

PERCEPTIONS OF THE INFERTILE PATIENT EDUCATED AND CARED FOR VIA  
TELEMEDICINE

A Paper  
Submitted to the Graduate Faculty  
of the  
North Dakota State University  
of Agriculture and Applied Science

By

Sharri Marie Lacher

In Partial Fulfillment  
for the Degree of  
MASTER OF SCIENCE

Major Department:  
Nursing

March 2014

Fargo, North Dakota

North Dakota State University

Graduate School

---

Title  
PERCEPTIONS OF THE INFERTILE PATIENT EDUCATED AND  
CARED FOR VIA TELEMEDICINE

---

**By**

Sharri Marie Lacher

---

The Supervisory Committee certifies that this *disquisition* complies with  
North Dakota State University's regulations and meets the accepted standards  
for the degree of

**MASTER OF SCIENCE**

SUPERVISORY COMMITTEE:

Dr. Mary Wright  
Chair

---

Dr. Loretta Heuer

---

Dr. Elizabeth Birmingham

---

Approved:

7/1/2014  
Date

---

Dr. Carla Gross  
Department Chair

---

## **ABSTRACT**

Approximately 20- 25% of women require infertility treatment using Assisted Reproductive Technologies (ART). These specialized services require highly educated personnel. The availability of these services is compounded by the limited access of specialty care available in the rural areas.

An advance in communicative technology called “Telehealth” has increased the accessibility of how education is delivered to patients in rural areas. Nurse and patient, located miles apart, are able to communicate through visual and audio means with the nurse providing education and support to the rural infertile patient.

The focus of this Practice Improvement Project was to determine the patient perspective and satisfaction with the use of telemedicine during their treatment. Patients were surveyed to ascertain their perspectives and satisfaction with telemedicine.

The data received confirmed women were satisfied with the education they received during their telemedicine visit. Sanford Health Systems (SHS) has expanded their telemedicine program due to the demand.

## **ACKNOWLEDGMENTS**

I am truly thankful to my adviser Dr. Mary Wright for all her support and her wealth of knowledge in the development of this Practice Improvement Project. Dr. Wright has given continual guidance and advice which has helped me in multiple ways throughout my clinical and research phase of education. I would also like to thank my committee members for all their help as their guidance offered great encouragement and insight in the initial and final phases of my project.

Secondly, I am thankful to my family for all their support and patience as this journey would not have been possible without them. They have offered encouragement and inspiration when necessary. The experience has allowed me to grow in so many ways. I thank them for allowing me to fulfill my dream of obtaining my Master's Degree in Nursing.

Thirdly, thank you to the professors who have encouraged me on my journey as I greatly appreciate all your help. You have taught me perseverance and passed on so much knowledge. I feel very privileged to have learned from your professionalism and knowledge you have offered.

## TABLE OF CONTENTS

ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	iv
LIST OF FIGURES .....	vii
CHAPTER ONE. INTRODUCTION TO THE PROJECT.....	1
Problem of Interest.....	1
Access to Medical Care .....	1
Problem Statement .....	5
Project Objectives .....	6
Rural Infertility Care.....	7
CHAPTER TWO. LITERATURE REVIEW RESEARCH AND THEORETICAL FOUNDATION .....	10
Definition, Circumstances, and Emotional Factors of Infertility.....	10
Biological Factors .....	12
Environmental Contaminants.....	13
Implementation of Telemedicine.....	13
Medical Treatments Options.....	15
Treatment Monitoring.....	18
Orem’s Theoretical Framework.....	19
CHAPTER THREE. TELEMEDICINE AND PATIENT RESPONSE.....	22
Evaluation Tool.....	22
Data Collection .....	23
Participants.....	23
Patient Experience .....	24

