MODIFIABLE LIFESTYLE FACTORS TO HOLISTICALLY SUPPORT FERTILITY

by

Tyra Morgan Hepworth

A DNP Project Submitted to the Faculty of the

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GRADUATE COLLEGE

As members of the DNP Project Committee, we certify that we have read the DNP project prepared by Tyra Morgan Hepworth, titled Modifiable Lifestyle Factors to Holistically Support Fertility, and recommend that it be accepted as fulfilling the DNP project requirement for the Degree of Doctor of Nursing Practice.

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Final approval and acceptance of this DNP project are contingent upon the candidate's submission of the final copies of the DNP project to the Graduate College.

I hereby certify that I have read this DNP project prepared under my direction and recommend that it be accepted as fulfilling the DNP project requirement.

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DEDICATION

To the many women who have dealt with infertility

You are enough, and you are not alone.

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ABSTRACT

Purpose: This quality improvement project aimed to increase the awareness and utilization of select lifestyle modifications that can positively impact and support fertility. These lifestyle changes aimed to support the overall well-being of those seeking fertility treatment.

Background: Infertility rates are impacting the declining number of births in the United States (US). One in five couples in the US have difficulty conceiving. The prevalence of infertility in Utah is 10-20%. There are many causes of infertility, and some are non-modifiable. However, the awareness of lifestyle choices and their impact on conception is lacking.

Methods: Recruitment for the project took place via advertisement on the Utah Infertility Resource Center Facebook support group page. A PowerPoint slide deck and verbal information were presented at Meet Me on 33rd, Millcreek, Utah. After viewing the presentation, participants were provided eight post-survey questions. These responses were recorded and measured privately. The results of these responses evaluated the effectiveness of the presentation materials.

Results: Fourteen women responded to the post-survey questions. The overall results from the analyzed data indicated that 50% of participants strongly agreed that their knowledge of lifestyle factors that support fertility increased, and 64.3% of participants strongly agreed that they are likely to utilize these modifications in their own lives. Most (71.4%) of participants desired further information on the topic.

Conclusions: The educational presentation was influential in raising awareness regarding lifestyle factors that support fertility and overall well-being. The presentation included practical ways women can support their fertility through lifestyle changes. Further education and projects

are needed to increase provider knowledge in this area so women of childbearing age can become aware earlier.

INTRODUCTION

According to the National Center for Health Statistics, births in the United States (US) have declined by 4% from 2019-2020 (Hamilton et al., 2021). A contributing factor to this decline is the increasing rates of infertility. One in five couples in the US has difficulty conceiving (Centers for Disease Control and Prevention [CDC], 2021). Many couples believe fertility treatments and reproductive medicines may be their only option when they have problems getting pregnant. Still, these treatments are often costly and may require extra time, access to care, and transportation, all of which are barriers to receiving adequate care (Ohio Reproductive Center, n.d.). Despite the available knowledge on modifiable lifestyle changes, healthcare providers and parents-to-be often remain unaware of these (Dupont et al., 2020). Further, Boedt et al. (2021) highlight the need to investigate preconception lifestyle advice as it affects infertility. Many modifiable lifestyle factors support realistic chances of conception, so increasing the community's awareness of this topic is essential.

Background Knowledge and Significance

Infertility is the inability to conceive after one year of regular, unprotected intercourse (Stanford et al., 2018). Two-thirds of infertility cases are caused by female or male factors, while the other third have no discovered cause (CDC, 2021). The most common cause of female infertility is ovulation disorders, accounting for 40%. Ovulation disorders can be caused by premature menopause, autoimmune and hormone disorders, eating disorders, alcohol and drug use, stress, and intense exercise. Further, the CDC (2021) states that age, smoking, excessive alcohol use, extreme weight gain or loss, and undue physical or emotional stress increase women's risk of infertility.

As stated above, there are variables in individual health that are not modifiable and often require infertility treatment. Still, lifestyle modifications can benefit individual health and support fertility adjunct to treatment when needed (Dupont et al., 2020). The keys to fertility should contain a multidisciplinary approach, increasing overall well-being and individual health, and include maintaining a healthy weight, exercising, and choosing foods to support the ability to conceive (Chavarro et al., 2009). Infertility affects couples emotionally, physically, and financially, impacting the population of the US and the state of Utah (Stanford et al., 2018).

Maintaining a healthy weight and choosing fertility-boosting foods are essential factors for conception. The fertility diet was created by Jorge Chavarro and Walter Willett from the Harvard School of Public Health (Chavarro et al., 2009). Specific recommendations in this diet include avoiding trans fats and sugary sodas, using unsaturated oils, increasing some plant-based proteins and whole grains, consuming full-fat dairy daily, and getting plenty of iron. Other lifestyle changes that may improve fertility are taking prenatal vitamins before conception, participating in one hour of moderate exercise daily, supporting oral health, quitting smoking and alcohol, decreasing stress, and understanding the timing of intercourse (Ohio Reproductive Center, n.d.).

Local Problem

Among couples in Utah, the prevalence of infertility was 10-20% (Stanford et al., 2018). Utah's population of women of childbearing age (ages 15-44) in 2020 was estimated to be 713,339 (March of Dimes, 2020). The fertility rate in Utah in 2010 was 86.8 per 1,000 women ages 15-44. In 2020, that number dropped to 64.1. Increasing rates of infertility, better access to contraception, and fewer teen pregnancies contribute to this decline (Osterman et al., 2023).

The site of implementation for this quality improvement (QI) project was the Utah Infertility Resource Center (UIRC). This organization also facilitates a Utah Infertility Resource Center Support Group Facebook page. This nonprofit organization, created in 2013, aims to provide education and emotional support to those struggling to grow their families. There are approximately 2,100 members in the support group. Each member is personally dealing with infertility and lives in the state of Utah.

Intended Improvement

Project Purpose

This Doctor of Nursing Practice (DNP) QI project aimed to prioritize individual wellness and increase lifestyle modifications in patients seeking fertility support to impact their fertility journey positively.

Project Questions

1. Did the educational materials provide increased awareness of lifestyle modifications that support fertility?
2. Did viewing the educational materials provided in the project increase patients' intent to implement these lifestyle modifications within their own lives?

Project Objectives

1. To increase the awareness and understanding of lifestyle modifications to support natural fertility in women struggling with infertility through a verbal presentation and written materials.
2. Evaluate the effectiveness of the educational project through post-surveys.

3. Evaluate the intent to utilize these lifestyle modifications in their lives based on the educational interventions through post-surveys.

Theoretical Framework

Providing a theoretical framework for this QI project should make complex information more understandable. The theory allows changes in healthcare to become more manageable (Rural Health Information Hub, 2018). The Health Belief Model (HBM) is the theoretical framework for this QI project. This model can guide health promotion and disease prevention programs. The HBM is used to explain and predict an individual's changes in health behavior (Rural Health Information Hub, 2018). This project aimed to measure the effectiveness of education as it intends to change health behaviors. The HBM is widely used to understand an individual's perception of health. According to Dupont et al. (2020), lifestyle modifications may greatly influence fertility, but these may be difficult to change due to behavioral factors.

The HBM was created in the 1950s by social psychologists Hochbaum and Rosenstock (Skinner, Tiro, & Champion, 2015). They worked in public health and initially attempted to explain why there was a failure in disease prevention programs. Later, they expanded to study individuals' behavioral responses to health-related conditions. The HBM comprises six constructs that can be applied to a broad range of health behaviors: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Skinner, Tiro, & Champion, 2015).

Perceived Susceptibility

Perceived susceptibility describes one's belief about having a disease or condition (Skinner, Tiro, & Champion, 2015). As it relates to this project, perceived susceptibility explains a woman's perception of infertility and her belief about how it may be developed.

Perceived Severity

Perceived severity is the belief in the seriousness of the disease and the consequences that may come when left untreated (Skinner, Tiro, & Champion, 2015). Women may have different perceptions of the severity of infertility and the effects that it may have on their lives. Women may also be unaware of the relationship between poor life choices and infertility (Pramodh, 2020).

Perceived Benefits

Perceived benefits explain the positive consequences of potential health actions (Skinner, Tiro, & Champion, 2015). Women with infertility may have conflicting views of the benefits of modifiable lifestyle factors or infertility treatments and how they may affect fertility.

Perceived Barriers

Perceived barriers are the opposite of perceived benefits in explaining the negative aspects of different health actions (Skinner, Tiro, & Champion, 2015). They can be related to women who feel like lifestyle changes may cause further damage to health and fertility.

Cues to Action

According to the HBM, cues to actions trigger a health action. These driving factors involve individuals in health decisions (Skinner, Tiro, & Champion, 2015). Health condition may

provide enough driving force, but education about modifiable lifestyle factors may increase one's desire to change.

