

EDUCATION OF STRESS MANAGEMENT DURING INFERTILITY

by

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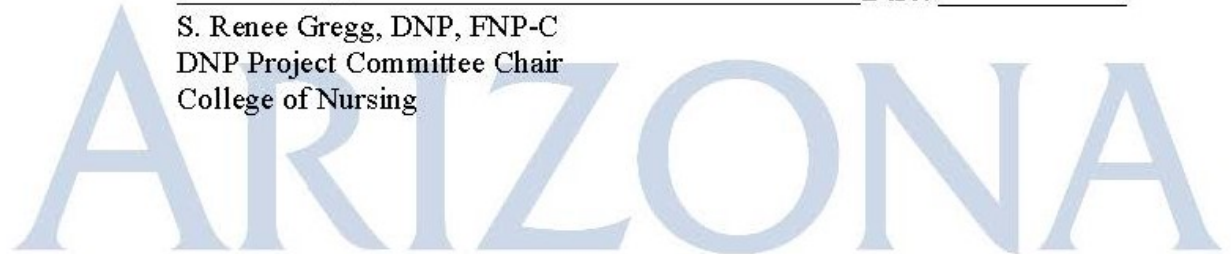
  
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## DEDICATION

To all the women who have dealt with infertility ...

You are loved, you are strong, you are enough, and you are not alone.

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## ABSTRACT

Infertility affects 10% of women in the United States, making it an extremely common problem. Rates of anxiety and depression are found to be much higher in women dealing with infertility. Despite this education concerning stress, infertility, and stress reduction techniques are lacking in availability. The purpose of this project is to educate women dealing with infertility about the link between stress and infertility, as well as stress reduction techniques and intent to implement stress management techniques. Recruitment took place in Facebook infertility support group with women ages 18-50. They completed surveys in the RedCap system before and after viewing education materials in the form of a brochure and video explanation of the brochure. Educational materials including information about the relationship between stress and infertility, as well as specific examples of stress reduction techniques. Overall participants reported a minor increase in understanding concerning stress and infertility, and an increased intent to utilize stress management techniques of 20%. While this project was performed with a small sample the reported increased intent to use stress reduction techniques and desire for more information about stress and infertility show that the education materials could be revised and used for future research.

## **INTRODUCTION**

The birth rate in the United States (U.S.) is on a steady decline, with rates dropping 2% between 2017 and 2018, making births in 2018 the lowest in 32 years (NVSS, 2019). One contributing factor to this decline is the increasing rates of infertility. One in ten U.S. women has difficulty becoming or staying pregnant (HHS, 2019). While many factors may be at the root of this growing issue, increased levels of perceived stress is a known factor with infertility (Domar, 2019). However, stress management education when undergoing treatments for infertility is not a priority in many reproductive medicine clinics. This lack of education should be addressed to improve understanding as well as potential outcomes.

### **Background Knowledge**

Currently, in the U.S., approximately 10% of women have issues becoming pregnant and are dealing with infertility (Stanford et al., 2018). Two-thirds of infertility cases have an identifiable cause, whether originating from the woman or the man, while the other one-third of cases do not have an identifiable cause and are considered idiopathic (HHS, 2019). Utah leads the nation in cases of infertility and the number of women seeking reproductive medicine to conceive, with up to 20% of couples dealing with infertility issues (Stanford et al., 2018). Also, rates of depression and anxiety have been found to be up to four times higher in women dealing with infertility and the related treatment modalities (Ramezanzadeh et al., 2004).

Stress, particularly long-term stress, can have a profound effect on the body and even present as physical ailments or illnesses (MQ Mental Health, 2018). Research has shown that women dealing with stress, particularly depression and anxiety are twice as likely to deal with infertility as women that are not dealing with those issues (Domar, 2019). Infertility can have

profound effects on the quality of life of the women dealing with it (Palomba et al., 2018), and with approximately 10% of the population dealing with the issue, possible interventions to aid in improving the care and quality of life of these women need to be addressed and implemented. This cyclical effect of stress on infertility and vice versa needs an intervention to aid in stopping the cycle.

The Society for Assisted Reproductive Technology (SART) has developed a presentation concerning the link between stress and fertility that includes additional resources for coping with the stress of infertility that is open for anyone to view from their website. Planned Parenthood also has information available on its website for anyone to access. While these are valid resources, they lack face-to-face interaction with those dealing with infertility, which can be an essential factor in ensuring the material is understood.

Education concerning the links between stress and fertility is needed as a way of combating such a prevalent issue. Along with providing physical information about stress and fertility, relevant and appropriate options for stress relief should also be presented as part of the education process. Mindfulness exercises (Ghawadra, Abdullah, Choo, & Phang, 2019), social support (Casu et al., 2019), group counseling (Ehsan, Yazdkhasti, Rahimzadeh, Atae, & Esmaelzadeh-Saeieh, 2019), and journaling (Hamilton, Wilhite, Grefe, Hart, & Jin, 2019) have all been found to be effective at relieving stress. These interventions can be utilized by those dealing with infertility and related treatments.

Health literacy is an important issue within health care because only 12% of the population is considered proficient regarding health literacy (HHS, 2008). An individual's reading or education level does not guarantee that they will understand the information presented

to them from a medical standpoint. In developing new education materials, it must be appropriate for all health literacy levels to ensure adequate understanding (CDC, 2019b).

### **Local Problem**

The Utah Department of Public Health (2019) found using the Utah Pregnancy Risk Assessment Monitoring System (PRAMS) that 26% of women experience anxiety prior to conception and 17% of women experience depression prior to conception. Both of these values have been shown to increase when dealing with infertility up to 86% and 40%, respectively (Ramezanzadeh et al., 2004). The national birth rate has been steadily declining over the last decade. This is of concern to local governments and government officials because the implications of declining birth rates mean that the population is not replacing itself, and the number of adults entering the workforce and contributing to programs like Social Security is declining (Rowe, Goldman, & Olshansky, 2018).

The site for implementation of this quality improvement project was an infertility support group of Facebook called myMindBodyBaby Infertility Support: Nutrition, Fitness & Mental Health. The group was started in 2019 and has approximately 700 members. The administrator of the group recognized that education regarding stress and infertility can be lacking and needs to be more readily available to those who are dealing with infertility

### **Purpose**

The purpose of the quality improvement (QI) doctor of nursing practice (DNP) project was to increase the understanding of women dealing with infertility concerning the link between stress and infertility, as well as improve their knowledge of stress reduction methods and intent to implement stress management.

This project utilized newly developed, evidence-based education materials discussing the relationship between stress and infertility and provide stress-reducing strategies to participants through written materials and a verbal explanation. Research has shown that up to 87% of women feel that they need additional reproductive education (Bennett et al., 2015) without the additional challenge of navigating the field of infertility.

### **Project Questions**

In women currently dealing with infertility:

1. Will viewing education materials increase awareness of the link between stress and infertility?
2. Will women express intent to utilize stress reduction techniques as part of their infertility journey?

### **Specific Aims**

1. To improve the understanding of women dealing with infertility concerning the link between stress and infertility and introduce strategies for stress relief through the development of education materials to be delivered both verbally and with written materials.
2. Evaluate effectiveness of teaching through pre- and post-tests or surveys.
3. Evaluate intent to change and incorporate stress management into their fertility journey based on the educational intervention.

### **Theoretical Framework**

The use of theory, when attempting to create improvements and changes in healthcare, can make complex situations more understandable and more manageable (Green, 2000).

Additionally, theories can aid in overcoming barriers to change through new interventions (McDonald, Graham, & Grimshaw, 2004). The Health Belief Model (HBM) was the chosen theoretical framework in developing a quality improvement project for education concerning fertility, stress, and stress reduction techniques. The HBM has been successfully used to guide other education programs (Bayat et al., 2013; Shao et al., 2018; Yue et al., 2015), which justified the choice of this framework.

The HBM developed between 1950 and 1960 by researchers in the United States Public Health Service (Skinner, Tiro, & Champion, 2015). The HBM focuses on identifying health behaviors as well as promoting health education (Skinner, Tiro, & Champion, 2015). This model is comprised of six key concepts that include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Skinner, Tiro, & Champion, 2015). The HBM uses negative health consequences as a means to motivate individuals to make positive choices and actions concerning their health.

### **Perceived Susceptibility**

According to the HBM, perceived susceptibility refers to one's perceived likelihood of developing any given condition (Skinner, Tiro, & Champion, 2015). In this case, susceptibility relates to the development of elevated stress levels, which then further impacts infertility.

Women may not realize how fertility treatments vary from other forms of medical care, putting them at risk for developing elevated stress levels, including various degrees of anxiety and depression.

**Perceived Severity**

According to the HBM, perceived severity describes how serious a condition is thought to be (Skinner, Tiro, & Champion, 2015). In this case, the perceived severity is the effects of elevated stress levels related to infertility and fertility treatments. Women may not understand the full extent of what fertility treatments entail and the stress, both physical and emotional, that can be caused by that lack of knowledge.

**Perceived Benefits**

According to the HBM, perceived benefits are the possible positive benefits that can come from a changed behavior (Skinner, Tiro, & Champion, 2015). The future educational content that will be provided aims to increase understanding concerning stress and infertility, as well as decrease stress levels. If women participate in stress reduction techniques presented, their quality of life will improve with the decreased stress levels.

**Perceived Barriers**

According to the HBM, perceived barriers are the possible issues that can be encountered when implementing a change, including obstacles or negative consequences (Skinner, Tiro, & Champion, 2015). The primary barrier to this quality improvement project would be women not being interested in participating in the study. One other barrier would be participant health literacy levels and their ability to understand the education provided.

