledge about menstrual cycle health and fertility in both men and women can lead to the underdiagnosis and undertreatment of chronic conditions associated with cycle dysfunction, which can have negative impacts on an individual's overall well-being (Vigil et al., 2017a). University students and those with a college education have been found to have significant knowledge gaps regarding menstrual cycle health, and adequate menstrual health literacy is important for engaging in health promotion and prevention activities. Lacking reproductive

health knowledge can impair one's ability to make informed healthcare decisions and lead to unsatisfactory healthcare outcomes (ACOG, 2015).

While university students are frequently identified as having low menstrual cycle health literacy, there is limited research available regarding successful interventions to improve menstrual cycle health literacy on university campuses (Shin et al., 2020). A need for menstrual cycle education at the University of Mary SGSHS was identified. Therefore, this project aimed to integrate menstrual cycle health education into the university curriculum to increase menstrual cycle health education availability and improve menstrual cycle health literacy. The implementation of this project led to enhanced menstrual cycle health awareness for the students and positive feedback from the attendees, highlighting the feasibility and advantages of implementing menstrual cycle health education on university campuses.

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Appendix A



SAINT GIANNA SCHOOL OF HEALTH SCIENCES

/

March 18, 2022

To whom it may concern,

As the Dean of the St. Gianna School of Health Sciences, I am excited and happy to support Karlee Litchfield, Kari Bernhardt, and Alexandra Dub's DNP project that will focus on health literacy and fertility awareness in college-aged women and men. We have discussed making this a voluntary offering in the fall for students in the health professions and athletics. Prior to full implementation, we will solicit support from the health profession program directors, athletic training staff, and the VP of Academic Affairs to ensure robust participation.

Thank you for allowing me to be a part of this needed and important project.

A handwritten signature in black ink that reads 'Mary Dockter'.

Mary Dockter, PT, PhD
Dean, St. Gianna School of Health Sciences

for Life.

Appendix B

Project Budget

Direct costs	Task	Accumulated hours	Hourly rate	Unit price
	Project Chair, DNP	N/A	\$45.62/hr	\$0.00
	- Assist project leaders in project development		(Zip Recruiter, 2022b)	
	- Meetings with project leaders			
	Project implementation			
	Organizational Champion	N/A	\$82.79/hr	\$0.00
	- Assist project leaders in project development		(Salary Expert, 2022)	
	- Meetings with project leaders			
	- Communications with department leaders			
	Marketing Specialist / Social media Manger	N/A	\$22.11/hr	\$0.00
	- Project advertisement		(Zip Recruiter, 2022c)	
	Technology	N/A	N/A	\$0.00
	- Computer			
	- Projector			
	Supplies/Equipment	N/A	N/A	\$0.00
Indirect costs	Task	Accumulated hours	Hourly rate	Unit price
	Project Chair DNP	75	\$45.62/hr	\$3,421.50
	- Assist project leaders in project development		(Zip Recruiter, 2022b)	
	- Meetings with project leaders			
	- Project implementation			
	Organizational Champion	10	\$82.79/hr	\$827.90
	- Assist project leaders in project development		(Salary Expert, 2022)	
	- Meetings with project leaders			

- Communications with department leaders	10	\$22.11/hr (Zip Recruiter, 2022c)	\$221.10
Marketing Specialist / Social media Manger			
- Project advertisement			
Technology	N/A	N/A	\$0.00
- Computer			
- Projector			
- Lecture Hall			
- Internet			
- Facility utilities			

In-kind costs	Task	Accumulated hours	Hourly rate	Unit price
	Nurse practitioner students (3)	200	\$52/hour (Zip Recruiter, 2022)	\$10,400 each
	- Literature review			(\$31,200 total)
	- Project development			
	- Meetings with project sponsor			
	- Development of educational course			
	- Gathering data after implementation			
	- Deliverance of education			
	Organizing and disseminating project results			
Total project expenditure				\$35,670.50

Appendix C

Understanding the menstrual cycle for health and future professional practice

Objectives:

At the conclusion of this presentation should be able to:

- *Describe the physiology of the normal menstrual cycle with regards to events taking place in the hypothalamus, pituitary, ovary, and uterus/endometrium*
- *Draw a representation of pituitary and ovarian hormones throughout the normal menstrual cycles*
- *Define the normal menstrual cycle*
- *Describe important hormonal events in the cycles and the resulting physiologic changes*
- *Highlight the key external observations or biomarkers that women can learn to chart to better understand their fertility cycle.*
- *Review a variety of fertility charts and discuss specific observations that may indicate a potential underlying health issue.*
- *State additional opportunities to learn how to address women's health issues using fertility charts.*

PowerPoint

- The value in learning your fifth vital sign and appreciating your period
- Anatomy
 - The female reproductive system / reproductive organs
 - Pathways of the eggs
 - Lifetime of sperm
 - Healthy sperm- include lifestyle changes to promote healthy sperm/combined fertility (to include males in the presentation)
- The menstrual cycles
 - Phases of the cycle and biomarkers of female fertility (cervical mucus, urinary hormones, basal body temperature)
 - Follicular
 - Ovulatory
 - Release of hormones
 - How ovulation leads to menstruation
 - Luteal
- What does a normal period look like
 - Is my period normal?
 - How many days should I bleed
 - How much should I bleed
 - Is it normal for my period to be painful
- Normal Menstrual symptoms
 - Cramping, bloating, moods etc.
- Menstrual abnormalities that may require evaluation

- Signs that your period is informing you of a deeper problem with one of the body's most basic functions as a woman
- Common conditions
 - PCOS
 - Endometriosis
 - Ovarian Cysts
 - Dysmenorrhea
 - Menorrhagia
 - Female athlete triad
 - Amenorrhea
- Health repercussions of anovulation
 - Mental health, IBS, diabetes, etc.
- Hormonal birth control
 - No ovulation
 - Withdrawal bleed (not a period)
 - Can't track cervical mucus
 - Side effects
- Questions to ask your provider
 - Quick explanation of FEMM protocol (investigating root cause) .. other ways to treat conditions listed above aside from OCP therapy (TSH, Pelvic US, FSH/LH, ect.)
- How can I get started? - Using charting to aid in diagnosis
- Implications for future practice
 - How this information applies to each profession/degree (exercise science, SLP, AT, PT, OT, Nursing, DNP)
- Resources
 - FEMM
 - FACTS
 - Know your body
 - Local providers
 - Telehealth
- Conclusion
- Questions
- Case study

Appendix D

Understanding the menstrual cycle for health and future professional practice

Gender:_____ Degree:_____ Age:_____

1. At what age are women most fertile?

- ☐ 12-19
- ☐ 20-29*
- ☐ 30-39
- ☐ 40-49

2. Over which age range does a woman's ability to get pregnant decline most precipitously?

- ☐ 25-29
- ☐ 30-34
- ☐ 35-39*
- ☐ 40-45

3. A woman and a man can both contribute to a couple's infertility:

- ☐ True*
- ☐ False

4. A man's age is a factor that affects a couple's fertility:

- ☐ True*
- ☐ False

5. Having less than 9 periods in a year can be normal for some women and doesn't require any further evaluation:

- ☐ True
- ☐ False*

6. What is the average survival time of normal sperm in the female reproductive tract?

- ☐ 12-24 hours
- ☐ 24-48 hours
- ☐ 3-5 days*
- ☐ 6-9 days

7. Where does fertilization most commonly occur?

- ☐ In the uterus
- ☐ Inside the ovaries
- ☐ On the surface of the ovaries
- ☐ In the Fallopian tubes*

8. The following are likely to decrease a woman's chance of fertility:

	True	False
Smoking.....	<input type="checkbox"/> *	<input type="checkbox"/>
Occasional caffeine intake.....	<input type="checkbox"/>	<input type="checkbox"/> *
Moderate alcohol consumption.....	<input type="checkbox"/>	<input type="checkbox"/> *
Obesity.....	<input type="checkbox"/> *	<input type="checkbox"/>
Gonorrhea or Chlamydia infection.....	<input type="checkbox"/> *	<input type="checkbox"/>
Prior use of oral contraceptive pills.....	<input type="checkbox"/>	<input type="checkbox"/> *
Being underweight due to frequent exercise or limited caloric intake.....	<input type="checkbox"/> *	<input type="checkbox"/>