Self-Efficacy

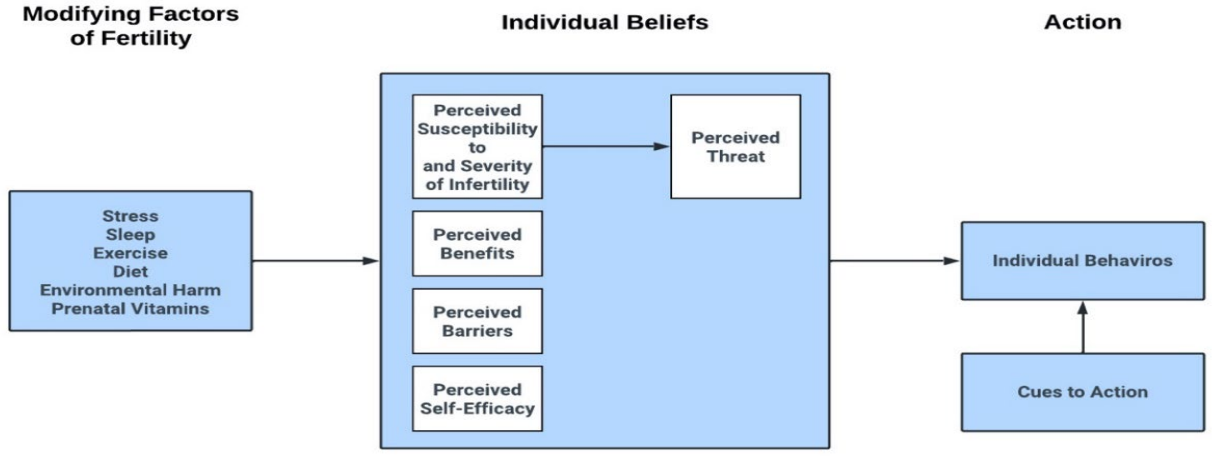
Finally, self-efficacy is believing one can achieve the behavior required to execute the outcome (Skinner, Tiro, & Champion, 2015). Following the educational presentation, individuals should have a greater knowledge of lifestyle changes related to fertility and well-being. They were asked about their intent to utilize these changes in their lives.

Theory in Practice

The HBM can be utilized within this project to describe the process of implementing education on lifestyle changes that relate to female infertility. Prior research has been conducted to understand perceived susceptibilities, benefits, and barriers of women with infertility and their intent to utilize lifestyle changes in their own lives. Educational materials were used to discuss further the use of specific lifestyle changes that may support natural fertility and measure participants' intent to implement changes.

Figure 1

Health Belief Model



Literature Synthesis

Evidence Search

A literature search was conducted related to lifestyle modifications and infertility. The database titled PubMed was searched using the key terms “infertility and lifestyle,” “fertility AND healthy lifestyle,” and “infertility AND lifestyle.” Search filters were applied to narrow the results to those appropriate for analysis.

Within the literature search in PubMed, the first term yielded 1,406 results. The search was narrowed by utilizing the MeSH feature and applying the words “infertility AND lifestyle.” This search yielded 373 results. Other criteria were used to refine the results, including dates narrowed to 2016 to present, “humans,” and “English,” and further limited the results to 146.

Another MeSH feature search was utilized with the terms “fertility AND healthy lifestyle.” This search yielded just 13 results. Dates were narrowed to 2016, and “humans” and “English” were applied but did not reduce the number of results. Results irrelevant to the education of lifestyle modifications and their effect on infertility were excluded. Of the two MeSH feature searches, 11 articles were selected for the full review.

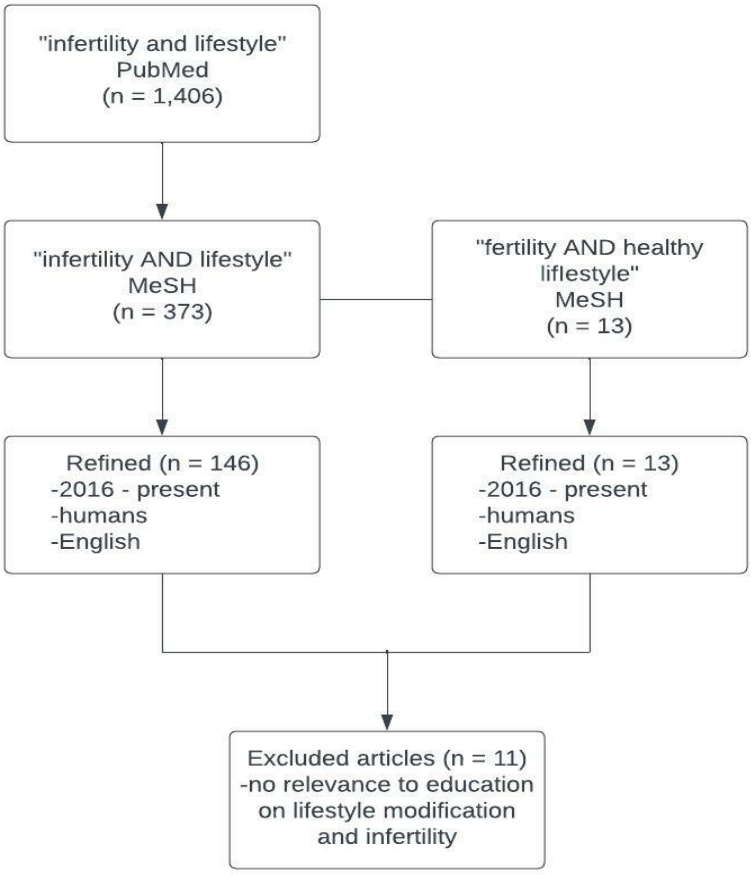
An analysis of the 11 articles selected was performed. Overall, the data found in these articles showed that there is a link between healthy lifestyle modifications and fertility (Boedt et al., 2021; Dupont et al., 2020; Gaskins et al., 2019; Grieger et al., 2020; Kim et al., 2020; Kudesia et al., 2021; Ng et al., 2018; Segal & Guidice, 2019). Data also showed a need to increase education and research in this population (Boedt et al., 2021; Barron et al., 2020). Based on the data analyzed, modifiable lifestyle factors and nutrition should be considered first-line treatments of unexplained infertility before or during the implementation of medication and

injections. Many of the modifications analyzed may be recommended as periconceptional habits for all hopeful parents-to-be.

Three of the 11 articles were randomized controlled trials (Boedt et al., 2021; Dupont et al., 2020; Ng et al., 2018). Three of the 11 articles were prospective cohort studies (Gaskins et al., 2019; Grieger et al., 2020; Kudesia et al., 2021). Three of the 11 articles were case reports (Barron et al., 2020; Pramodh, 2020; Rosenthal & Bonder, 2019), and the remaining articles comprised one systematic review and meta-analysis (Kim et al., 2020) and one cross-sectional study (Segal & Guidice, 2019).

Figure 2

Literature Search



Comprehensive Appraisal of Evidence

The review of this literature shows that there is a link between fertility and healthy lifestyle habits. The primary focus of this project was to increase awareness of these healthy lifestyle habits in a way that is easy to understand and implement within one's own life through comprehensive educational materials. This project also focused on providing realistic ways to modify lifestyle habits for women dealing with infertility holistically. A summary table can be found in Appendix F.

Recommended Modifications to Support Fertility

The most common cause of female infertility is ovulation disorders. These disorders can be caused by non-modifiable risk factors but are also caused by eating disorders, alcohol and drug use, stress, and intense exercise. Women should begin the journey to becoming pregnant in the best overall health (Grieger, 2020). Advising women on factors that affect fertility may increase the chances of timely conception (Ng et al., 2018). The following lifestyle modifications are discussed to expand on these topics and provide other lifestyle modifications linked to increased fertility and overall physical and psychological well-being. These interventions empower women to make healthy, conscious lifestyle choices to improve overall well-being.

Reduce Acute Stress

Stress is one modifiable risk factor for female infertility that should be considered. Stress might increase one's time to achieve pregnancy or accelerate ovarian reserve exhaustion (Dupont et al., 2020). Individuals can decrease their stress and anxiety levels by increasing their vagal nerve tone by activating the *parasympathetic nervous system* (Breit et al., 2018). Our *autonomic nervous system* is divided into *parasympathetic* and *sympathetic* nervous systems. This

parasympathetic nervous system has also been named the rest and digest nervous system and causes dilation of the blood vessels. It oversees many body functions, including controlling mood, breathing, heart rate, immune response, and digestion. The vagus nerve, also known as cranial nerve 10, is the main component of the parasympathetic nervous system. Vagal nerve activation allows one to relax faster when experiencing stress.

When anxiety is experienced, the *sympathetic* or 'fight or flight' nervous system is activated. The vagus nerve counterbalances the fight or flight response, triggers relaxation, and can be achieved using four methods. The first is cold exposure by taking a cold shower or running hands under cold water (Jungmann et al., 2018). The second one is deep and slow breathing. Individuals should aim for six breaths per minute, focusing on expanding their abdomen, with the exhalation lasting longer than the inhale (Hopper et al., 2019). Third, sing, hum, or gargle. The vagus nerve is connected to your vocal cords and becomes activated with each activity (Cleveland Clinic, 2022). The fourth is exercise. Regular moderate exercise is beneficial, but even quick motions, such as shaking hands during acute anxiety attacks, can be effective (Kai et al., 2016).