**Cues to Action**

Cues to action are the concept of the HBM that are the driving forces to get those involved to take part or take action (Skinner, Tiro, & Champion, 2015). By educating women about the effects of stress and infertility, it is the hope that they will be receptive to the

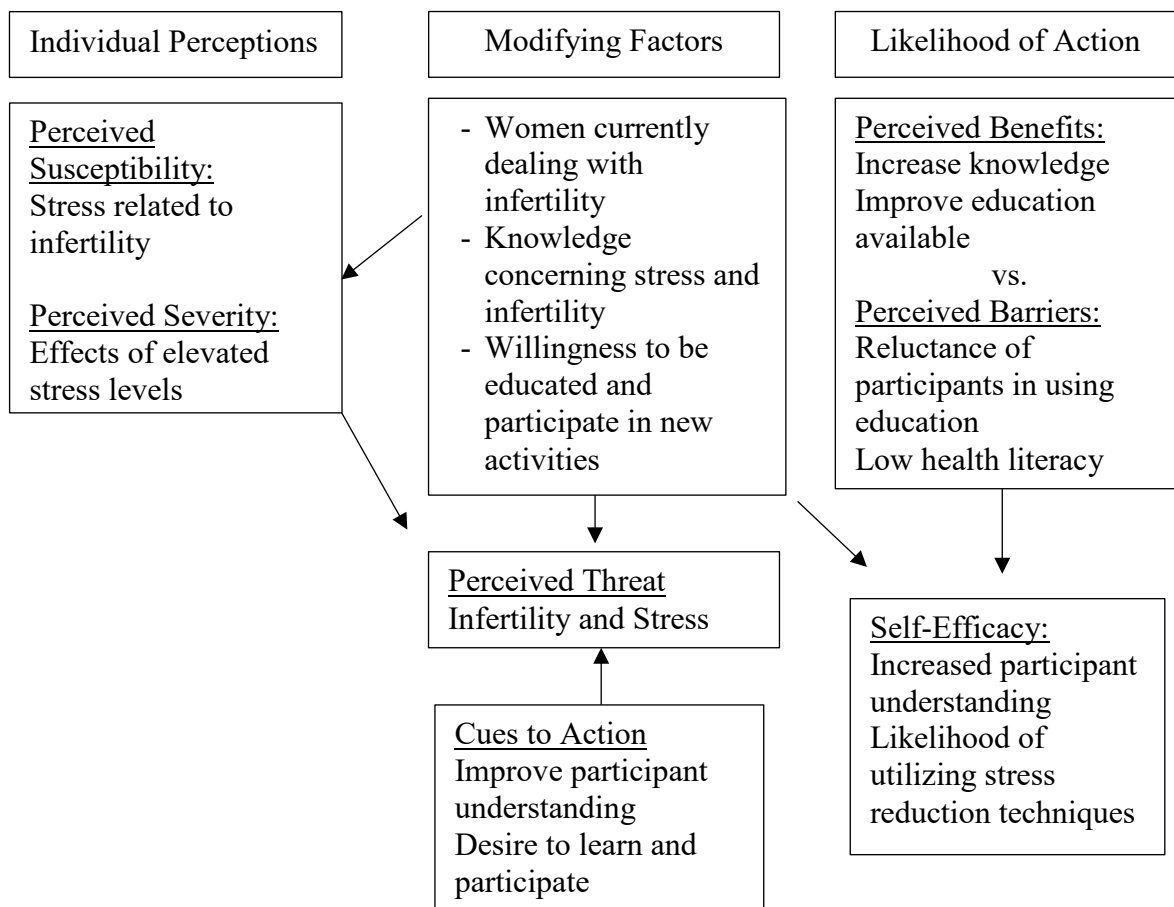
information, want to participate in stress reduction activities, and feel empowered to ask their healthcare providers for more information if they feel they need it.

### **Self-Efficacy**

Self-efficacy is the individual feeling that one can perform recommendations for change (Skinner, Tiro, & Champion, 2015). Following education delivery, participants will have increased knowledge about infertility and stress as well as stress reduction techniques. In addition to increased understanding, participants will also be asked about their intent to utilize stress reduction techniques.

### **Theory into Practice**

The HBM theoretical framework was utilized to develop educational materials for women currently dealing with infertility concerning stress, infertility, and stress reduction techniques. Through the identification of perceived susceptibility and perceived severity this project will be able to address the threat of illness. The goal is to develop quality education concerning the severity of infertility-related stress, overcome barriers to the implementation of new education, accomplish benefits to providing this education, and provide tools to women allowing them to have self-efficacy in the participation of stress reduction. Figure 1 provides a visual representation of this process.

**Figure 1***Health Belief Model*

*(Adapted from Hazavehei, Taghdisi, & Saidi, 2007)*

### Key Concepts

Frequently stated key concepts that are included within this paper include infertility, fertility treatments, stress, stress reduction, and health literacy.

**Infertility**

Infertility, as defined by the World Health Organization (WHO), is the failure to achieve pregnancy after 12 months or more in sexually active couples not using contraceptives (WHO, 2016).

**Fertility Treatments**

Fertility treatments are medical interventions used to achieve pregnancy (CDC, 2019). Some examples include the use of ovulation medications, artificial intrauterine insemination (IUI), and in vitro fertilization (IVF).

**Stress**

Stress is defined as any factor, whether physical, emotional, or mental, that causes tension (Sheil, 2018). Stressors can be environmental, such as job pressures, or internal, such as illnesses.

**Stress Reduction**

Stress reduction is the ability to decrease the physiological effects of stress through various coping mechanisms (Craig Hospital, 2015).

**Health Literacy**

Health literacy involved any individual's knowledge base that allows them to successfully understand information in medical situations (CDC, 2019). Knowledge includes accessing medical services, as well as understanding and following medical plans of care appropriately (CDC, 2019).

### Literature Synthesis

A literature search was conducted related to infertility and stress. The CINAHL and PubMed databases were searched using key terms “infertility and stress,” “effects of stress on fertility,” and “stress reduction for fertility.” Search filters were utilized to narrow results to those appropriate for analysis.

Within the CINAHL database, the first term yielded 786 results. Dates were narrowed to 2015 to present, and other criteria were applied in the refine results application, including “free full text,” and “English,” which reduced the number of results to 329. The second search term yielded seven results using the same search criteria. The third search term yielded just two results using the same search criteria.

Within the PubMed database, the first term yielded 3,838 results. Dates were narrowed to 2015 to present, and other criteria were applied to refine the results, including “free full text,” and “humans,” which reduced the number of results to 13. The second term yielded six results using the same search criteria. The third term yielded three results using the same search criteria. Some 360 results from the combined database searches were considered, and additional searches adding the term “health literacy” to the previous searched were utilized to further narrow results. Results not pertaining to or having relevance specifically to the subject of infertility, stress, and patient education were excluded. Fourteen articles were selected for the full review.

An analysis of the 14 articles selected was performed. Overall, the data showed that there are links between stress and infertility (Damone et al., 2019; Facchin et al., 2019; Li et al., 2019), including increased requirements for antidepressants in women receiving fertility treatments (Pedro et al., 2019). Data also showed that the need for additional education that is health

literacy appropriate is indicated and necessary in the setting of infertility (Bennet et al., 2015; Kilfoyle et al., 2016; Mastroianni et al., 2019; Parnell et al., 2019). Based on the data, techniques such as yoga (Kirca & Pasinlioglu, 2019), journaling (Hamilton et al., 2019), group counseling (Ehsan et al., 2019), increased social support (Casu et al., 2019), and various mindfulness exercises (Bai et al., 2019; Ghawadra et al., 2019) would be appropriate recommendations for stress reduction in the setting of infertility.

Three of the 14 articles were randomized controlled trials (Bai et al., 2019; Eshan et al., 2019; Kirca & Pasinlioglu, 2019). Three out of the 14 articles were the outcomes of systematic reviews (Ghawadra, Abdullah, Choo, & Phang, 2019; Kilfoyle, Vitko, O'Connor, & Bailey, 2016; Parnell et al., 2019). The remaining articles consisted of one non-randomized control trial (Hamilton et al., 2019), two cross-sectional surveys (Bennet et al., 2015; Li et al., 2019), one cross-sectional analysis of a longitudinal study (Damone et al., 2019), two observational studies (Facchin et al., 2019; Pedro et al., 2019), one dyadic study (Casu et al., 2019), and one pre- and post-effectiveness study (Mastroianni et al., 2019). A summary table can be found in Appendix G.

A literature review shows that there is a link between infertility and stress, with up to 40% of women receiving fertility treatments having been diagnosed with anxiety, depression, or both (Rooney & Domar, 2018). Additionally, health literacy has been shown to impact all aspects of reproductive health outcomes (Kilfoyle, Vitko, O'Connor, & Bailey, 2016). The primary focus should be creating a comprehensive education material that is appropriate for all health literacy levels, which adequately covers the links between stress and fertility as well as

realistic options for potential stress reduction to be presented to women currently dealing with infertility

## **Data, Health Literacy and Recommended Therapies**

### **Current Data and Health Literacy**

A literature review shows that there is a link between infertility and stress, with up to 40% of women receiving fertility treatments having been diagnosed with anxiety, depression, or both (Rooney & Domar, 2018). Additionally, health literacy has been shown to impact all aspects of reproductive health outcomes (Kilfoyle, Vitko, O'Connor, & Bailey, 2016). The primary focus should be creating a comprehensive education material that is appropriate for all health literacy levels, which adequately covers the links between stress and fertility as well as realistic options for potential stress reduction to be presented to women currently dealing with infertility.

It has been found that stress related to infertility is significantly associated with increased antidepressant use (Pedro et al., 2019). Women with higher stress levels are also more likely to experience sexual dysfunction and infertility (Facchin et al., 2019). PCOS, which is a common cause of infertility, causes women to have increased levels of depression, anxiety, and stress (Damone et al., 2019). With the links between stress and infertility, many women experiencing infertility or going through fertility treatments may need extra support. Fertility stress scales, such as the Copenhagen Multi-Centre Psychosocial Infertility (COMPI) Fertility Problem Stress Scale, can be used to determine if women need extra psychological support during fertility treatments (Pedro et al., 2019).