Protection of Human Subjects .....	26
Telemedicine Process in Rural Clinics .....	27
CHAPTER FOUR. EVALUATION.....	28
Survey Data.....	34
Discussion.....	34
Implications for Nursing Practice .....	37
Conclusion .....	39
REFERENCES .....	41
APPENDIX A. LETTER OF INVITATION TO PARTICIPATE.....	47
APPENDIX B. LETTER OF INVITATION SANFORD HEALTH SYSTEM .....	48
APPENDIX C. PATIENT POST-TELEHEALTH SURVEY .....	49
APPENDIX D. IRB APPROVAL .....	51
APPENDIX E. AMENDED CONSENT AND INTRODUCTION FROM NDSU .....	52
APPENDIX F. SANFORD HEALTH SYSTEM IRB RESPONSE .....	53
APPENDIX G. MAP OF TELEHEALTH SITES USED FOR REPRODUCTIVE HEALTH BY SANFORD HEALTH SYSTEM .....	54
APPENDIX H. APPROVAL LETTER FROM PAMELA WILLSON .....	55
APPENDIX I. LIST OF QUESTIONS FROM FIGURE 5.....	56
APPENDIX J. LIST OF PATIENT COMMENTS AND SUGGESTIONS ON TELEHEALTH SERVICES.....	57

## LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Ages and number of responses received .....	29
2. The reasons patients used telemedicine .....	30
3. Patient satisfaction level with the provider .....	31
4. Patient satisfaction level with the nurse .....	32
5. Patient satisfaction level with telemedicine .....	34

## **CHAPTER ONE. INTRODUCTION TO THE PROJECT**

### **Problem of Interest**

A commonly held misconception of the general public is that women can choose to get pregnant at any time, with a partner, without any special effort or intervention. Sadly, this is not the case for all women. One particular group of women is unable to get pregnant when they are ready to start their families. This subset of women is diagnosed infertile. They require special care and intervention from a highly educated group of providers and nurses. This intervention is called Assisted Reproductive Technologies (ART). It can be costly, time consuming, and emotionally taxing for the woman and her partner (Smith et al., 2010; Macaluso et al., 2010; Olivius, Friden, Borg, & Bergh, 2004).

Women are likely to discontinue infertility treatment due to the emotional, financial, and time incurred related to treatment (Olivius, et al., 2004; Smith, et al., 2010). The distance to a metropolitan area where infertility treatment is available, can be quite different depending on where women live within rural areas. The concern is, women may have to travel long distances to attain treatment requiring time off work creating financial hardship. Many people living in rural areas already earn wages that rank below the national income level (Bureau of Labor Statics, 2012). For those patients excessive time-off and the loss of associated wages are detrimental. It puts their jobs at risk and diminishes the family income.

### **Access to Medical Care**

Access to medical care in rural areas can be very challenging. Many women living in rural locations are not able to access care that is available in the metropolitan areas. According to data from Centers for Disease Control and Prevention (CDC)



approximately 24% of couples suffer from infertility (Macaluso, et al., 2010). Women experiencing infertility living in rural areas must travel to take advantage of infertility care, to benefit from interventions like (ART).

In order for rural clinics to offer services for infertility patients, same day hormone laboratory testing must be available. Hormone testing is expensive and labor intensive, so it is not always available in the small clinic laboratories. Follicular ultrasounds are not routinely done on patients and therefore maintaining competency for the technologist is difficult and requires intensive routine training. Therefore, many local clinics don't offer testing of this magnitude. Despite medical services being offered in the local clinics, many patients still drive several hours to those clinics. Patients living in rural areas drive for hours to get infertility treatment even if it is considered local clinic.

According to Sherrod (2004), 19% of women that live in rural areas require a significant amount of commuting to get appropriate interventions, nursing education, and consultation services for infertility care. Sherrod's research was instrumental in learning about historical care of the infertile women in the rural female population. Currently, in North Dakota, Minnesota, Montana, and South Dakota, medical services exist for these women to get laboratory and medical testing done at a local clinic in the region. But, a critical component such as relevant comprehensive specialized nursing education and highly specialized provider consultation are lacking at the regional local clinics.