Sleep

Lower sleep duration can cause higher inflammation associated with infertility (Dupont et al., 2020). It has been demonstrated that sleep disturbances are associated with menstrual irregularities and reproductive dysfunction. Melatonin affects the reproductive system as it has antioxidant qualities that can protect the oocyte from oxidative stress during ovulation (Szkodziak et al., 2020). Increasing early morning and evening sunlight exposure and decreasing

blue light exposure can naturally increase the body's production of melatonin and aid in achieving a more restful sleep (Karami et al., 2016).

Moderate Exercise

Dupont et al. (2020) studied the effects of moderate physical activity on female infertility. It is found in many observational studies that a sedentary lifestyle is linked to female infertility. A healthy weight is strongly correlated with fertility, and women should be encouraged to participate in 30 minutes to one hour of moderate exercise each day.

Nutritious Diet

Diet has been exhibited to optimize natural fertility. The fertility diet was discussed earlier to increase the intake of fertility-boosting foods. Many other studies have found a positive association between the intake of whole grains, seafood, full-fat dairy, and soy foods and limiting the intake of high-pesticide fruits and vegetables and female fertility (Gaskins et al., 2019). According to a controlled analysis, those who followed the fertility diet had a 66% lower risk of infertility related to ovulatory disorders (Kudesia et al., 2021). A nutritious diet was also found to support mental health disorders, further supporting the psychological well-being aspect of infertility.

Diet directly affects the endometrial nutritional content (Ng et al., 2018). Grieger (2020) investigates diet and time to pregnancy, suggesting that increasing fruit and decreasing fast food and sugar-sweetened beverages may improve the time to pregnancy. A diet high in low-mercury fish, legumes, and low-carbohydrate snacks positively affects pregnancy chances (Ng et al., 2018). Further, if women begin infertility treatment, a nutritious diet was found to positively

impact fertility and a higher likelihood of becoming pregnant while undergoing in vitro fertilization (IVF) (Kudesia et al., 2021).

Decrease Harmful Environmental Exposure, Alcohol, and Smoking

Many environmental factors can affect female infertility. There are more than 80,000 environmental chemicals in the air, soil, drinking water, and consumer products in the US (Segal & Giudice, 2019). These toxins include endocrine-disrupting chemicals, such as bisphenol A (BPA) and phthalates, and heavy metals, such as mercury and lead.

Endocrine-disrupting chemicals mimic endogenous hormones in the body. These chemicals can be hard to avoid, but buying organic produce and cooking at home is helpful. BPA is primarily found in cans and plastic containers and can affect oocyte and implantation quality (Segal & Giudice, 2019). Women should reduce their consumption of canned foods and replace plastic bottles and containers with glass or stainless steel (Segal & Giudice, 2019). It is also advised to avoid microwaving any plastic material. Phthalates are commonly found in personal care products and fragrances. Because of this, it is best to use the fragrance-free laundry, cleaning, and personal-care products, which are also valid for women undergoing IVF treatment.

Mercury, a neurotoxin, can be found in certain seafood, dental supplies, and skin creams. It is recommended that women seeking to become pregnant should limit mercury-containing foods (Segal & Giudice, 2019). Lead is also a neurotoxin in soil, clay, paint, and jewelry. Women should avoid working in jobs with high lead exposure and remove their shoes before entering their homes.

It is recognized by Dupont et al. (2020) that a high level of alcohol and tobacco negatively impacts female fertility. Ng et al. (2018) state that smoking significantly affects fertility. To optimize fertility, women should attempt to avoid alcohol and tobacco altogether.

Take Prenatal Vitamins

Most western diets are insufficient in micronutrients. Because of this, the most evidence-based approach to supporting female fertility is a nutritious diet and supplementation of prenatal vitamins (Kudesia et al., 2021). Most prenatal vitamins contain folate, vitamins B, C, D, and zinc. These are essential for fetal development, but a higher intake of these micronutrients has also been associated with increased fertility.

Strengths, Weaknesses, Limitations and Gaps of Evidence

There were some significant weaknesses and limitations found in the literature. The risk of bias was evident due to the lack of blinding (Boedt et al., 2021; Kim et al., 2020), poor reporting of outcomes and self-reported data (Boedt et al., 2021; Pramodh, 2020), and difficulty measuring the effectiveness of specific interventions (Dupont et al., 2020; Gaskins et al., 2019; Rosenthal & Bonder, 2019) can skew data. Inclusion and exclusion criteria, including women without polycystic ovary syndrome (PCOS) (Boedt et al., 2021), diabetes mellitus (DM), and contraindications to physical activity (Gaskins et al., 2019), are also mentioned in the literature.

Health disparities, including access to organic and nutritious foods, gyms, a smartphone, or vitamin supplementation, have been shown to interfere with increasing natural fertility and may have been barriers to participating in these studies. Some participants cannot decrease their exposure to environmental toxins due to living conditions (Segal & Guidice, 2019).

Despite these limitations and weaknesses in the literature, the data compiled from multiple sources showed significant similarities in findings. Specific strengths included data from participants of both pre-infertility treatment and during the initiation of therapy (Boedt et al., 2021). There was also a wide variety of participant characteristics and ethnic groups (Gaskins et al., 2019).

Pramodh (2020) demonstrated that women lack knowledge of essential infertility concepts. There is also a significant gap in healthcare providers' understanding of holistic approaches regarding women's reproductive health and infertility. Nor do most clinicians have the groundwork to provide sound counseling in this area. It is evident from this analysis that substantive work is needed to raise awareness about the reproductive health benefits of these lifestyle modifications.

METHODS

Project Design

The Institute for Healthcare Improvement (IHI) developed the Model for Improvement (MFI), created to accelerate quality change (Institute for Healthcare Improvement [IHI], 2022). This QI project utilized the MFI to implement these changes and measure the outcomes. The first part of the MFI's design strategy includes three questions: What are we trying to accomplish? How will we know the change is an improvement? What change can we make that will result in improvement?

Model for Implementation

This QI project aimed to expand awareness of lifestyle modifications that may increase fertility in women struggling with infertility. This project also aimed to increase the intent to

utilize these lifestyle changes within those individuals' lives. A post-survey (Appendix D) was conducted to measure participants' intention to use the education they learned.

Setting and Stakeholders

The project setting was the Utah Infertility Resource Center (UIRC) building (Meet Me on 33rd) and the Utah Infertility Resource Center (UIRC) support group on Facebook. This Facebook group is a resource available only to those struggling with infertility. Prospective members must answer specified questions to ensure they are an appropriate addition to the group, given the sensitive nature of infertility. Each member lives in the state of Utah. The Facebook group directly correlates with UIRC as support group members have access to resources within the Facebook group site, including invitations to support meetings and counseling at UIRC.

Stakeholders for this project include the Facebook support group administrator, all members of the Facebook support group, and all individuals present during the project presentation at UIRC.

Planning the Intervention

The plan for this project was to assess participants' knowledge of lifestyle changes that may support fertility and identify their intent to utilize the information learned in the presentation via the post-survey (Appendix D). A PowerPoint slide deck (Appendix E) and corresponding post-survey questions were created and presented to participants. The site administrator approved the slide deck and post-survey questions. The participants were given the post-survey via quick response (QR) code immediately following the presentation. This project was implemented in 16 days, with a goal of 15 participants. After collecting the survey responses, the information was

gathered and recorded in a password-protected Microsoft Excel spreadsheet. All surveys were anonymous.

Participants and Recruitment

Primary inclusion criteria for participants included women verified to be personally dealing with infertility with established membership in the Facebook group. All participants were 18 years of age or older. All participants could read and speak English to view and understand the presentation and educational materials. Participants also required the ability to access a computer or smartphone with the internet to view the notice of the presentation date and time on the Facebook support page.

After the University of Arizona's Institutional Review Board (IRB) review (Appendix A), an advertisement was posted on the UIRC Facebook page. The message notified members of the upcoming educational presentation date, time, and location and allowed women to participate voluntarily. The advertisement had a link to the educational materials (Appendix D) and also contained the disclosure form (Appendix B) and post-survey questions (Appendix D). Recruitment was finalized after 16 days of open registration participation.

Consent and Ethical Considerations

Participants were gathered voluntarily after reading the disclosure information and obtaining consent for registration. All information collected within the project was privately secured and kept entirely anonymous, ensuring confidentiality. The survey information was stored within a Microsoft Excel password-protected database. Data was collected after the Determination of Human Subjects IRB review was obtained (Appendix A).

Respect, justice, and beneficence were considered for all individuals when developing this project. Respect was taken as participants' involvement was kept confidential to ensure privacy. Justice was shown as the project was compatible with all participants and fairly distributed. Inclusion and exclusion criteria were justified. Those with infertility are especially vulnerable, but beneficence ensured no harm was inflicted on all participants.

Data Collection and Analysis

Plan-Do-Study-Act (PDSA) Cycle

The second part of the MFI includes a plan-do-study-act (PDSA) cycle strategy to test and evaluate the interventions to create this change.

Plan

The need for change was focused on creating educational materials to increase participant awareness and understanding of modifiable factors related to female infertility. The planning portion of this QI project was related to gathering research for background information and preparing the educational presentation. Discussions were held with the Facebook group and UIRC administrator to collect de-identified group demographic information and establish buy-in. After this was completed, post-surveys were developed.