Health literacy concerning reproductive health has a direct impact on health outcomes (Kilfoyle, Vitko, O'Connor, & Bailey, 2016). It has been found that 87% of patients receiving infertility treatments want more education concerning infertility as well as the related treatments (Bennett et al., 2015). Health literacy awareness is an essential aspect of developing new processes, especially developing new education materials in the healthcare setting (Parnell et al., 2019). The Patient Education Materials Assessment Tool (PEMAT) has been shown to be a useful tool to assess reading level in educational materials (Vishnevetsky, Walters, & Tan, 2018), to make them more readable and useable by patients.

### **Recommended Therapies for Stress Reduction**

**Yoga.** It has been shown that yoga can be used as complementary medicine in the treatment of depression, anxiety, and stress (Shohani et al., 2018). This is particularly true of Hatha yoga, which uses slow and controlled movements, making it easier and more achievable for people of all activity levels (Mayo, 2019). Using The Copenhagen Multi-center Psychosocial Infertility (COMPI) Fertility Problem Stress Scale yoga has been effective in significantly reducing stress scores in infertile women (Kirca & Pasinlioglu, 2019). The utilization of yoga could potentially be a beneficial practice for women dealing with infertility.

**Journaling.** Journaling has been shown to decrease stress in patients dealing with critical or chronic illnesses, as well as for family members close to them (Hamilton et al., 2019). Journaling can include simply writing down inner thoughts to help with processing emotions, engaging in the practice of writing down thoughts and then physically throwing away the paper as a way to clear the mind, or writing down hopes and goals as a way to reflect and plan for the future (Tams, 2018). This practice for stress reduction is a low-cost option for individuals and

families, which can be easily incorporated without requiring extensive time or scheduling requirements.

**Group counseling.** Group counseling involved getting a group of individuals who are experiencing or have experienced similar situations and discussing them with a group leader. These types of groups often lead to the building of connections and friendships that increase social support to those involved (Tartakovsky, 2018). Group counseling and increased social support have been shown to have statistically significant effects on reducing stress levels in infertile women (Ehsan et al., 2019; Casu et al., 2019). Based on these statistics, providing women dealing with infertility resources to engage in-group counseling and connect with other families dealing with similar health issues as the potential to decrease stress levels.

**Mindfulness exercises.** Self-administered mindfulness exercises have been shown to decrease levels of depression significantly and improve sleep quality in infertile women (Bai et al., 2019) as well as reduce levels of anxiety and stress (Ghawadra et al., 2019). There are many types of mindfulness exercises that can be utilized, which are a low-cost option for stress reduction that do not require a lot of time or scheduling requirements, making them more accessible and easier to utilize. Some examples of mindfulness exercises that can be utilized include the raisin exercise, the body scan, mindful seeing, the five senses exercise, and the three-step mindfulness exercise (Ackerman, 2020) (Appendix H).

### **Strengths, Weakness and Gaps**

Some significant weaknesses from the analyzed data include many studies excluding low income or low education participants (Bai et al., 2019; Bennett et al., 2015), recall biases (Facchini et al. 2019), small sample sizes (Ehsan et al., 2019; Hamilton et al., 2019; Kirca et al.,

2019; Mastroianni et al., 2019), and results that do not account for extenuating personal situations of the participant (Li et al., 2019). While the data seems to be consensual in most results, the limitation of samples based on inclusion and exclusion criteria could be skewing the data (Pannucci & Wilkins, 2010). In addition, much of the research involving stress, anxiety, and depression is based on personal recall allowing biases to skew the results (Pannucci & Wilkins, 2010). While it may be nearly impossible to account for every participant's personal situation when analyzing results, by excluding participants with extremely stressful home situations or life-events, skewing of the data can be prevented (Patino & Ferreira, 2018).

One significant gap in knowledge that still needs to be explored and researched is data regarding men or partners of women dealing with infertility. Most of the included data does not evaluate the other partner in couples coping with infertility and how the interventions are affecting them or the outcome of the studies.

Despite these weaknesses and gaps, data compiled from multiple countries show similar results. The similarity of results from a variety of cultures, environments, and ethnic backgrounds is a strength and illustrates that stress related to infertility is a universal experience for those dealing with infertility (Esser & Vliegthart, 2017). Infertility and stress have a relationship that could potentially be shown as a causal relationship with continued research. All studies analyzed regarding stress reduction techniques had the shared strength of statistically significant stress reduction with the regular use of the activities implemented (Tenny & Abdelgawad, 2019). This shows that stress reduction is possible with options allowing the participant to choose the best activity for themselves and their situation. In regard to the articles

reviewed, seven of the 14 articles fall under level 1, or the strongest level, in the hierarchy of evidence, with the remaining falling under level 2 (Petrisor & Bhandari, 2007).

## **METHODOLOGY**

### **Purpose**

The purpose of this QI project was to increase the understanding of women dealing with infertility concerning the link between stress and infertility, as well as improve their knowledge of stress reduction methods and intent to implement stress management, through the development and implementation of new education materials through an infertility support group on the social media site Facebook. It was implemented by providing education materials to participants in an online format. Materials included a brochure for them to read and an asynchronous Zoom video with a verbal explanation of the brochure (Appendix E). Participants were provided information for data collection through surveys taken before and after education was provided. Pre- and post-education surveys can be found in Appendix D.

### **Setting and Stakeholders**

The setting for the project was the myMindBodyBaby Infertility Support: Nutrition, Fitness & Mental Health Facebook group. This group is open only to individuals dealing with infertility. Prospective members are required to answer questions prior to being allowed into the group to ensure that they are an appropriate addition due to the sensitive nature of infertility. Members are from all over the world due to the widespread use of social media.

Stakeholders for this project included the members of the myMindBodyBaby Infertility Support: Nutrition, Fitness & Mental Health Facebook group. The members of this group play a crucial role in the project because they will be providing the data to analyze. It was hoped that

participation would be a benefit to participants due to receiving the education and that they would only be minimally inconvenienced by the need to take 10 to 15 minutes to participate.

### **Participants**

The primary inclusion criteria for this quality improvement (QI) project was that the women participating must receive reproductive medical treatments at the clinic. All participants were over the age of 18 with an upper age limit of 50. All participants needed to speak English to be able to read and listen to the presented materials, as well as access to a computer with internet connection to be able to view the materials. There were no additional exclusions from participation as long as age and established membership in the Facebook group are met.

### **Recruitment and Consent**

Upon review by the University of Arizona IRB, an advertisement was posted in the myMindBodyBaby Infertility Support: Nutrition, Fitness & Mental Health Facebook group (Appendix C) allowing women the opportunity to participate on a voluntary basis. This advertisement contained a link to a website containing all of the evidence-based educational materials (Appendix E), the disclosure form (Appendix B), and links to the pre- and post-education surveys (Appendix D). Recruitment took place over two weeks.

### **Project Design**

The Model for Improvement was developed by the Institute for Healthcare Improvement (IHI) and (IHI, 2019). The model begins with three questions: What is the intent? How will the change be evaluated? What improvements can be made?

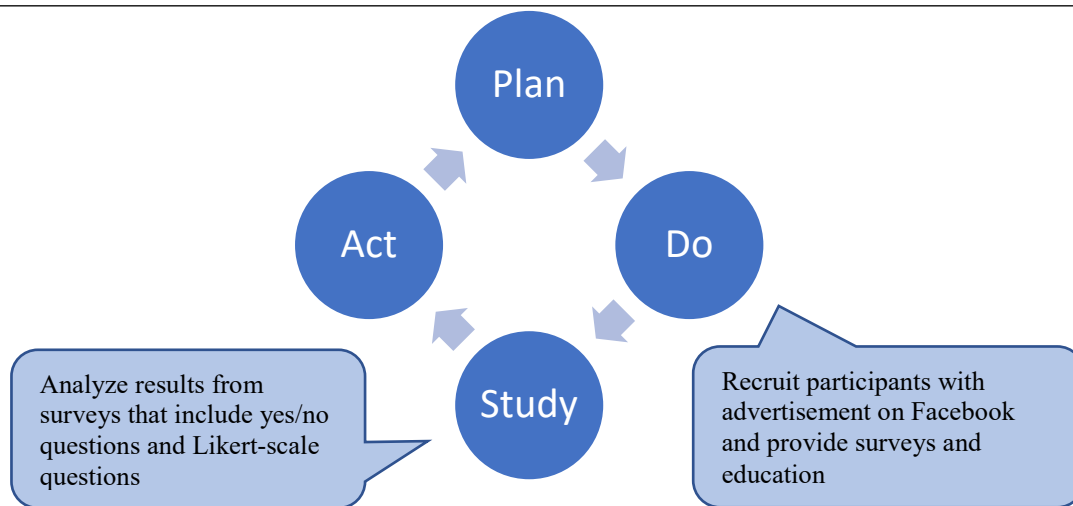
## PDSA Improvement Cycle

The PDSA cycle focuses on the four stages of change implementation, allowing for evaluation and evolution of interventions to improve them over time (IHI, 2019). Figure 2 illustrates the PDSA cycle for this project and project questions.

### Figure 2

#### *PDSA Improvement Cycle*

Intent - The goal was to improve the understanding of women currently dealing with infertility concerning stress and infertility, as well as stress reduction techniques  
Evaluation - We will know if the change was an improvement based on results from participant surveys  
Change - Changes to educational materials can be tested for improvement



**Plan.** The idea for change for this QI project was to develop education material to increase participant understanding about stress, infertility, and stress reduction techniques. Education material was developed using current research on the topic, as well as the Patient Education Materials Assessment Tool (PEMAT), to ensure that the brochure is understandable and appropriate for varying levels of health literacy (AHRQ, 2019). Following the development

of the educational material (Appendix E), the next step was to use pre- and post-education surveys (Appendix D), to gather data concerning the effectiveness of the educational material.