Patient education is a critical component of most health services (Atack, Luke, & Chien, 2008). Evidence shows that patients who gain knowledge and skills related to their disease process improve their ability to manage self-care, enhance decision-making, and improve their quality of life (Atack et al., 2008).

Patient education is a critical aspect of the nursing profession. Patient education in the clinic setting requires the nurse to work closely with each patient to coordinate the woman's infertility treatment planning, support the woman's decision-making ability, and assist with patient education (Stokowski, 2011). The knowledge acquired by a woman helps her to achieve success with self-efficacy and life skills necessary in dealing with the infertility diagnosis. Women are better able to understand components involved with infertility treatment when nurses discuss the treatment regimens and health promotion initiatives required for positive outcomes.

The overall scope of practice of the nurse is regulated by the North Dakota Board of Nursing (NDBON). The nurse's position description is correlated with the medical specialty. When the primary residence of a nurse is in North Dakota, they can enter into a compact agreement that grants privileges to practice as part of a multi-state agreement. This allows the nurse to practice in the compact states without the requirement of additional licenses. The nurse must obtain a separate license for states not in the compact agreement. Nurses are responsible for abiding by provisions and rules of states where they practice. Minnesota, which does not have a compact, requires a separate license for in order to practice. Because of the broad area that Sanford Reproductive Medicine Institute (RMI) reaches, the nurse must have licensure in ND, MN, and SD.

Within the realm of Reproductive Medicine, the expert nurse must become an expert nurse through specialized education, practice experience, and professional certification through American Society of Reproductive Medicine (ASRM) (Marquis & Huston, 2009 p. 82). The expert nurse in reproductive medicine is expected to promote

health initiatives, encourage prevention of disease, and assist with education and emotional support for women seeking reproductive services.

The advanced practice nurse expands the roles of the registered nurse by concentrating and expanding on the assistance to the patients by ordering labs and specialized testing necessary for each individual patient. The advanced practice nurse in reproductive services has autonomy to individualize the care plans so a treatment regimen can be generated to promote the best outcomes for each patient (Donald et al., 2010).

Joint Commission has established safety standards for each patient, whether the visit is being seen either face-to-face or via telemedicine (Joint Commission Perspectives, 2009). It is crucial that standards are documented in the electronic medical record to assure patient safety and quality of care. Patient safety and quality of care is necessary for every patient being seen at every visit. Patients are assured safety if they are seen face-to-face or by telemedicine. Telemedicine allows the patient to discuss vital information with the nurse, for example medication concerns, or emotional and safety aspects within the home that need to be addressed. Another positive aspect of a telemedicine visit is the visual exchange that occurs between patient and nurse during the visit that phone conversations cannot offer (Fincher, Ward, Dawkins, Magee, & Wilson, 2009).

The geographic location of patients, combined with advances in communications technology, is creating a new system of remote patient access termed "Telemedicine." (Sevean, Dampier, Spadoni, Strickland, & Pilatzke, 2008). Society is prompting providers and nurses to adapt to change and improve the methods of delivering care (Sevean et al., 2008). Telemedicine was initially used to consult medical care for patients in distant areas. Telemedicine has rapidly become part of the health systems normal

healthcare delivery structure. The key is to incorporate the operations of the telemedicine system into the work place and to use the technology to provide consistent, seamless, high quality care to patients. Once the program has been integrated into the health system and patient care is established using telemedicine, patient care consultations are done using telemedicine.

As noted by Starren et al. (2005), “Telemedicine is the use of electronic information and communication technologies to provide and support healthcare when distance separated the participants” (p. 181). Teleconferencing can decrease the patient’s travel and time costs, while still giving quality health care alternatives that would not otherwise be available to the patients.