Do

This QI project's implementation phase was first to recruit members via advertisement from the Facebook support group page. After participants were recruited and completed registration for the presentation, they were directed to follow a link that provided educational materials to be presented (Appendix D), a disclosure form (Appendix B), and the post-survey questions (Appendix D). Registration was directed and completed by the center's administrator.

The educational materials were presented to participants at the UIRC location in Millcreek, Utah. This presentation included a PowerPoint slide deck (Appendix D) and verbal information. Upon completion of the presentation, participants were provided eight post-survey questions. All surveys (Appendix D) were anonymous.

Study

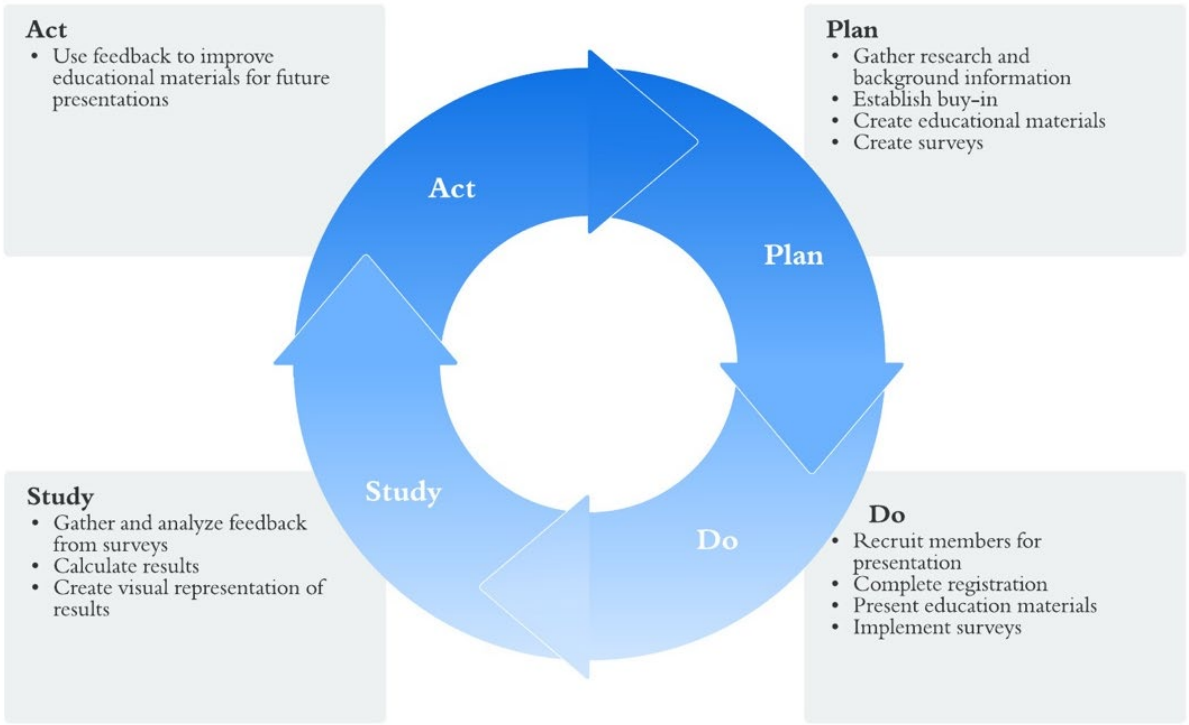
Feedback from the post-survey questions was used to analyze and evaluate the effectiveness of the educational materials. The answers to these questions were developed into graphs to analyze the results in a visual representation. Percentages were calculated, and the responses were compared to evaluate the materials' effectiveness.

Act

The outcomes found after the analysis of the post-survey results will be used to modify and improve the educational material in future presentations. Based on the results of this QI project, more comprehensive patient education can be utilized at UIRC and other infertility clinics.

Figure 3

PDSA Improvement Cycle



RESULTS

Outcomes

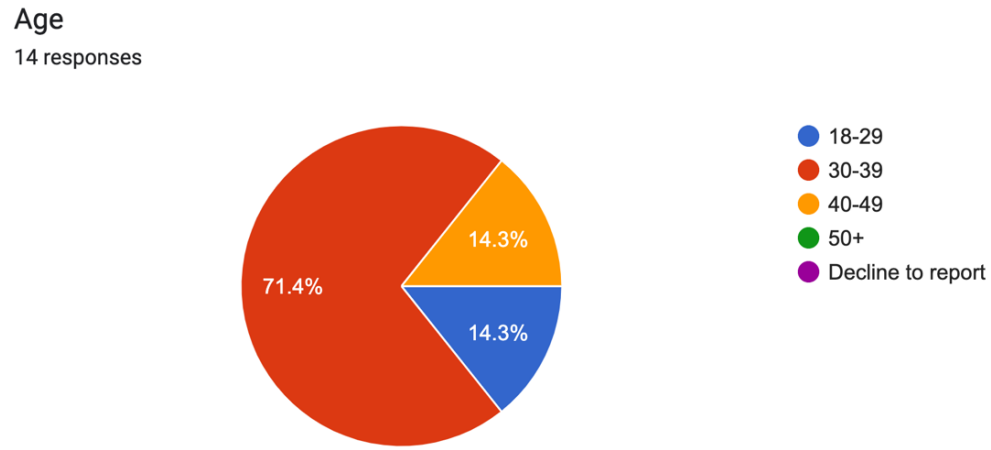
The recruitment advertisement (Appendix C) was posted to the UIRC Facebook support group page by the group administrator two times during the implementation period. This project was implemented over 16 days, from January 10, 2023, to January 25, 2023. Fourteen women completed the post-education surveys (Appendix D). An entire timeline of the project can be found in Appendix F. The percentages were calculated for each question on the post-survey. Each question will be addressed individually below.

Question 1: Participant Age

Responses were divided into categories including 18-29, 30-39, 40-49, 50 or greater, and the option to decline. Two participants were 18-29 years old; 10 participants were 30-39, and two were 40-49. The majority (71.4%) of the participants were aged 30-39.

Figure 4

Participant Age (Q1)

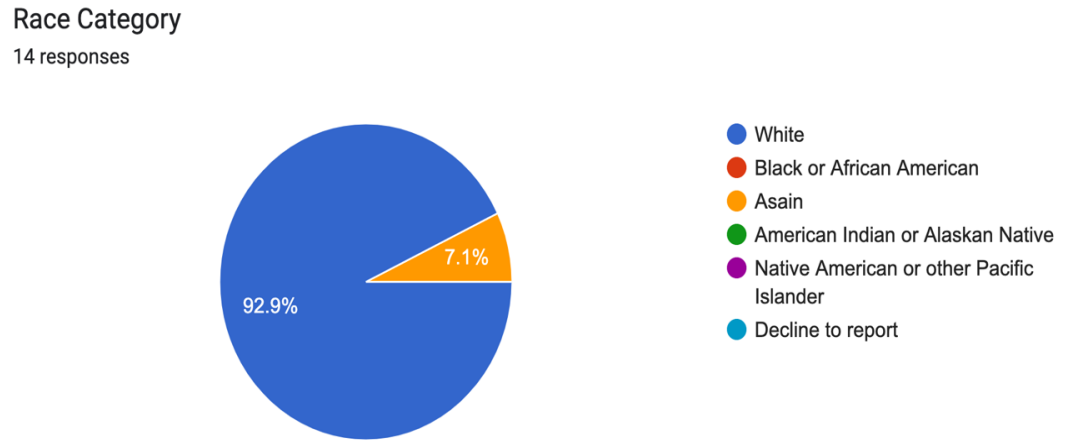


Question 2: Participant Race

Responses were divided into categories: White, Black or African American, Asian, American Indian or Alaskan Native, Native American or other Pacific Islander, and the option to decline. One of the participants was Asian, while the remaining 13 were White. The majority of participants (92.9%) were White in race.

Figure 5

Participant Race (Q2)

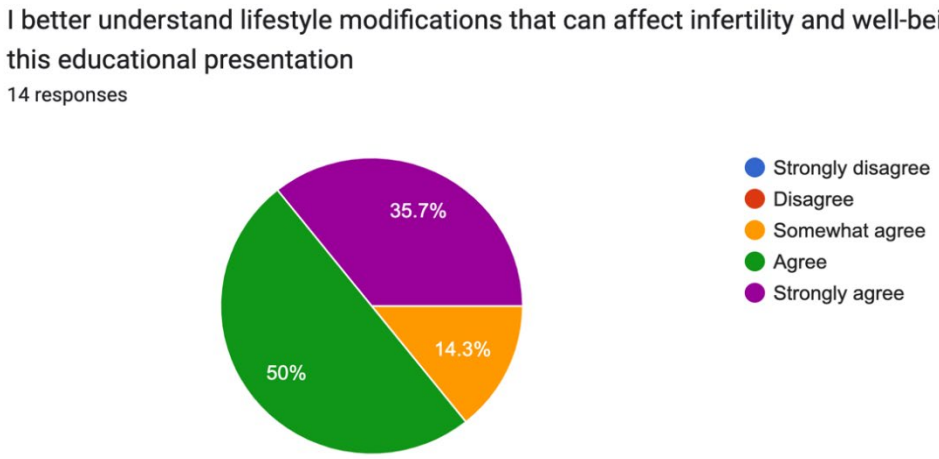


Question 3: Increased Understanding of Lifestyle and Infertility

Question 3: Participant Understanding of Lifestyle Modifications that can Affect Infertility and Well-being after Viewing the Educational Presentation. Response options included *strongly disagree, disagree, somewhat agree, agree,* and *strongly agree.* Five participants strongly agreed, seven agreed, and two somewhat agreed, indicating an overall increase in understanding of lifestyle modifications that affect infertility.