**Do.** The implementation of the educational material (Appendix E) was done via online and email format with members of the myMindBodyBaby Infertility: Nutrition, Fitness & Mental Health Facebook group. Upon review by the University of Arizona IRB, an advertisement will be posted in the myMindBodyBaby Infertility Support: Nutrition, Fitness & Mental Health Facebook group allowing women the opportunity to participate on a voluntary basis. This advertisement contained a link to a website containing all of the evidence-based educational materials (Appendix E), the disclosure form (Appendix B), and links to the pre- and post-education surveys (Appendix D). Recruitment took place over two weeks.

**Study.** Feedback from the surveys was be used to make improvements to education materials. Both surveys (Appendix D), include “yes/no” questions as well as Likert scale type questions were used, and were analyzed using descriptive statistical analysis, including the development of graphs and tables as visual representations of the data.

**Act.** Based on the results found during the study portion of the project concerning the increased understanding of participants using the educational materials, changes and improvements can be made to the education material to be used at in infertility medical clinic in the future, allowing for more comprehensive patient education.

### **Data Collection and Evaluation**

The goal of data collection was to gather baseline information of the understanding of women currently dealing with infertility concerning stress, infertility, stress reduction techniques along with feedback and evaluation of new knowledge following administration of education

materials. A survey (Appendix D) that includes 5-point Likert and “yes/no” questions were taken prior to the administration of education concerning stress, infertility, and stress reduction techniques. Upon completion of the first survey, participants viewed the educational brochure (Appendix E), along with a verbal explanation of the information in the form of an asynchronous Zoom video (Appendix E). Following the administration of education, participants (took a second survey (Appendix D), also containing 5-point Likert and “yes/no” questions. Surveys were administered on RedCap. All surveys were anonymous and linked through the RedCap system.

### **Data Analysis**

The data collected using pre- and post-education surveys (Appendix D) was analyzed using descriptive statistics. Mean, median, and modes were calculated for 5-point Likert scale questions. Percentages were calculated for “yes/no” questions. Responses were compared to evaluate the effectiveness of the educational material. The open-ended question on the post-education survey was reviewed for common themes for what participants would like to see improved or included in future education.

### **Ethical Considerations**

No identifying information was collected from participants. Once completed, all information and data will be kept in the University of Arizona College of Nursing password protected file service. Data collection did not begin until the Determination of Human Subjects IRB review was obtained. A timeline for the project can be found in Appendix F. Respect for persons, beneficence, and justice were all ethical principles taken into consideration when developing this project.

Respect for persons requires that those that can make their own decisions give informed consent with promised confidentiality (HHS, 2018). This project allowed women to participate on a purely voluntary basis and no identifying information was collected, keeping their confidentiality preserved. Beneficence is the principle that requires that researchers not inflict any unnecessary type of harm and promote positive health outcomes if possible (HHS, 2018). There was a slight possibility that a participant could experience anxiety or negative emotions when reading about infertility. While this risk was no greater than the risk of reading about infertility on any platform, the information included a hotline number to the National Infertility Association and stated to call their healthcare provider if needed. The principle of justice requires that vulnerable populations are not being exploited and that inclusion and exclusion criteria is justifiable (HHS, 2018). This project did not involve any vulnerable populations, inclusion criteria only required that participants could reasonably give consent and gain access to educational materials.

## **RESULTS**

### **Outcomes**

The recruitment advertisement (Appendix C) was posted to the myMindBodyBaby Infertility Support: Nutrition, Fitness & Mental Health Facebook page by the group administrator four times during the implementation period. The pre-education surveys were completed by 30 women ages 18-50 who were part of the Facebook group; however, 10 responders failed to complete the post-education survey. This left a sample size of 20 (n=20), with a 33% attrition rate. This project was implemented over a two-week period from September 29, 2020 to October 13, 2020. A full timeline of the project can be found in Appendix F.

Descriptive statistics including the mean, median, and modes were calculated for Likert-style questions, and percentages were calculated for “yes/no” questions. Likert-style question response options were assigned numerical values from ‘1’ to ‘5’ to allow for these calculations.

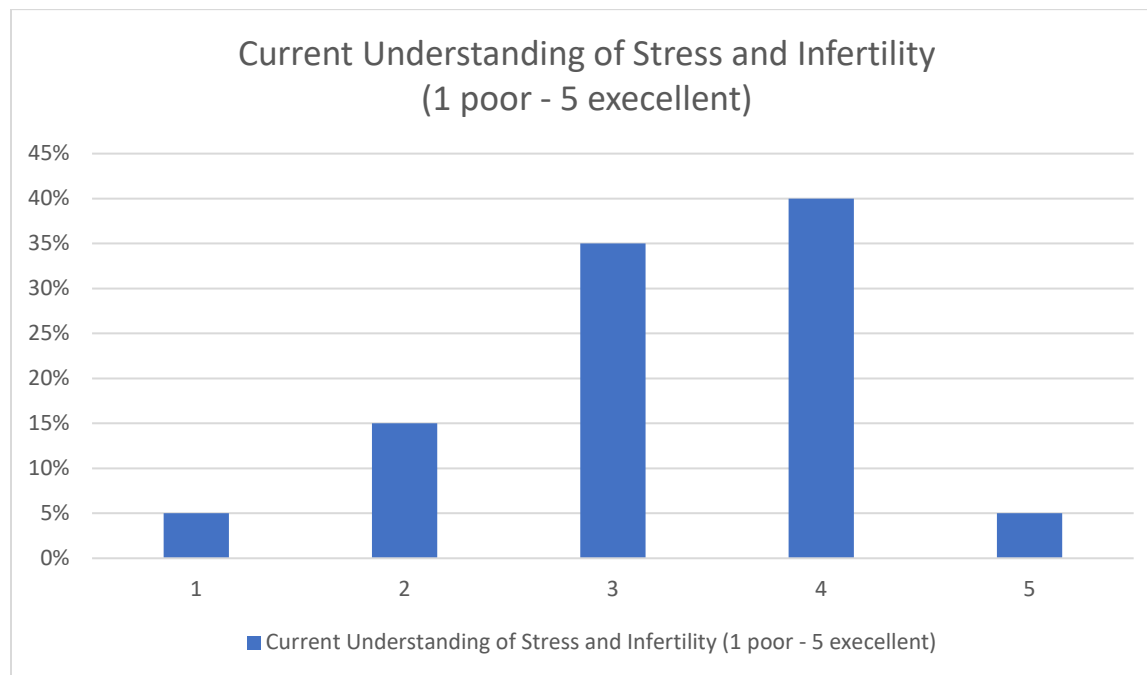
The pre-education survey results were as follows:

1. How would you rate your understanding of stress affecting infertility? (1 poor – 5 excellent)

Mean of 3.25, median of ‘3,’ and mode of ‘4’ indicates an overall rating of current understanding between ‘3’ and ‘4.’

### Figure 3

#### *Current Understanding of Stress and Infertility*



2. Have you previously been given education regarding stress and infertility?

Only 35% of participants have previously received education concerning stress and infertility, and 65% have never received education on this subject.

3. How would you rate your understanding of stress reduction techniques? (1 poor – 5 excellent)

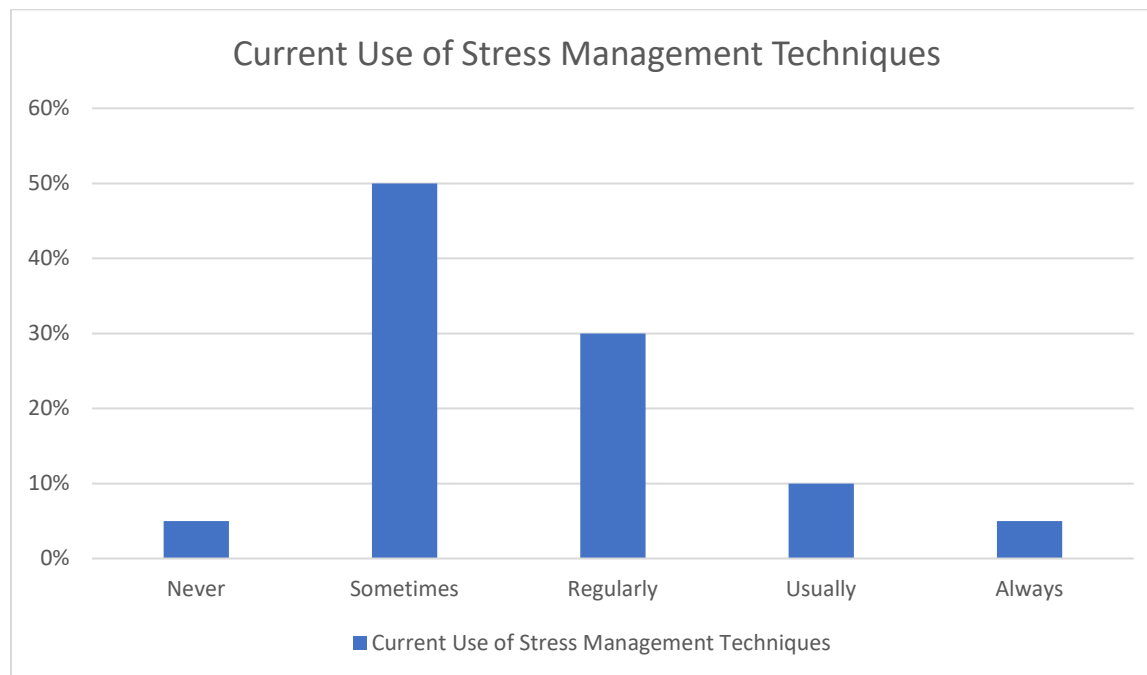
Mean of 3.7, median of '4,' and mode of '4' indicates an overall rating of current understanding of '4.'