In many of these cases, telemedicine has proven to be an effective adjunct to close the gaps in clinical care. It gives patients the opportunity for quality and cost-effective care in areas that have otherwise been underserved (Balamurugan et al., 2009).

The telemedicine unit is set up in the Sanford ambulatory clinic office in a consult room at both sites. The setting allows privacy for patients to discuss information confidentially with either the expert registered nurse (RN), the advanced practice nurse, or the physician without feeling emotionally compromised. The patient may wish to discuss very explicit sexually intimate information with the healthcare provider and the space needs to accommodate the discussion.

### **Problem Statement**

This project seeks to elicit patient perspectives and satisfaction with the delivery of specialized nursing care via telemedicine. Three physicians offer ART services in the Fargo-Moorhead area. However, this specialty service is only available in the

metropolitan area. Women in outlying rural areas do not have access to these same services unless they travel great distances, take time off from work for multiple visits and trips, and incur the cost associated with travel and lost wages.

Therefore the problem addressed by this Practice Improvement Project is related to the access to specialty care for infertile women in rural areas. Telemedicine provides the mechanism to bring treatment to infertile women in rural areas. Technology should help to decrease the time away from work and increase cost effectiveness in the use and availability of health care staff in treating patients. Positive learning and positive patient satisfaction are essential to assure patients continual use of the service.

### **Project Objectives**

The Practice Improvement Project addressed three objectives which focused, on first, evaluating the delivery of evidence-based reproductive health care via telemedicine; second, determining the patient satisfaction of care delivered via telemedicine; and third, analyzing, the patient's perception of emotional support during telemedicine visits.

The first objective involved the use of evidence-based clinical guidelines for the treatment of infertility delivered via telemedicine. The project focuses on patient satisfaction and perspectives on the nursing care via telemedicine. However, this project was directed at the use of guidelines by the nurse during a telemedicine visit with infertile rural women. Quality Assurance (QA) has been designed to following evidence based guidelines along with monitoring of the process to assure optimal outcomes (Bliss- Holtz, 2009).

The second objective of the project was to establish a positive relationship with the patient thereby fostering patient satisfaction. "Intentional presence" is an approach

required of staff using telemedicine. Staff needs to intentionally talk into the computer monitor maintaining good eye contact with the patient. Self-awareness and cognizance by the nurse are needed related to facial expressions when discussing both positive and negative outcomes.

The emotional connection to the patient is the third objective that this practice improvement project addressed. The patients must be aware that care and consideration for her well-being is the primary concern of the staff member. Showing concern for the patient creates an emotional connectedness. The high-quality patient-nurse relationship is maintained by good communication. Positive communication makes the patient feel important which is necessary to create connectedness (Sevean et al., 2008).

### **Rural Infertility Care**

Assistive Reproductive Technology (ART) providers travel to outreach clinics to develop and monitor treatment plans however, expert and advanced practice nursing with knowledge in reproductive medicine is lacking at these locations. Each patient seeking reproductive assistance is given an individualized education plan to engage and empower the patient during the complex treatment plan developed by the ART provider. The expert RN or advanced practice nurse explains to each couple the diagnosis and promotion of a healthy lifestyle to increase fertility outcomes. The expert RN also discusses laboratory and diagnostic outcomes with the couple to foster self-efficacy. If the couple requires self-injection, the expert nurse teaches the couple or woman.

During the first quarter of 2013, reproductive medicine physicians traveled from Sanford Health to consult with patients in four communities: East Grand Forks and Alexandria, Minnesota and Jamestown and Bismarck, North Dakota. Rural patients must

travel to one of these clinics to take advantage of infertility specialty services. At the rural clinic, the ART provider and patient discuss possible options, and decide on a treatment plan. The history of the patient dictates the type of treatment plan and management of the patient. The complexity of the treatment regimen depends on the patient's medical history (Allahbadia, 2001; The Practice Committee of the American Society for Reproductive Medicine [ASRM], 2004).