Figure 6

Increased Understanding of Lifestyle and Infertility (Q3)

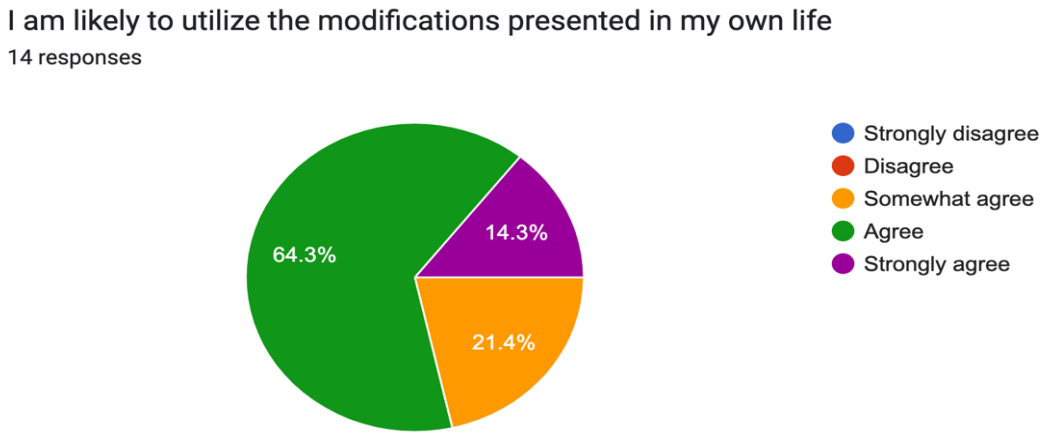


Question 4: Likeliness to Utilize Lifestyle Changes

Question 4: Participant Likeliness to Utilize the Modifications Presented in Their Own Life. Responses included *strongly disagree, disagree, somewhat agree, agree,* and *strongly agree.* Two participants strongly agreed, nine agreed, and three somewhat agreed, indicating a moderate likeliness for participants to utilize the lifestyle changes in their own lives.

Figure 7

Likeliness to Utilize Lifestyle Changes (Q4)

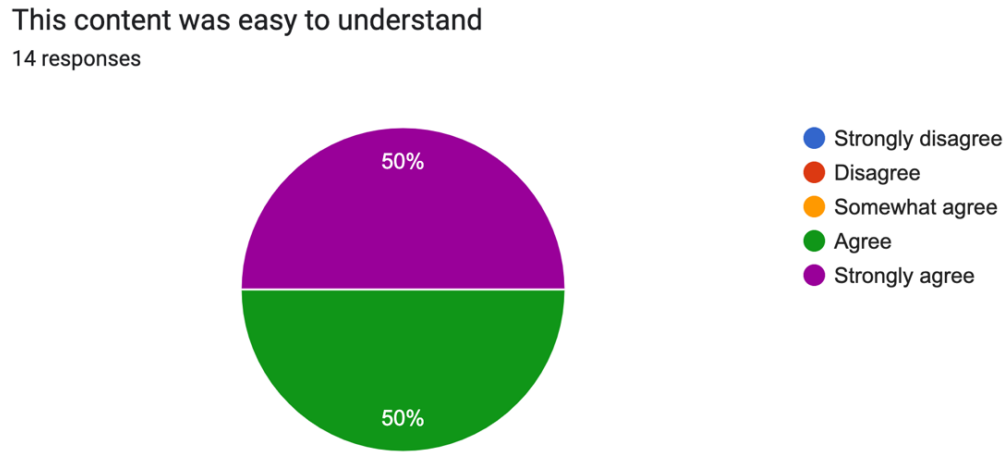


Question 5: Ease of Understanding

Question 5: The Content was Easy to Understand. Responses included *strongly disagree, disagree, somewhat agree, agree,* and *strongly agree.* Seven participants strongly agreed, and seven agreed, indicating a general agreement that the educational material was easy to understand.

Figure 8

Ease of Understanding (Q5)

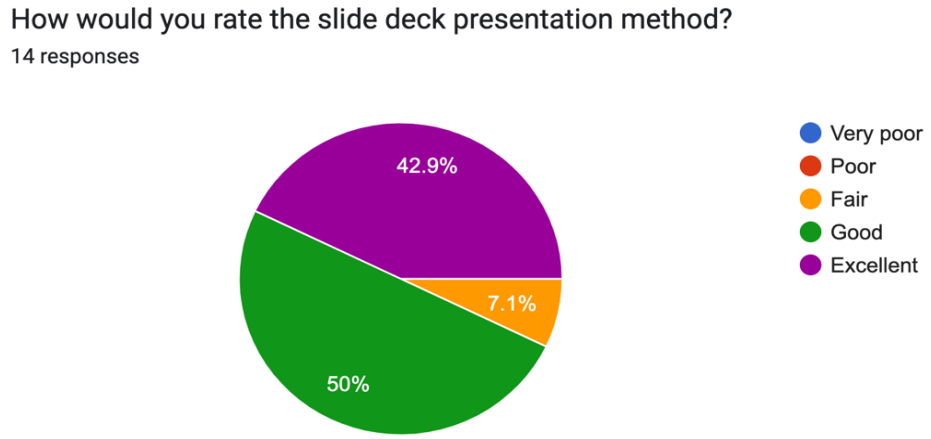


Question 6: Presentation Materials

Question 6: Participant Rating of the Presentation Slide Deck. Responses included *very poor, poor, fair, good,* and *excellent.* Six participants said excellent, seven said good, and one said fair, indicating an overall good rating of the slide deck.

Figure 9

Presentation Materials (Q6)

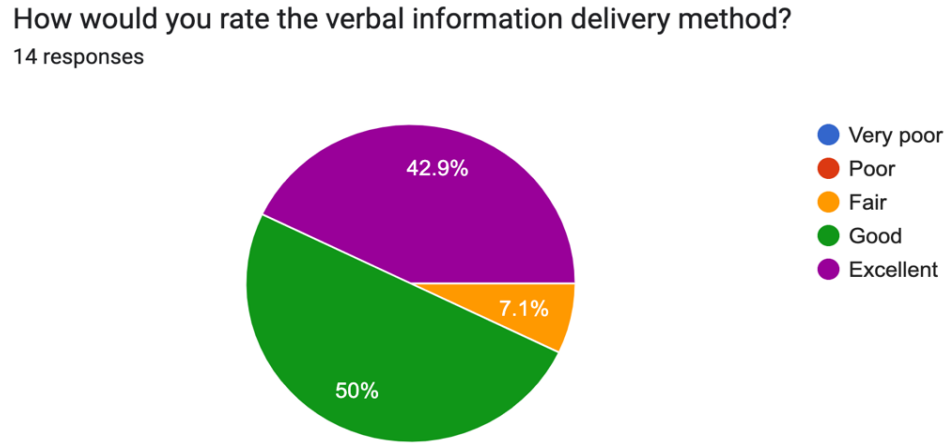


Question 7: Verbal Delivery

Question 7: Participant Rating of the Presentation Delivery. Responses included *very poor, poor, fair, good,* and *excellent.* Six participants said excellent, seven said good, and one said fair, indicating an overall good rating of the verbal delivery of information.

Figure 10

Verbal Delivery (Q7)

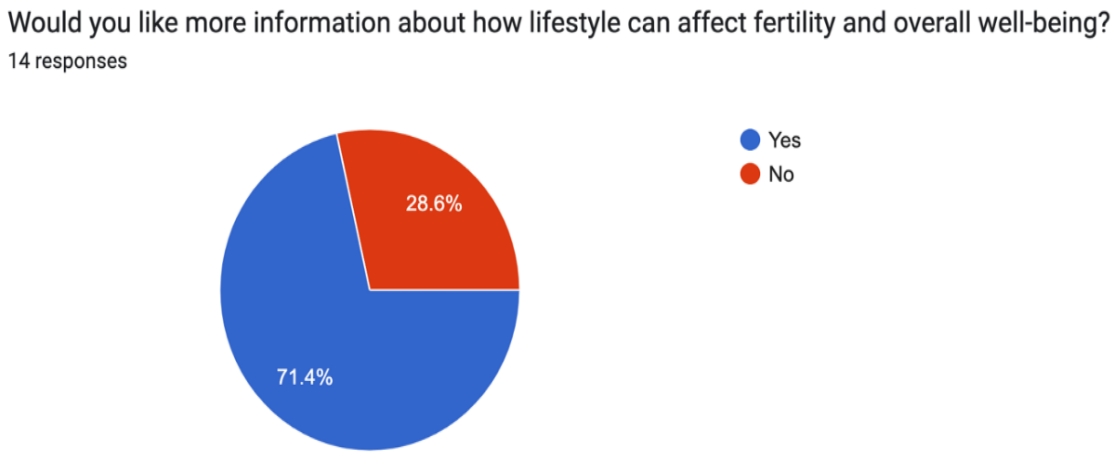


Question 8: Participant Request for Further Information

Responses were 'yes' or 'no.' Ten participants said 'yes,' and four said 'no,' indicating an above-average (71.4%) desire to receive further information on the topic.