4. Have you previously been given education on stress reduction techniques related to infertility?

Only 25% of participants have previously received education concerning stress management techniques, and 75% have never received education on this subject.

5. Do you currently engage in any stress reduction activities?

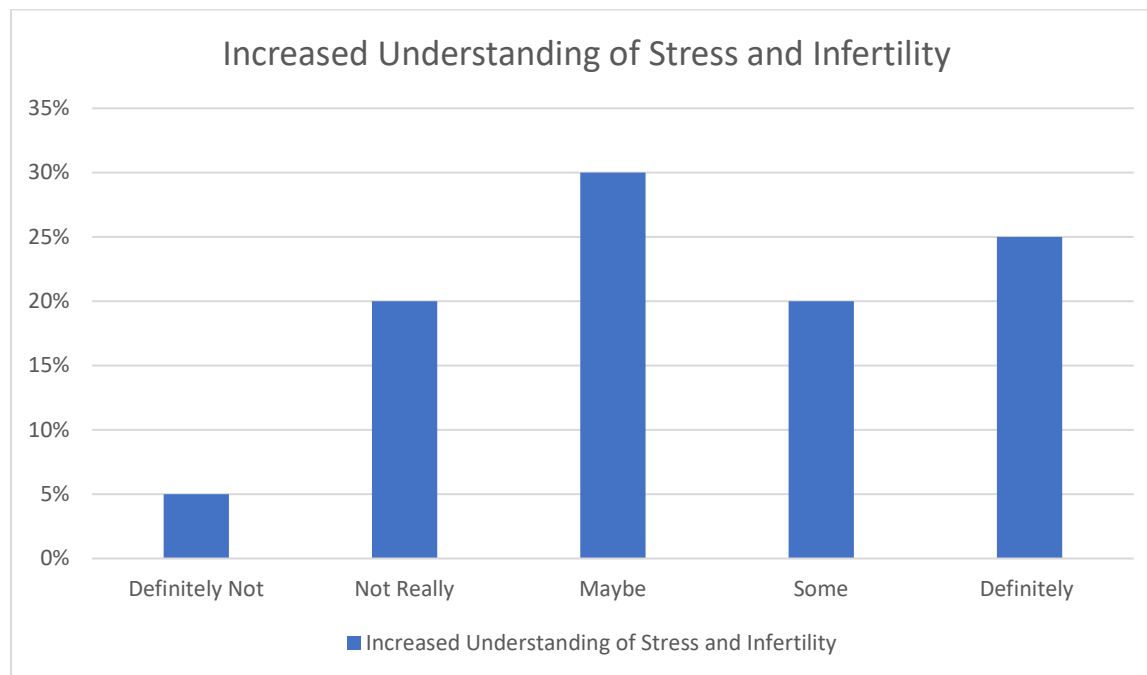
Response options included *never, sometimes, regularly, usually, and always* and numerical values from '1' to '5' were assigned. Mean of 2.6, median of '2,' and mode of '2' indicates an overall rating for current use of stress management techniques as '2' or *sometimes*. Only 45% of participants report that they usually or always use stress management techniques.

**Figure 4***Current Use of Stress Management Techniques*

The post-education survey results were as follows:

1. Do you better understand how stress can affect infertility after this teaching?

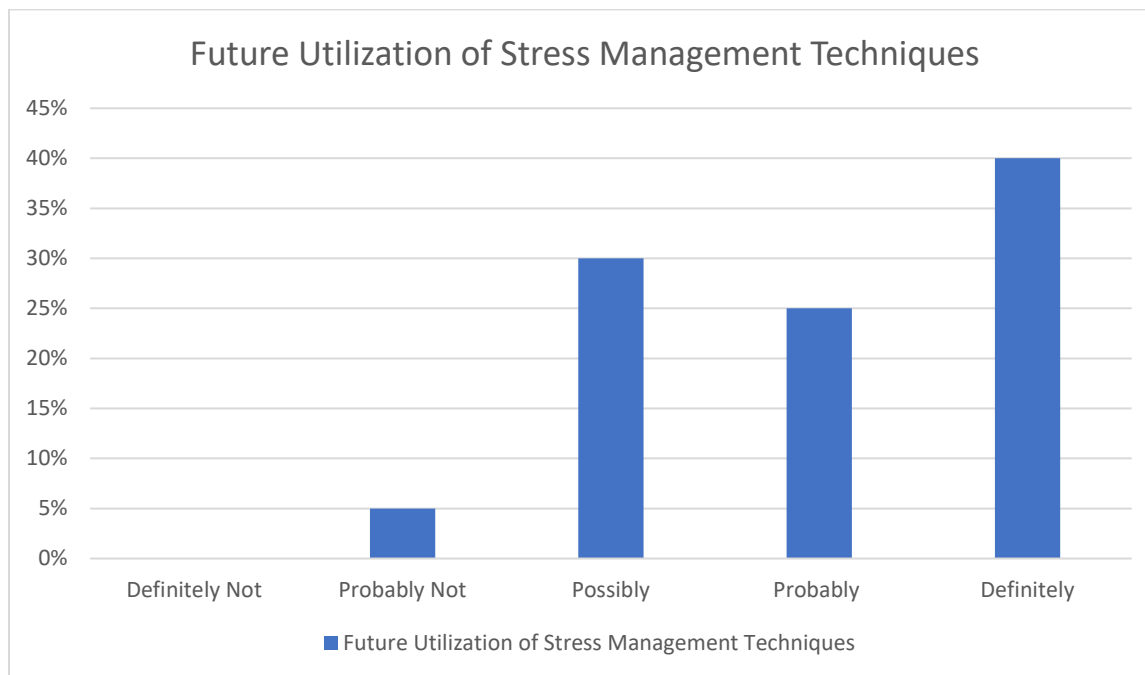
Response options included *definitely not*, *not really*, *maybe*, *some*, and numerical values from '1' to '5' were assigned. Mean of 3.4, median of '2,' and mode of '3.' This indicates an overall rating for improved understanding of stress and infertility as '2' to '3' or *not really* to *maybe*. Compared to the pre-education survey, this is only an increase in the mean of 0.15, indicating that there was not significant increase in understanding of stress and infertility.

**Figure 5***Increased Understanding of Stress and Infertility*

2. How likely are you to utilize the stress reduction techniques presented?

Response options included *definitely not*, *probably not*, *possibly*, *probably*, and *definitely* and numerical values from '1' to '5' were assigned. Mean of '4,' median of '3' and mode of '5' indicates an overall rating for likeliness to utilize stress management techniques between '3' to '5,' or *possibility to definitely*.

Some 65% of participants reported intent to utilize stress reduction techniques as '*probably*' or '*definitely*.' This is a 20% increase from the number of participants who were using stress management techniques regularly prior to viewing the education materials.

**Figure 6***Future Utilization of Stress Management Techniques*

## 3. Was the content easy to understand?

Response options included *very poor*, *poor*, *fair*, *good*, and *excellent* and numerical values from '1' to '5' were assigned. Mean of 4.15, median of '4,' and mode of '4' indicate an overall rating for the educational materials' content as '4' or *good*.

## 4. How would you rate the brochure delivery method?

Response options included *very poor*, *poor*, *fair*, *good*, and *excellent* and numerical values from '1' to '5' were assigned. Mean of 3.65, median of '3,' and mode of '3' indicates an overall rating for the brochure as '3' or *fair*.

5. How would you rate the video delivery method?

Response options included *very poor*, *poor*, *fair*, *good*, and *excellent* and numerical values from '1' to '5' were assigned. Mean of 3.95, median of '3,' and mode of '3' indicates an overall rating for the video as '3' or *fair*.

6. Would you like more information about how stress can affect fertility?

Some 65% of participants indicated that they would like more education concerning stress, infertility, and stress management techniques. In addition, 35% indicated they were not interested in more information.

7. Please leave any additional comments, questions, or suggestions here (free text).

Five participants left additional comments in this free text area. Major themes found in these comments are that participants would like more information on the brochure, rather than just having links to other websites, and more specific information about stress reduction during the various stages of infertility treatments.

## **DISCUSSION**

### **Summary**

Infertility and stress have been found to have a link or relationship, with 40% of women dealing with infertility, also receiving the diagnoses of anxiety, depression, or both (Rooney & Domar, 2018). A clinical practice guideline for stress and infertility has not been developed, and education on this topic is not readily available to the masses. In addition, fertility treatments are a very specific area of medicine, requiring particular medical and technical language. Health outcomes in reproductive medicine have been found to be correlated with the individual's health literacy (Kilfoyle, Vitko, O'Connor, & Bailey, 2016). Education concerning stress and infertility

needs to be developed, but it also needs to be appropriate for all health literacy levels to ensure that it is adequately understood.

This QI project aimed to increase understanding of stress, infertility, and stress reduction techniques in women dealing with infertility. The relationship between stress and infertility was explained to participants through the development of new educational materials using evidence-based sources. This explanation included options for stress reduction techniques that they could use during their infertility journey.

### **Interpretation**

There were two project purpose questions for this quality improvement project. They were: In women currently dealing with infertility:

1. Will viewing education materials increase awareness of the link between stress and infertility?
2. Will women express intent to utilize stress reduction techniques as part of their infertility journey?

Based on the post-education surveys results, this particular intervention did not have a significant effect on awareness or understanding of the link between stress and infertility. This, along with the strong response from participants that they would like more information about stress and infertility, indicates that more information is needed in the educational materials in order to have a significant effect. This is also reflected as a theme from the open-ended question in the post-education survey.

Based on the post-education survey results, this intervention did have a significant effect on the intent to utilize stress reduction techniques. A desire for more information was strongly

reported. A theme from the open-ended question in the post-education survey showed that participants would like more detailed information about each stress reduction technique, rather than just having links to other websites available. Despite these requests, participants who reported intent to utilize stress reduction techniques after receiving the education was 20% higher than the number of participants who actively used stress reduction techniques prior to receiving the education.