The specialized nursing care that patients require is coordinated with the treatment plan. Patients are registered for a class to learn self-administration of medication depending on the medication and complexity of the treatment plan. Classes range from one to two hours of contact time for the patient and either the expert nurse or advanced practice nurse. Classes are taught in Fargo, North Dakota. Based on the patient's home location, the patient may need to drive some distance to Fargo for the specialized education before beginning the medication. This can be time-consuming and stressful and patients may need to take time off work which further adds to the financial burden. Some patients choose to forgo any infertility treatment because of the 'additional costs'.

Infertility is a chronic and emotional disease and stressors compound the patient's feeling of aggravation (Chang & Mu, 2007). Teleconferencing offers a technologically mediated version of face-to-face consultation that eliminates or minimizes many of these problems. During infertility treatment via telemedicine, the expert RN and the advanced practice nurse continues to nurture learning and tailor information to each patient (Fincher et al., 2009). The visual interaction with telemedicine provides an advantage and better quality than a telephone call (Atack et al., 2008). Telemedicine allows the

advanced practice nurse to visit with the patient and provide additional instructions and emotional support to the patient when needed. Visualization via telemedicine promotes increased learning and understanding for patients. Telemedicine also offers the opportunity for the nurse to provide visual guidance for activities such as self-injection or for the patient to ask or visually question the expert nurse related to medication regimens or other aspects of treatment.

To summarize, the purpose of the Practice Improvement Project was to focus delivery of care using evidence-based reproductive care via telemedicine as a means to provide education and support to infertile rural women. Secondly, to determine patient satisfaction of care delivered via telemedicine, and thirdly the patient's perception of emotional support with telemedicine is sought using patient surveys via this method of care delivery by nurses.



## **CHAPTER TWO. LITERATURE REVIEW RESEARCH AND THEORETICAL FOUNDATION**

Chapter two of this Practice Improvement Project provides a review of literature and information about the theoretical foundation of this project. The chapter is divided into six sections: a) Definitions, Circumstances, and Emotional Factors of Infertility; b) Biological Factors; c) Environmental Contaminants; d) Medical Treatment Options; e) Treatment Monitoring; and f) Orem's Theoretical Framework. All of these sections provide background information related to the problem that this project addresses: access to specialty care for infertile women in rural areas via the use of telemedicine.

### **Definitions, Circumstances, and Emotional Factors of Infertility**

Approximately eighty-five percent of the American population does not have an issue with conceiving and bearing children. The other fifteen percent of this group is regarded as sub-fertile and will have issues conceiving and carrying a child to term at some time in their childbearing years. Nationally, women are postponing pregnancy until later in life through the use of contraception and the growing use of Assisted Reproductive Technologies (ART) (Maheshwari, Porter, Shetty, & Bhattacharya 2008; Sherrod, 2004). This has given women the erroneous impression that their fertility can be resumed at a more convenient time in life which is an inaccurate judgment and can actually cause infertility (Maheshwari et al., 2008).

The actual definition of infertility is the failure to conceive after twelve months of unprotected intercourse (Benyamini, Gozlan, Kokia, 2004). Some couples never have children, while some spend months undergoing treatment with the hopes and plans of parenthood. Stress occurs from both the threat of becoming a parent as well as the emotional rollercoaster of the treatment process of trying to become pregnant (Benyamini et al., 2004).

Approximately twelve percent of all couples will have an issue dealing with infertility at some point in their reproductive years (Center for Disease Control and Prevention [CDC], 2012). Infertility can be costly in a multitude of ways, particularly emotionally and financially (Chang & Mu, 2007). Some insurance providers pay for ART services but in a limited dollar amount. This financial burden adds to the emotionally stressful situation that women already experience. Insurance companies vary on what procedures they will cover and the dollar amounts paid for each procedure. The insurance benefits are very specific and can become very overwhelming to patients. The financial burden is worrisome, but the longing to have a child and family is many times stronger (Harvard Mental Health Letter, 2009).