Figure 11

Participant Request for Further Information (Q8)



DISCUSSION

Summary

The prevalence of infertility in Utah is 10-20% (Stanford et al., 2018). The fertility rate in Utah moderately decreased in 2020 when compared to 2010. Women's infertility can be affected by lifestyle choices. There are no specific clinical practice guidelines for healthcare providers to offer plans to change lifestyle choices in women with infertility, causing many patients to be left unaware. It is essential for healthcare providers to discuss these lifestyle changes with women battling infertility and all women of childbearing age.

This QI project aimed to increase the knowledge of lifestyle factors that can affect infertility and increase the use of these modifications in the lives of women with infertility. The

relationship between lifestyle factors and infertility was explained to participants through an educational presentation using evidence-based sources.

Key findings of this project included an overall increase in understanding of and intent to utilize lifestyle modifications that support fertility in women battling infertility after viewing the educational materials. The content was easy to understand for all participants, and all participants rated the presentation delivery methods fairly or above. Many participants desired to receive further information on the related subject.

Interpretation

There were two project questions for this QI project. They were: In women with infertility … :

1. Will the educational materials provided in the project increase awareness of lifestyle modifications that support fertility?
2. Will viewing the educational materials provided in the project increase patients' intent to implement these lifestyle modifications within their own lives?

Based on the post-education surveys, the intervention moderately affected participants' understanding of the link between lifestyle and infertility. There was also a moderate increase in participants' intent to utilize lifestyle changes within their own lives. The strong response from participants' desire to receive further information indicates a need for clinicians to provide more education to patients with infertility.

Implications

Practice

This QI project showed how lifestyle changes could affect women's fertility. It exposed the need further to increase education in reproductive medicine. While 85.7% of participants agreed or strongly agreed that they better understand how lifestyle factors can affect fertility, there was still a solid request to receive more information on the topic. Moreover, at least 70% of participants desired further information on lifestyle changes that can affect fertility. Infertility management and treatment should be individualized, demonstrating the need for healthcare providers to be aware of this knowledge and gap in care.

Education

This QI project delivered educational materials to women with infertility. Participants reported a moderate increase in their knowledge of lifestyle factors holistically supporting fertility and overall well-being. In addition, 85.7% of participants agreed or strongly agreed that they will likely utilize these lifestyle changes in their lives moving forward.

Research

This QI project found the need to increase provider knowledge regarding lifestyle and infertility. Most participants stated they would like more information on the topic than what was provided in the educational presentation. Considering the local problem of infertility and its many effects on overall well-being, more research in this area would be largely beneficial.

Policy

The CDC (2021) considers infertility a public health issue, but no guidelines or policies regarding lifestyle modifications support fertility. Because it is a public health issue, it would be

wise for the CDC to develop a guideline to assist clinicians in caring for women with infertility. Guidelines would ensure patients receive proper guidance on managing their fertility amongst receiving treatment when necessary. These policies would benefit patients' emotional, physical, and overall well-being. The education gap is potentially detrimental to women with infertility.

Limitations

UIRC provides resources and support for couples hoping to build their family. Recruitment took place via advertisement on the Facebook support group page. Depending on the Facebook feed algorithm, many of the group's followers may not have seen the advertisement, leading to a small sample size. To mitigate this issue, the group administrator posted the advertisement two times during the implementation period. The participant race was nondiverse. This was difficult to mitigate as the population in Salt Lake City is 72.5% white (U.S. Census Bureau QuickFacts: Salt Lake City, Utah, n.d.). Last, this Facebook group page promotes emotional and physical support for infertility couples and could skew the project's results, as many women may have already been interested in lifestyle changes to support their fertility.

DNP Essentials Addressed

The Doctor of Nursing Practice (DNP) Essentials were created by the American Association of Colleges of Nursing (AACN) (2006) as a way to provide a framework of foundational areas for students so they can transform healthcare (Zaccagnini & Pechacek, 2017).

DNP Essential I: Scientific Underpinnings for Practice

The knowledge of a mature DNP is built on science and theory (Zaccagnini & Pechacek, 2017). This essential encourages DNPs to utilize science-based concepts to evaluate and enhance

healthcare to improve patient outcomes. This project was guided theoretically by the HBM and the plan-do-study-act (PDSA) improvement cycle, which assisted in finding an appropriate way to address the problem and create an intervention.

DNP Essential III: Clinical Scholarship and Evidence-Based Practice

The doctoral student must be able to appraise and evaluate current evidence in the literature (Zaccagnini & Pechacek, 2017). and includes inquiry, analysis, synthesis, creativity, and translation. After formulating the clinical question, the principal investigator of this project conducted a full literature review to identify relevant articles and research.

DNP Essential VI: Interprofessional Collaboration for Improving Patient and Population Health

Team-based care is essential for patient safety and well-being, and optimal health is generated through a multifaceted approach (Zaccagnini & Pechacek, 2017). This project focused on lifestyle factors that support fertility and overall well-being. Dependent on the particular patient, an interprofessional collaboration led by a DNP could greatly benefit a patient's emotional and physical well-being.

DNP Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health

This essential addresses disease prevention and risk reduction (Zaccagnini & Pechacek, 2017). The foundation of this project was focused on preventing and reducing the risk of infertility through evidence-based lifestyle modifications. Improving the overall well-being of women with infertility also addresses the population health segment of this essential.

Conclusions

Infertility is a common problem within the US. According to the CDC (2021), one-in-five couples has difficulty conceiving within one year of regular, unprotected intercourse. Further, Utah's fertility rate has had a moderate decrease since 2010. Lifestyle factors can influence a woman's fertility, unbeknownst to them. Provider knowledge on this topic is also limited, despite widely available data. As outlined in this project, many modifiable lifestyle factors can support fertility. In conclusion, the participants of this project had an overall increase in knowledge of and intent to utilize lifestyle changes to support their fertility positively.

Plan for Sustainability

The educational materials used in this project will be continually improved to satisfy participants' wants. The presentation will be frequently modified with reliable and up-to-date information. Further adaptation may allow larger sample sizes, including males and more diversity, in future presentations. A needs assessment in the community, specific to lifestyle modifications utilized, would benefit future recommendations. A brochure of the presentation could be provided to patients at infertility clinics.

Plan for Dissemination

The results of this project were formally presented to the project committee in March of 2023 as a final defense. It will include a slide deck presentation of the implementation strategies and an analysis of the survey results. The results will also be disseminated and presented to the administrators of UIRC via Zoom meeting with the hopes of modifying future educational materials to meet patients' needs better.

APPENDIX A

SITE APPROVAL/THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD AUTHORIZATION LETTER

Utah Infertility Resource Center
1565 East 3300 South
Salt Lake City, UT 84106

October 19, 2022

Human Subjects Protection Program
The University of Arizona
845 N Park Ave., Suite 537A
Tucson, AZ 85719

RE: Modifiable Lifestyle Factors to Holistically Support Fertility

Please note that Ms. Tyra Hepworth, University of Arizona Doctor of Nursing Practice student, has permission from the Utah Infertility Resource Center to conduct a quality improvement project at our site prior to May 1, 2023 for her project, "Modifiable Lifestyle Factors to Holistically Support Fertility."

Ms. Hepworth will provide education materials to guests in a presentation format with an associated post-survey about the material. Guests will be recruited via social media through fliers, ads, and email and other marketing materials. After the presentation is given Ms. Hepworth will provide attendees with a brief survey and collect them the same day.

If there are any questions, please contact me.

Signed,

Auschel Felt

Auschel Felt
UIRC Project Manager
Auschel@UIRC.info

University of Arizona IRB
845 N Park Ave., Suite 537A
Tucson, AZ 85719
Fax: 520-621-9810
VPR-IRB@arizona.edu

NOT HUMAN RESEARCH

January 10, 2023

Tyra Hepworth

Dear Tyra Hepworth:

On 1/10/2023, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title:	Modifiable Lifestyle Factors to Holistically Support Fertility
Investigator:	Tyra Hepworth
IRB Submission ID:	STUDY00002364
Sponsor:	None
Prime Sponsor:	None
IND, IDE, or HDE:	None
Documents Reviewed:	• Advisor Attestation.pdf, Category: Institutional Approval; • Disclosure Form.doc, Category: Consent Form; • IRB Protocol for Determination of Human Research.docx, Category: IRB Protocol; • Post-Survey.docx, Category: Data Collection Tool; • Presentation Slides.docx, Category: Other; • Site Authorization.pdf, Category: External Site Authorization; • UIRC advertisement.png, Category: Recruitment Materials;

The IRB determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations.

IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are research involving humans in which the organization is engaged, please

THE UNIVERSITY OF ARIZONA
Research
Innovation & Impact

University of Arizona IRB
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Tucson, AZ 85719
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submit a new request to the IRB for a determination. You can create a modification by clicking **Create Modification / CR** within the study.