## **Implications**

### **Practice**

This QI project exposed the need for more education in the field of reproductive medicine regarding stress and stress management techniques. While 65% of the participants stated they would begin utilizing stress management techniques after viewing the education materials, there was still a demand for more in-depth information. Moreover, 65% of participants reported their desire for more education and information about stress, infertility, and stress management techniques. Three of the comments left specified that they would like more information about stress management during specific stages of infertility treatments, which would only be able to be provided by their healthcare providers because they are aware of each woman's individual circumstances and health status. This show that more providers need to be aware of this gap in knowledge and education.

### **Education**

This QI project successfully delivered education materials to women dealing with infertility about stress and infertility, including stress management techniques. Participants reported minor increases in knowledge about stress and infertility, and significant increase in

knowledge about stress management techniques. In addition, many reported strong intents to utilize stress management techniques as part of their fertility journey who were not engaging in stress reduction prior to participating in the project.

### **Research**

This QI project found the need for increased research regarding stress and infertility. Many participants stated they wanted more information than was provided in the educational material for this project. Some of the desired information included specific stress management options during the various stages of fertility treatments, concerning which the PI did not find specific research during the literature search and synthesis. Considering the large population of women that deal with infertility, more detailed research in this area of health care would be prudent.

### **Policy**

The CDC considers infertility a public health issue but does not have any standing guidelines or policies regarding stress management during infertility (CDC, 2019a). Based on the fact it has been designated as a public health issue, it would be prudent for the CDC or NIH to develop some sort of guideline or policy that aids healthcare providers in their care of women with infertility, ensuring that they are using evidence-based interventions for stress. The development of guidelines for stress management during infertility would be extremely beneficial to women dealing with infertility and receiving fertility treatments, ensuring that their mental and emotional wellbeing is also being addressed. Based on this quality improvement project's results, it appears that healthcare providers in these clinics do not regularly address

stress management. This gap in education is potentially detrimental to women dealing with infertility and should be addressed on a broad scale.

### **Limitations**

This QI project did have some limitations, primarily related to recruitment. The first limitation is that the project was only implemented in one Facebook group. Depending on the Facebook newsfeed algorithm and group members' use of Facebook, the recruitment posts may not have shown up on many of the group members' news feeds, leading to a small sample size. Second, there appeared to be confusion concerning the need to complete both the pre-education and post-education survey, leading to some responses not being counted in the final sample because the post-education survey was not completed. In an effort to mitigate these limitations, the recruitment advertisement was posted multiple times during the two-week recruitment period by the group administrator who mentioned that both surveys needed to be completed. Lastly, this particular Facebook group is already used to promote physical and emotional health and well-being during infertility, potentially skewing this project's results because the members are already interested in stress management.

### **COVID-19 and Other Issues**

The year 2020 has been extremely challenging for people across the world due to the COVID-19 pandemic. Some of these challenges have included jobs losses and financial strains, difficulty accessing basic supplies for the home, delays in accessing healthcare, and an overall more stressful world to live in. With the added effects of the COVID-19 pandemic on their personal situations and how fertility clinics have been able to function during closures it is plausible that women dealing with infertility have been dealing with far more stress during this

year. This project was aimed, in part, to stress reduction methods and its results may have been skewed to do the increased desire to escape the additional stress related to the pandemic.

This project was originally intended to be implemented at a reproductive medicine clinic associated with a university other than the University of Arizona. However, issues arose during the process of getting IRB applications submitted. Both universities required their own IRB approval, which led to additional correspondence between the two in order to get both submitted in the appropriate time frame. Additionally, the university associated with the clinic wanted a data share agreement because the results would be reported through the University of Arizona, but they were providing the participants. The time it would have taken to arrange this particular agreement put the completion of the project outside of the designated timeframe, forcing the change to the social media implementation previously detailed.

### **DNP Essentials Addressed**

The Doctor of Nursing Practice (DNP) Essentials have been developed by the American Association of Colleges of Nursing (AACN) to ensure that students are competent in foundational areas required for advanced practice nursing (AACN, 2006).

#### **DNP Essential I: Scientific Underpinnings for Practice**

This essential prepares doctoral students with the ability to develop new practices based on scientific theories from nursing and from other specialties (AACN, 2006). This project utilized the Health Belief Model as its guiding theoretical framework and the plan-do-study-act (PDSA) improvement cycle to develop an appropriate intervention to the problem addressed.

### **DNP Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice**

This essential prepares doctoral students to evaluate and appraise current evidence to determine evidence-based interventions for practice (AACN, 2006). This QI project involved a full literature search, review, and synthesis to determine evidence-based interventions for the problems addressed. Additionally, this project disseminated findings in order to improve quality of care and healthcare outcomes.

### **DNP Essential VII: Clinical Prevention and Population Health**

This essential prepares doctoral students to address gaps in care for individuals and populations (AACN, 2006). This project identified a gap in care for individuals dealing with infertility. This gap was identified through a literature search of existing literature and the results of this project.

### **Conclusion**

Infertility is a very common problem, affecting 10% of women in the U.S. Despite the prevalence of infertility, and the data available concerning the relationship between stress and infertility, education on these topics is not widely available. This quality improvement project found that with simple educational materials, understanding in women dealing with infertility concerning stress, infertility, and stress management techniques can be improved. Education concerning options for stress reduction clean leads to significantly increased intent to utilize those techniques as part of the infertility journey. More information concerning infertility and stress was highly requested by participants, illustrating the need for more research concerning

stress and infertility, along with more readily available education from healthcare providers and outside sources.

### **Plan for Sustainability**

This project is the first cycle of the plan-do-study-act (PDSA) improvement cycle and will be considered the pilot study prior to the implementation of the project in a reproductive medicine clinic. Results of this project will be used to adapt the education materials to include some of the topics participants wanted more information about. It is hoped that further adaptation and implementation in a more formal setting will lead to large sample sizes and more information about stress and infertility.

### **Plan for Dissemination**

A formal presentation of the implementation and results of this project will be given during November of 2020 to the DNP project committee in the form of a final defense. This will include a project poster that has been created as a visual representation of the project. This project's results will also be disseminated to the administrator of the myMindBodyBaby Infertility Support: Nutrition, Fitness & Mental Health Facebook page via a zoom meeting presentation utilizing the project poster.

APPENDIX A:

MYMINDBODYBABY INFERTILITY SUPPORT: NUTRITION, FITNESS & MENTAL  
HEALTH FACEBOOK SITE APPROVAL/THE UNIVERSITY OF ARIZONA  
INSTITUTIONAL REVIEW BOARD LETTER

University of Arizona Institutional Review Board  
c/o Office of Human Subjects  
1618 E Helen St  
Tucson, AZ 85721

Please note that Ms. Michelle Lancaster, UA Doctor of Nursing Practice student, has permission of the myMindBodyBaby Infertility Support: Nutrition, Fitness & Mental Health Facebook group to conduct a quality improvement project on our social media group page for her project, "Education for stress management during infertility."

Ms. Lancaster will provide educational material to patients in an online format with pre- and post-education surveys about the material. Patients will be recruited through a post on our social media private group page. This post will include a brief description of the project and link to the associated project website.

If there are any questions, please contact me. [lyndsey@mymindbodybaby.com](mailto:lyndsey@mymindbodybaby.com)

Signed,



Lyndsey Clabby  
myMindBodyBaby co-founder  
*myMindBodyBaby Infertility Support: Nutrition, Fitness & Mental Health* Group Administrator



THE UNIVERSITY OF ARIZONA  
**Research, Discovery  
 & Innovation**

Human Subjects  
 Protection Program

1618 E. Helen St.  
 P.O. Box 245137  
 Tucson, AZ 85724-5137  
 Tel: (520) 626-6721  
<http://irgw.arizona.edu/compliance/home>

**Date:** September 28, 2020  
**Principal Investigator:** Michelle Loy Lancaster  
**Protocol Number:** 2009058059  
**Protocol Title:** Education of stress management during infertility  


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**Determination:** Approved  
**Expiration Date:** September 27, 2025

**Documents Reviewed Concurrently:**

Data Collection Tools: *Post-Education Survey.docx*  
 Data Collection Tools: *Pre-Education Survey.docx*  
 HSPP Forms/Correspondence: *Lancaster appendix\_waiver\_v2019-08.pdf*  
 HSPP Forms/Correspondence: *Lancaster application\_9.18.2020.pdf*  
 HSPP Forms/Correspondence: *Lancaster list\_of\_research\_personnel\_v04-2020.pdf*  
 Informed Consent/PHI Forms: *Disclosure Form.docx*  
 Informed Consent/PHI Forms: *Disclosure Form.pdf*  
 Other Approvals and Authorizations: *COI Certification Complete for 2009058059.msg*  
 Other Approvals and Authorizations: *Social Media Support Letter.docx*  
 Participant Material: *Educational Brochure.docx*  
 Participant Material: *Link to and Outline of Educational Video.docx*  
 Participant Material: *Screen Shot 2020-09-25 at 12.45.16 PM.png*  
 Participant Material: *Screen Shot 2020-09-25 at 12.45.25 PM.png*  
 Participant Material: *Screen Shot 2020-09-25 at 12.45.33 PM.png*  
 Participant Material: *Screen Shot 2020-09-25 at 12.45.40 PM.png*  
 Participant Material: *Screen Shot 2020-09-25 at 12.45.52 PM.png*  
 Recruitment Material: *Social Media Post.docx*

**Regulatory Determinations/Comments:**

- The project is not federally funded or supported and has been deemed to be no more than minimal risk.
- The project listed is required to update the HSPP on the status of the research in 5 years. A reminder notice will be sent 60 days prior to the expiration noted to submit a 'Project Update' form.

This project has been reviewed and approved by an IRB Chair or designee.