9. If a woman takes a combined hormonal oral contraceptive as prescribed, she still ovulates:

- ☐ True
☐ False*

10. What is the average length of healthy menstrual cycle?

- ☐ 24-38 days*
☐ 15-25 days
☐ 35-45 days

11. What components make up the female athlete triad? Select all that apply:

- ☐ Amenorrhea*
☐ Low bone mineral density*
☐ Disordered eating*
☐ Hypothyroidism

12. A female with hair growth on unexpected areas of the body, acne, obesity, and complaints of irregular menstrual cycles most likely has the following condition:

- ☐ Endometriosis
☐ Polycystic ovary syndrome *
☐ Female athlete triad
☐ Urinary tract infection

13. How did you hear about this educational session? (circle)

Email

Flyer

Word of mouth

other: _____

14. Why did you attend this educational session?

15. Would you be interested in an elective course with credit hours at the University of Mary with greater depth and detail on this topic

16. What is your main takeaway from this session?

17. Do you have any recommendations or suggestions for improvement?

18. Do you feel this information was beneficial for your personal use? Yes / No

Do you feel this information was beneficial for your future professional use? Yes / No

Please explain the reasoning behind your answers:

Appendix E

University of Mary

Opportunity Email/Letter

Dear student of the St. Gianna School of Health Sciences,
With the support of Dr. Mary Dockter, the Dean of the SGSHS, we are excited to invite you to an opportunity to learn more about menstrual cycle health. This information can be used for both personal and future professional practice in all healthcare disciplines. Both male and female students are welcome and encouraged to attend!

[Insert time, date, and location here]

The educational session will be delivered by Dr. Brittany Kudrna, DNP, FNP-C, a local Family Nurse Practitioner, with the support of three doctor of nursing practice students. Attendance is voluntary but will support the development of future interprofessional curriculum at the University of Mary.

See attached flyer for more details.

***Attendance at the educational session may qualify for department specific volunteer hours.*

If you have any questions, please contact: [Name and contact information of investigators]

Appendix F

UNDERSTANDING THE MENSTRUAL CYCLE FOR PERSONAL AND FUTURE PROFESSIONAL PRACTICE

with Brittany Kudrna, DNP, FNP-C

MONDAY, NOVEMBER 14TH &
THURSDAY, DECEMBER 1ST
7:00 PM
SIMMONS CENTER (CASEY 128)

-Male and Female Students-

Join us at either session to learn information that
can be used for both personal health and future
professional practice in ALL healthcare disciplines!



Appendix G



University of Mary IRB Office
irb@umary.edu • 701-355-8037

IRB Determination – Not Human Subjects Research

2213101622

IRB Protocol Number

Implementation of a Menstrual Cycle Health Education Program for University of Mary St. Gianna
 School of Health Sciences: An Evidence Based Practice Project

Project Title

10 / 23 / 2022

Dear Karlee Litchfield

The University of Mary Institutional Review Board (IRB) has reviewed the above referenced project. The IRB has determined that this study does not meet the definition of human subjects research under [45 CFR 46](#). The IRB acknowledges that it does not have oversight authority over projects which are not human subjects research.

If no changes in protocol are made that would shift this project into human subjects research, this project is able to proceed without further review from the IRB. However, if changes in protocol are made which may affect the human subjects research status of this project, then resubmission to the IRB is required prior to the implementation of those changes.

While IRB oversight has been determined to not apply to this project, be aware that you are still subject to any and all university policies, research site policies, or legal regulations which may apply to this project. Project investigators, along with project advisors, are responsible for making sure that studies are conducted according to the protocol and for all actions of the staff and sub-investigators with regard to the protocol. If you have any questions or concerns about this project's assessment as non-human subjects research, please contact the IRB Office through the contact information below.

Sincerely,

Chair, Institutional Review Board
 University of Mary
 7500 University Dr
 Bismarck, ND 58504

irb@umary.edu