All Covered Individuals must disclose all sponsored and non-sponsored Research Projects to the Office for Responsible Outside Interests (OROI) prior to Conducting Research if the individual is an Investigator. Please visit the OROI website for more information.

We value your feedback and would appreciate you taking the time to complete our survey about your experience with the IRB staff:
https://uarizona.co1.qualtrics.com/jfe/form/SV_ehQ04WxNA06b42i.

If questions arise at any time during your study, please email the general IRB inbox at VPR-IRB@arizona.edu.

APPENDIX B

CONSENT DOCUMENT (DISCLOSURE FORM)

DISCLOSURE FORM

Modifiable Lifestyle Factors to Holistically Support Fertility

Introduction
My name is Tyra Hepworth. I am a Registered Nurse and a Doctor of Nursing Practice, Family Nurse Practitioner student at the University of Arizona, College of Nursing.

Purpose of the project
I am conducting a Quality Improvement project at the Utah Infertility Resource Center. The purpose of this project is to assist women struggling with infertility in increasing their awareness and understanding of lifestyle modifications that may increase natural fertility and overall well-being.

Why are you being asked to participate?
All women ages 18 and older are invited to participate in this Quality Improvement project. Your feedback may help tailor future educational materials and better personalize care for women with infertility.

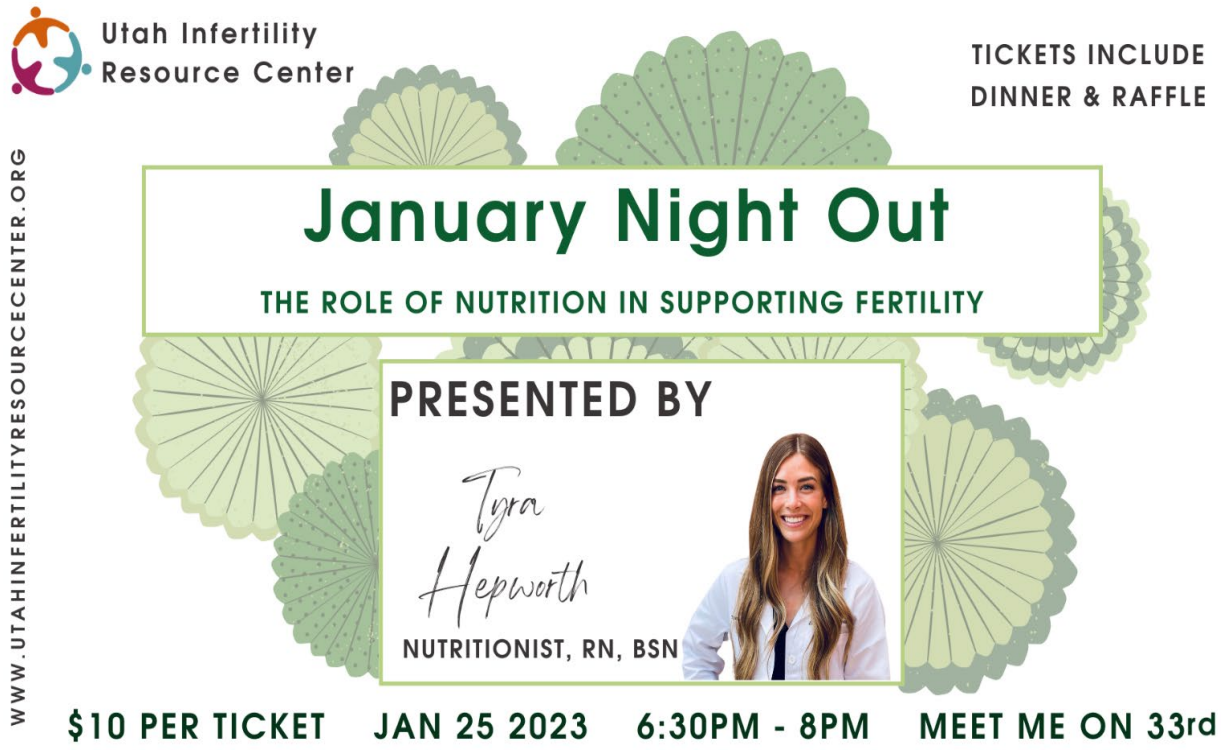
Description of the project
If you choose to take part in this project, you will participate in viewing an educational slide deck intended to increase awareness of lifestyle modifications that may support your overall well-being. This presentation will take place at Meet Me on 33rd in Millcreek, Utah, and will take approximately 30 minutes. You will then have the opportunity to ask questions. After the presentation, a short survey will be accessed via a QR code. These surveys will allow me to understand the effectiveness of the educational materials and ways to improve in the future.

Are there any risks?
There are no foreseeable risks associated with participating in this project. Your responses are anonymous. Your name will not be collected or linked to your answers. Participation in this project is voluntary and you may withdraw at any time. In addition, you may skip any question that you choose not to answer. By participating, you do not give up any personal legal rights you may have as a participant in this project.

For questions or concerns you may contact
Tyra Hepworth, RN, BSN
University of Arizona DNP-FNP student
tyrahepworth@email.arizona.edu

APPENDIX C

RECRUITMENT MATERIAL (RECRUITMENT FLYER)


Utah Infertility
Resource Center
TICKETS INCLUDE
DINNER & RAFFLE
WWW.UTAHINFERTILITYRESOURCECENTER.ORG
January Night Out
THE ROLE OF NUTRITION IN SUPPORTING FERTILITY
PRESENTED BY
Tyra
Hepworth
NUTRITIONIST, RN, BSN
$10 PER TICKET
JAN 25 2023
6:30PM - 8PM
MEET ME ON 33rd

APPENDIX D

EVALUATION INSTRUMENTS (POST-EDUCATION SURVEY)

POST-EDUCATION SURVEY

1. Age:

   18-29 30-39 40-49 50+ Decline to report

2. Race Category:

   White | Black or African American | Asian | American Indian or Alaskan Native

   Native Hawaiian or other Pacific Islander | Decline to report

3. I better understand lifestyle modifications that can affect infertility and well-being after viewing this educational presentation

   Strongly disagree Disagree Somewhat agree Agree Strongly agree

4. I am likely to utilize the modifications presented in my own life

   Strongly disagree Disagree Somewhat agree Agree Strongly agree

5. This content was easy to understand

   Strongly disagree Disagree Somewhat agree Agree Strongly agree

6. How would you rate the slide deck presentation method?

   Very poor Poor Fair Good Excellent

7. How would you rate the verbal information delivery method?

   Very poor Poor Fair Good Excellent

8. Would you like more information about how lifestyle can affect fertility and overall well-being?

   Yes No

9. Please leave any additional comments, questions, or suggestions here:

APPENDIX E

PARTICIPANT MATERIAL (EDUCATIONAL POWERPOINT SLIDES)

1

Disclaimer

- This is not meant to be medical advice. Please speak with your healthcare provider before changing specific health practices.

2

Goals of this Presentation

- Increase awareness of lifestyle factors that support overall well-being and fertility
- Increase the use of these lifestyle changes within your own lives

3

Causes of Infertility

- 1/3 unknown cause
- 1/3 male factors
- 1/3 female factors
  - 40% ovulation disorders

4

Risks for Ovulation Disorders

Premature menopause	Autoimmune and hormone disorders	Eating disorders
Alcohol and drug use	Stress	Intense exercise

5

Other Risks for Infertility

- Age
- Smoking
- Extreme weight gain or loss

6

Lifestyle Factors that Support Fertility & Overall Health

- Reduce stress
- Sleep
- Moderate exercise
- Nutritious diet
- Decrease environmental toxins
- Decrease or stop alcohol use and smoking
- Prenatal vitamins

7

Reduce Stress

- Increasing the Vagus nerve tone
  - Parasympathetic Nervous System: "rest and digest"
  - Triggers relaxation

COLD EXPOSURE | DEEP & SLOW BREATHING | SING, HUM, GARGLE | EXERCISE

8

Sleep

- Lower sleep duration — increased inflammation in the body — menstrual irregularities and reproductive dysfunction
- Melatonin: antioxidant qualities
  - 30 minutes of early morning and evening sun
  - Decrease blue light exposure

9

Moderate Exercise

- Sedentary lifestyle — increased inflammation of the body
- 30 – 60 minutes each day

10

Nutritious Diet

- Fertility boosting foods
  - Whole grains
  - Some seafood
  - Full-fat dairy
  - Soy foods
  - Limit high-pesticide fruits and vegetables
  - Limit fast food
  - Limit sugar-sweetened drinks

11

Decrease Environmental Toxins

- More than 80,000 environmental chemicals in the air, soil, drinking water, and consumer products
  - Endocrine-disrupting chemicals
    - BPA
      - Cans and plastic containers
    - Phthalates
      - Personal care products and fragrances
    - *Artichoke extract
    - Heavy metals
      - Mercury
        - Some seafoods, dental supplies, and skin creams
      - Lead
        - Soil, clay, paint, and jewelry

12

Decrease Alcohol and Tobacco Use

- Should attempt to completely avoid alcohol and tobacco

13

Prenatal Vitamins

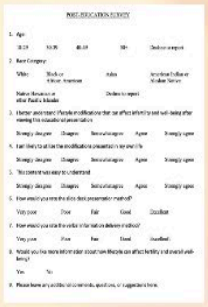
- Most diets are insufficient in micronutrients
  - Folate, vitamin B, C, and D, and zinc

14

Control the controllables!