- The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).
- All research procedures should be conducted according to the approved protocol and the policies and guidance of the IRB.
- The Principal Investigator should notify the IRB immediately of any proposed changes that affect the protocol and report any unanticipated problems involving risks to participants or

others. Please refer to Guidance Investigators [Responsibility after IRB Approval](#), [Reporting Local Information](#) and [Minimal Risk or Exempt Research](#).

- All documents referenced in this submission have been reviewed and approved. Documents are filed with the HSPP Office.

APPENDIX B:  
CONSENT DOCUMENTS (DISCLOSURE FORM)

**Disclosure Form**  
**Education for Stress Management During Infertility**  
**Michelle Lancaster**

The purpose of this project is to improve understanding about stress and infertility, including stress reduction techniques and intent to implement stress management, in women currently dealing with infertility.

If you choose to take part in this project, you will be asked to read through educational materials and have a verbal explanation presented to you in an electronic format, as well as complete pre and post-education surveys. It will take approximately 15 minutes to complete this process. There is a slight possibility that you could experience anxiety or negative emotions when reading about infertility. While this risk is not greater than the risk of reading about infertility on any platform, the information will include a hotline number to the National Infertility Association and will state to call your healthcare provider if needed. You may experience improved understanding about infertility and stress as well as stress reduction methods that may help you deal with the stress of your infertility journey. You will not be paid for participating in this study. The only cost to you is your time. Survey responses are anonymous. Your name will not be collected or linked to your answers. Information collected about you will not be used or shared for future research studies.

If you choose to participate in the project, participation is voluntary. Refusal to participate will involve no penalty or change your ability to be a part of the Facebook support group. You may withdraw at any time from the project. 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.

By completing the surveys, you are giving consent for the survey data to be utilized by research personnel.

An Institutional Review Board responsible for human subjects' research at the University of Arizona reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

The information that you provide in the study will be handled confidentially. However, there may be circumstances where this information must be released or shared as required by law. The University of Arizona Institutional Review Board; other federal, state, or international regulatory agencies; or the sponsor of the study, if any, may review the research records for monitoring purposes.

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact the Human Subjects Protection Program at 520-626-6721 or online at <http://rgw.arizona.edu/compliance/human-subjects-protection-program>.

For questions, concerns, or complaints about the project, you may call Michelle Lancaster BSN, DNP student with the University of Arizona at 801-865-4192 or [mlancaster@email.arizona.edu](mailto:mlancaster@email.arizona.edu).

APPENDIX C:  
RECRUITMENT MATERIAL (RECRUITMENT FLYER)



## **PARTICIPANTS NEEDED for research study concerning Infertility and Stress**

**If you are a woman over 18 with infertility and would like to know more about how stress can affect infertility, and ways to help, this study may be for you.**

Participation is anonymous and will take approximately 15 minutes of your time to view a brochure and answer two surveys.

Follow the link below for more information and to participate:

<https://fertilityandstresssurvey.weebly.com>

\*An Institutional Review Board responsible for human subjects research at The University of Arizona reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

APPENDIX D:  
EVALUATION INSTRUMENTS (PRE-EDUCATION SURVEY AND POST-EDUCATION  
SURVEY)

PRE-EDUCATION SURVEY

1. How would you rate your understanding of stress affecting infertility? (1 poor – 5 excellent)

1      2      3      4      5

2. Have you previously been given education regarding stress and infertility?

Yes    No

3. How would you rate your understanding of stress reduction techniques? (1 poor – 5 excellent)

1      2      3      4      5

4. Have you previously been given education on stress reduction techniques related to infertility?

Yes    No

5. Do you currently engage in any stress reduction activities?

Never    Sometimes    Regularly    Usually    Always

POST-EDUCATION SURVEY

1. Do you better understand how stress can affect infertility after this teaching?

Definitely not   Not really   Maybe   Some   Definitely

2. How likely are you to utilize the stress reduction techniques presented?

Definitely not   Probably not   Possibly   Probably   Definitely

3. Was the content easy to understand?

Very Poor   Poor   Fair   Good   Excellent

4. How would you rate the brochure delivery method?

Very Poor   Poor   Fair   Good   Excellent

5. How would you rate the video delivery method?

Very Poor   Poor   Fair   Good   Excellent

6. Would you like more information about how stress can affect fertility?

Yes   No

7. Please leave any additional comments, questions, or suggestions here (free text).

APPENDIX E:  
PARTICIPANT MATERIAL (INSTRUCTIONAL VIDEO, BROCHURE)

Web address to zoom educational video:

[https://arizona.zoom.us/rec/share/hN5w4Wxs2nuCRZpf\\_RTbQxdejgePXaGXzYd09BkGwb6efsToC65WT-P2\\_RH6Ct.TnSt2DvtXiUQx8gH?startTime=1600138476000](https://arizona.zoom.us/rec/share/hN5w4Wxs2nuCRZpf_RTbQxdejgePXaGXzYd09BkGwb6efsToC65WT-P2_RH6Ct.TnSt2DvtXiUQx8gH?startTime=1600138476000)

Outline of video:

- Introduction of primary investigator and purpose of project
- Switch screen to show educational brochure
- Explanation of current statistics about infertility in the United States
- Explanation about stress and infertility relationship
- In-depth explanation of stress reduction techniques presented on the education brochure
- Explanation of additional resources that participants can use for more information found on the back of the brochure

## Additional Resources

ReproductiveFacts.org

Utah Infertility Resource Center –  
<https://www.utahinfertilityresourcecenter.org>

Society for Assisted Reproductive Technology -  
<https://www.sart.org/patients/fyi-videos/stress-and-infertility/>

Planned Parenthood -  
<https://www.plannedparenthood.org/learn/pregnancy/infertility/how-do-i-cope-infertility>

National Infertility Association Crisis Hotline:  
 (888) 623-0744

### References

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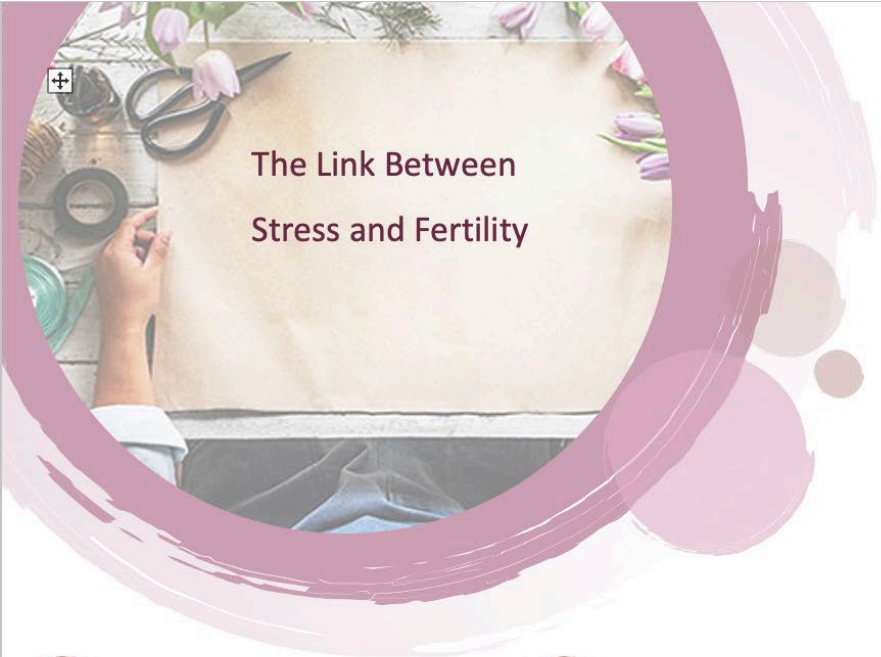
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**“Give your stress wings and let it fly away”**



**Stress and Fertility**





## The Link Between Stress and Fertility

### Current Statistics

- 10% of women in the United States experience infertility
- 1/3 of all infertility cases do not have an identifiable cause

### Stress and Your Body

Rates of anxiety and depression have been found to be up to 4 times higher in women dealing with infertility

Symptoms of anxiety and depression in women with infertility are as common as in those with cancer

Reducing stress may improve symptoms of depression and anxiety, relationship satisfaction, and possibly even pregnancy rates

### Ways to Reduce Your Stress

- Mindfulness exercises
  - 5 senses exercise
  - Body scan meditation
  - <https://positivepsychology.com/mindfulness-exercises-techniques-activities/>
- Group counseling and social support
  - <https://www.utahinfertilityresourcecenter.org/support-groups>
- Journaling
  - <https://psychcentral.com/blog/how-to-begin-journaling-for-stress-relief/>
- Exercise
  - <https://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/exercise-and-stress/art-20044469>
- Acupuncture/Acupressure
  - <https://www.aiam.edu/acupuncture/acupressure-points-relieve-stress/>
- Massage therapy
  - <https://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/massage/art-20045743>

APPENDIX F:  
PROJECT TIMELINE

Completion Date	Planning	Pre-Implementation	Implementation	Evaluation
12/17/2018	Initial meeting with the director of a fertility clinic to discuss topics and obtain support			
12/10/2019	Second meeting with the interim director of a fertility clinic to discuss the progress of project and future planning			
2/1/2020 to 2/29/2020		Development of brochure, pre-education survey and post-education survey to be used for education and data collection		
3/10/2020	Planning meeting with the interim director of an infertility clinic for approval of educational brochure and surveys			
8/12/2020	Change to new implementation site – Infertility support group on Facebook			
8/27/2020		Complete and submit IRB application		
9/29/2020 to 10/13/2020			Advertisement posted to Facebook group for recruitment and participation	
10/14/2020 to 10/30/2020				Analyze data collected from surveys to determine if education is successful
11/16/2020 to 11/23/2020				Final defense of project