15

Post-Survey



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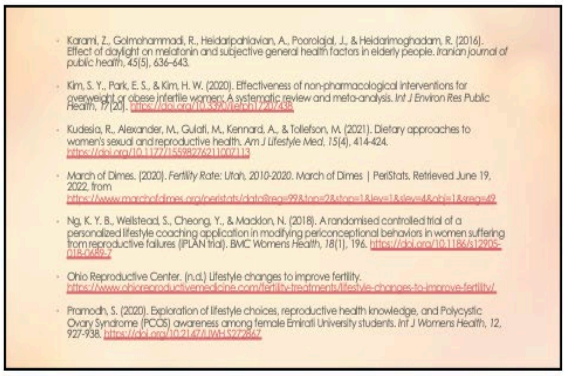

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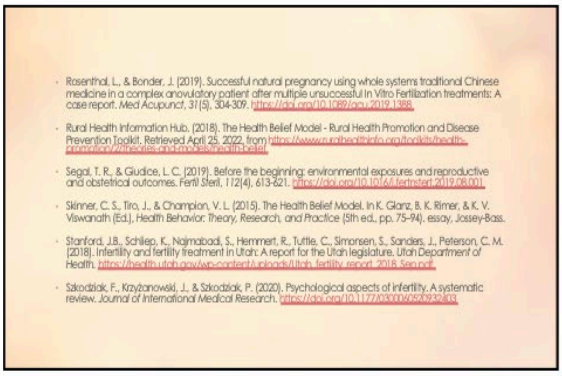

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APPENDIX F

PROJECT TIMELINE

Completion Date	Planning	Pre-implementation	Implementation	Evaluation
11/5/2021	Initial meeting with UIRC administrator			
6/23/2022	Second meeting with UIRC administrator			
7/1/2022 – 12/23/2022		Development of advertisement, presentation slide-deck, post-survey, and QR code		
10/19/2022	Site approval letter received			
11/29/2022		Presented proposal defense to project committee		
12/29/2022		Submitted to UA IRB		
1/10/2023		Obtained IRB approval		
1/10/2023 – 1/25/2023			Advertisements posted to Facebook page, educational materials presented to participants, post-surveys collected	
1/26/2023 – 2/15/2023				Analyzed post-survey data
3/28/2023				Presented final defense to project committee, disseminated results to UIRC

APPENDIX G

LITERATURE REVIEW GRID

Project Questions: 1) Did the educational materials provide increased awareness of lifestyle modifications that support fertility? 2) Did viewing the educational materials provided in the project increase patients' intent to implement these lifestyle modifications within their own lives?

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
Barron et al., 2020	Measuring fertility health knowledge in university students: Development and testing of a survey tool	Case report	This instrument is a valid and reliable short screening tool that can be used to assess knowledge of fertility and possibly open discussions about fertility self-care.	Assessing the increase in awareness by using a screening to assess knowledge on fertility. This study addresses an instrument used to assess this knowledge and will be helpful in guiding my fertility questionnaire.
Boedt et al., 2021	Preconception lifestyle advice for people with infertility	Randomized control trial	To assess the safety and effectiveness of preconception lifestyle advice on fertility outcomes and lifestyle behavioral changes for people with infertility. Suggests that preconception lifestyle advice on a combination of topics may result in little to no difference in the number of live births. Evidence was insufficient to allow conclusions on the effects of preconception lifestyle advice on adverse events and miscarriage and on safety, as no studies were found that looked at these outcomes, or the studies were of very low quality. This review does not provide clear guidance for clinical practice in this area. However, it does highlight the need for high-quality RCTs to investigate preconception lifestyle advice on a	This study showed little to no difference when looking at live births related to an increase in lifestyle changes for those with infertility. However, it did suggest the need to continue increasing education on this topic and then studying its effectiveness on fertility.

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			combination of topics and to assess relevant effectiveness and safety outcomes in men and women with infertility.	
Dupont et al., 2020	Effectiveness of a therapeutic multiple-lifestyle intervention taking into account the periconceptional environment in the management of infertile couples: Study design of a randomized controlled trial - the PEPCI study	Randomized control trial	The proposed PEPCI project might provide evidence that programs, aimed at beneficially changing preconception nutritional and lifestyle factors, should be considered as a first-choice treatment for unexplained infertility and should be suggested to each couple before ART. This original research program could also lead to public recommendations of periconceptional habits not only for sub fertile couples but for all parents-to-be.	This study indicates that women with infertility should consider nutrition and other lifestyle changes before infertility treatments like IVF.
Gaskins et al., 2019	Dietary patterns and outcomes of assisted reproduction	Prospective study	Higher pretreatment adherence to the profertility diet was associated with an increased probability of live birth among women undergoing assisted reproductive technologies. Commonly recommended dietary advice such as adhering to the Mediterranean diet may not provide the most appropriate guidance for women undergoing infertility treatment in the United States.	This study showed that a 'profertility' diet was associated with an increased live birth rate. The Mediterranean diet did not provide appropriate changes to women with infertility.
Grieger et al., 2020	Preconception diet, fertility, and later health in pregnancy	Prospective cohort study	Higher adherence to the profertility diet, characterized by a higher intake of	This study addresses the major factors in the profertility diet and showed an

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			supplemental folic acid, vitamin B12, vitamin D, low-pesticide fruits and vegetables, whole grains, seafood, dairy, and soy foods, and a lower intake of high-pesticide fruits and vegetables had higher odds of live birth by up to 50%. Further studies on dietary patterns and quantifying intakes will be helpful to potentially support recommendations on preconception diets and fertility.	increase in live birth rate when following the diet strictly.
Kim et al., 2020	Effectiveness of non-pharmacological interventions for overweight or obese infertile women: A systematic review and meta-analysis	Systematic review/Meta-analysis	Nonpharmacological interventions could have a positive effect on the pregnancy and natural conception rates, whereas it is unclear whether they improve the live birth rate. Further research is needed to demonstrate the integrated effects of nonpharmacological interventions involving psychological outcomes, as well as pregnancy-related outcomes.	The lifestyle modifications represented in the systematic review showed a positive effect on natural conception.
Kudesia et al., 2021	Dietary approaches to women's sexual and reproductive health	Prospective cohort study	Women with the highest intake of a "fertility diet" composed of plant proteins, full-fat dairy, nonheme iron, and monounsaturated fats, with low intake of trans fats and animal proteins, had a 66% lower risk of infertility related to ovulatory disorders and a 27%	This study is similar to the systematic review above in that it suggests that a diet high in plant proteins, full-fat dairy, nonheme iron, and monounsaturated fats had a lower risk of infertility.

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			lower risk of infertility from other causes, when compared with women with the lowest intake of this diet pattern, in a controlled analysis. Indeed, population attributable risk calculations based on this sample suggest that not following the "fertility diet" was the attributable factor in 46% of cases of infertility.	
Ng et al., 2018	A randomised controlled trial of a personalised lifestyle coaching application in modifying periconceptional behaviours in women suffering from reproductive failures (Iplan trial)	Randomized control trial	A personalized lifestyle coaching application may represent an empowering and cost-effective means of delivering periconceptional advice in women with subfertility or recurrent miscarriages.	This study shows the benefits of considering a lifestyle coach when looking to increase the natural chances of conceiving. It discusses important lifestyle advice for women with infertility.
Pramodh, 2020	Exploration of lifestyle choices, reproductive health knowledge, and polycystic ovary syndrome (PCOS) awareness among female Emirati university students	Case report	Mandatory programs and increasing availability of healthy eating options in campus should be considered by all universities, particularly in Arab regions, for improving lifestyle and preventing metabolic disorders in young students.	This case report may not be as useful as other resources listed here, but personal stories can generate motivation. This report looked at programs to increase a healthy diet at a university and the decrease in metabolic disorders, which relate to infertility.
Rosenthal & Bonder, 2019	Successful natural pregnancy using whole systems traditional Chinese medicine in a complex anovulatory patient after multiple	Case report	This report suggests that that in the setting of multiple IVF failure in anovulatory PCOS patients, the multifaceted approach of WS-TCM may be a treatment option to consider,	Although this case report indicates that more research is needed on this topic, it's important to look at studies that show the benefits of implementing lifestyle changes before or while initiating infertility treatments.

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	unsuccessful in vitro fertilization treatments: A case report		particularly before advising patients to move on to using egg donation or adoption. WS-TCM may provide an alternative means to induce ovulation and increase the odds of conceiving. More research is needed.	
Segal & Guidice, 2019	Before the beginning: Environmental exposures and reproductive and obstetrical outcomes	Cross-sectional study	Although environmental toxicants are hidden players on the reproductive stage, scientific evidence for their harm shows that the time has come to minimize their effects on our reproductive capacity and outcomes and advocate for change for the health and well-being of this and future generations	This cross-sectional study looks at an important lifestyle change that may improve fertility. While many of the studies show what to add to your lifestyle to increase fertility, this study looks at what to minimize in your life.

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