APPENDIX G:  
LITERATURE REVIEW GRID

<b>Pub. Year; Author's Last Name</b>	<b>Title of Publication</b>	<b>Type of Study</b>	<b>Main Outcomes of Findings</b>	<b>Support for and or Link to Project</b>
2019  Bai, Cui, Xu, Mi, Sun, Shao, Li, Jiang, Yang, Zhang, & Cao	Effectiveness of two guided self-administered interventions for psychological distress among women with infertility: a three-armed, randomized controlled trial  Human Reproduction	Three-armed randomized control trial	<u>Sample:</u> 234 women undergoing IVF/ICSI  <u>Setting:</u> The reproductive center in a public hospital	<u>Intervention:</u> <ul style="list-style-type: none"> <li>• Mindfulness exercises</li> <li>• Gratitude journaling</li> </ul> <u>Outcome Measures:</u> Primary – depression Secondary – anxiety, sleep quality
2015  Bennett, Wiweko, Bell, Shafira, Pangestu, Adayana, Hinting, & Armstrong	Reproductive knowledge and patient education needs among Indonesian women infertility patients attending three fertility clinics  Patient Educ Couns	Cross-sectional survey	<u>Sample:</u> 212 female infertility patients  <u>Setting:</u> Infertility clinics in Jakarta, Surabaya, and Denpasar, Indonesia	Survey of patients concerning most useful sources of information, understanding of infertility, understanding the difference between infertility and sterility, identification of fertility window, knowledge of causes and treatment of fertility, and desire for further knowledge
2019  Casu, Zaia, do Carmo Fernandes Martins, Barbosa, Gremigni, Fernandes Martins, & Parente Barbosa	A dyadic mediation study on social support, coping, and stress among couples starting fertility treatment  Journal of Family Psychology	Dyadic medication study	<u>Sample:</u> 201 couples  <u>Setting:</u> Couples starting their first assisted reproductive technology treatment	Self-reports of infertility-specific support from spouse and social network, and infertility stress  Coping strategies: <ul style="list-style-type: none"> <li>• Active avoidance</li> <li>• Active confronting</li> <li>• Passive avoidance</li> <li>• Meaning based</li> </ul> Actor-partner interdependence model applied
2019  Damone, Earnest, Joham, Teede, Moran, & Loxton	Depression, anxiety and perceived stress in women with and without PCOS: a community-based study  Psychological Medicine	Cross-sectional analysis of a longitudinal study	<u>Sample:</u> <ul style="list-style-type: none"> <li>• 478 women with PCOS</li> <li>• 8134 women without PCOS</li> </ul>	Primary Outcomes concerning PCOS: <ul style="list-style-type: none"> <li>• Depression</li> <li>• Anxiety</li> </ul> Perceived stress

<b>Pub. Year; Author's Last Name</b>	<b>Title of Publication</b>	<b>Type of Study</b>	<b>Main Outcomes of Findings</b>	<b>Support for and or Link to Project</b>
			<u>Setting:</u> Pulled from the Australian Longitudinal Study of Women's Health (ALWSH)	
2019 Ehsan, Yazdkhasti, Rahimzadeh, Atee, & Esmaelzadeh-Saeieh	Effects of Group Counseling on Stress and Gender-Role Attitudes in Infertile Women: A Clinical Trial  Journal of Reproduction & Infertility	Randomized clinical trial	<u>Sample:</u> 90 infertile women referred to Rooyesh Infertility Treatment Center  <u>Setting:</u> Karaj, Iran	<u>Intervention:</u> <ul style="list-style-type: none"> <li>Five-session group counseling</li> </ul> <u>Outcome Measures:</u> <ul style="list-style-type: none"> <li>Stress</li> </ul> Gender-role attitudes
2019 Facchin, Somigliana, Busnelli, Catavorello, Barbara, & Vercellini	Infertility-related distress and female sexual function during assisted reproduction  Human Reproduction	Observational study	<u>Sample:</u> 269 patients with infertility  <u>Setting:</u> Infertility Unit of Fondazione Ca' Granda, Ospedale Maggiore Policlinico of Milan	Infertility related distress measured using the Fertility Problem Inventory (FPI)  Sexual dysfunction measured using the Female Sexual Function Index
2019 Ghawadra, Abdullah, Choo, & Phang	Mindfulness-based stress reduction for psychological distress among nurses: A systematic review  Journal of Clinical Nursing (John Wiley & Sons, Inc.)	Systematic review	Review of 9 studies using The Quality Assessment Tool for Quantitative Studies (QATFQS)	<u>Intervention:</u> <ul style="list-style-type: none"> <li>Mindfulness-based stress reduction (MBSR)</li> </ul> <u>Outcome Measures</u> <ul style="list-style-type: none"> <li>Stress</li> <li>Anxiety</li> <li>Depression</li> </ul>
2019 Hamilton, Wilhite, Grefe, Hart, & Jin	Family Journaling to Reduce Stress Manifestations in Patients and Families After Critical Illness  Journal of Doctoral Nursing Practice	Non-randomized control trial	Patients and families who experience a critical care stay of 72 hours or more	<u>Intervention:</u> <ul style="list-style-type: none"> <li>Journaling</li> </ul> <u>Outcome Measures:</u> Posttraumatic stress syndrome 14 (PTSS-14) scores
2016	Health Literacy and Women's Reproductive Health: A Systematic Review	Systematic review	PRISMA guided review of 34 articles	<u>Inclusion criteria:</u> <ul style="list-style-type: none"> <li>developed countries</li> <li>in peer-reviewed journals</li> </ul>

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
Kilfoyle, Vitko, O'Connor, & Bailey	J Womens Health (Larchmt)			<ul style="list-style-type: none"> <li>measured health literacy with a validated assessment</li> <li>reported relationship between health literacy and reproductive health outcomes</li> </ul> had a study population that included reproductive age women
2019  Kirca & Pasinlioglu	The effect of yoga on stress level in infertile women  Perspectives in Psychiatric Care	Randomized controlled study	<u>Sample:</u> 128 women receiving infertility treatment  <u>Setting:</u> private IVF clinic	<u>Intervention:</u> <ul style="list-style-type: none"> <li>Twice weekly yoga sessions for 6 weeks</li> </ul> <u>Outcome Measures</u> Copenhagen Multi-center Psychosocial Infertility (COMPI) Fertility Problem Stress Scale
2019  Li, Zhang, Shi, Guo, & Wang	Resilience acts as a moderator in the relationship between infertility-related stress and fertility quality of life among women with infertility: a cross-sectional study  Health & Quality of Life Outcomes	Cross-sectional study	<u>Sample:</u> 498 women with infertility  <u>Setting:</u> Northeast China between 12/2017 and 02/2018	<u>Outcome Measures:</u>  Primary: <ul style="list-style-type: none"> <li>Fertility quality of life (QoL) scores</li> </ul> Secondary: <ul style="list-style-type: none"> <li>Fertility Problem Inventory (FPI)</li> <li>Connor-Davidson Resilience Scale (CD-RISC)</li> </ul>
2019  Mastroianni, Chen, Vellar, Cvejic, Smith, McCaffery, & Muscat	Implementation of an organization-wide health literacy approach to improving the understandability and actionability of patient information and education materials: A pre-post effectiveness study Patient Education & Counseling	Pre- and post-effectiveness study	<u>Sample:</u> 50 randomly selected patient information materials  <u>Setting:</u> Regional health service in New South Wales, Australia	<u>Outcome Measures</u> Understandability and actionability using paired sample tests and the Patient Education Materials Assessment Tool (PEMAT)

<b>Pub. Year; Author's Last Name</b>	<b>Title of Publication</b>	<b>Type of Study</b>	<b>Main Outcomes of Findings</b>	<b>Support for and or Link to Project</b>
2019  Parnell, Stichler, Barton, Loan, Boyle, & Allen	A concept analysis of health literacy  Nursing Forum	Concept analysis of ten systematic reviews	Walker and Avant's concept analysis method  10 systematic reviews included	Search terms: <ul style="list-style-type: none"> <li>• Health literacy</li> <li>• Patient education</li> <li>• Patient engagement</li> <li>• Patient activation</li> <li>• Health communication</li> <li>• Health promotion</li> </ul> Nursing
2019  Pedro, Vassard, Malling, Hougaard, Schmidt, & Martins	Infertility-related stress and the risk of antidepressants prescription in women: a 10-year register study  Human Reproduction	Register study	<u>Sample:</u> All women (n=1169) who participated in the Copenhagen Cohort Multi- centre Psychosocial Infertility (COMPI) study in 2000  Women initiating artificial reproductive therapy (ART) were followed until they received the first dose of an antidepressant or 12/31/2009	<u>Outcome Measures:</u> <ul style="list-style-type: none"> <li>• Physical and infertility-related stress in the personal, marital, and social domains</li> </ul> Redeemed prescription for antidepressant

APPENDIX H:  
OTHER DOCUMENTS AS APPLICABLE TO THE PROJECT (MINDFULNESS  
EXERCISES)

The Raisin Exercise	Focus solely on: how a raisin looks, how a raisin feels, how it smells, and how it tastes
The Body Scan	Begin by focusing on the breath, including the rhythm of inhaling and exhaling. Move attention to the body, starting with the texture of clothing on the skin, the temperature, and the environment. Move to focusing on each part of the body, starting at the toes and moving upwards, paying attention to how each part feels
Mindful Seeing	Begin by looking out a window. Instead of focusing on objects and labeling, focus more on colors or movements like the wind in the trees. Try to be observant of something that may have gone unnoticed in a state of stress.
The Five Senses Exercise	<p>Notice 5 things you can see</p> <p>Notice 4 things you can feel</p> <p>Notice 3 things you can hear</p> <p>Notice 2 things you can smell</p> <p>Notice 1 thing you can taste</p>
The Three-Step Mindfulness Exercise	Stop what you are doing, take note of your thoughts, and acknowledge your current feelings. Move attention to breathing for 6 breaths or 1 minute, focusing on inhalation and exhalation and how the chest and lungs move. Expand awareness to body focusing on areas of tightness, pain, or aches and try to relax those areas.

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