Many women put off childbearing - and then become pregnant in their older years but are at a higher risk of miscarriage, Down syndrome, low birth weight, pre-term deliveries, and other chromosomal anomalies (The Practice Committee of the ASRM, 2012). Pregnancy in older age also leads to maternal health issues such as gestational diabetes, hypertension, placenta previa, operative deliveries, and maternal mortality (Maheshwari et al., 2008).

Psychologically, infertility brings to mind many unpleasant feelings for women. Emptiness is one feeling many women express; another feeling is the sense of being out of control (Sherrod, 2004; Groff et al., 2004). When a couple or woman wishes to have a child and then fails, they may develop an overwhelming sense of urgency and deprivation. This emotion may overcome the couple or woman as they learn to deal with many possible and unanticipated crises and losses in their lives. Losses might include miscarriage or the loss of privacy. The couple must tell everything about themselves and their sexuality, and they might also experience the frustration of putting their plans on hold until pregnancy is achieved. Infertility often makes a woman feel out of control and, thus, decreases their self-worth while increasing anxiety levels

(Sherrod, 2004; Benyamini et al., 2004). According to Chang and Mu (2007), infertility is a very emotional issue for women and tends to be quite stressful for the couple going through the experience. Many couples feel the stress to “carrying on the ancestral line” (Chang & Mu, 2007 pp. 534) and this puts tremendous pressure on the couple to conceive and have a child. The stress of having a child is innate and materialistic for many. Some women will do and go through whatever it takes to have that child (Carter et al., 2010).

### **Biological Factors**

There are many biological factors which contribute to infertility and they can be quite complex. For the female, some of the reasons can include the absence or dysfunction of reproductive structures. The presence of ovaries is necessary for oocytes to be produced and the presence of fallopian tubes is needed for natural fertilization. If structural damage has occurred for any reason, it can impact the treatment and a more intense treatment plan needs to be implemented. Male infertility is also a possibility. Examples include production of too few sperm or the motility of the sperm is not adequate (CDC, 2012; Nallella, Sharma, Aziz, & Agrawal, 2006).

There are other types of infertility such as unexplained infertility, where testing has been done but there is no clear answer about what is causing the woman’s inability to become pregnant. Polycystic ovarian syndrome and ovulatory dysfunction are two other possible causes of infertility (Kosmas et al., 2007).

The diagnostic work-up for the female can be quite extensive and overwhelming because it does include x-rays, and multiple labs scheduled throughout pregnancy attempts (CDC, 2012; Van Voorhis, 2010). Laparoscopic surgery can be used when endometriosis is a factor. However the use of robotics has decreased the length of hospital stays and reduces complication rates.

Specialized skills and the use of new technologies are a limiting factor in the number of physicians available to provide the diagnostic surgery (Gianaroli, et al., 2012).

### **Environmental Contaminants**

Social factors such as tobacco, alcohol, caffeine, and many environmental toxins can affect either or both the male and female. Men who smoke or chew tobacco frequently have lower sperm counts and/or poor sperm motility reducing the woman's chances of getting pregnant. Women who smoke, or are exposed to smoke, reduce their ovarian reserve.

Environmental contaminants can also lead to chromosomal abnormalities in the baby or stillbirth and miscarriage (The Practice Committee of the ASRM, 2008; Allahbadia, 2001). Excessive consumption of alcohol can cause hormonal imbalances and it can affect generation of sperm and ovulation. Women who drink, tend to suffer from luteal phase defects, progesterone deficiencies, anovulation, and/or amenorrhea (The Practice Committee of the ASRM, 2008; Allahbadia, 2001).

Based on a study done by Mendola, Messer and Rappazzo (2008), women living in rural areas are exposed to more chemicals including pesticides, herbicides, fertilizers, and farm chemicals. As a result they have an increased infertility risk and higher rate of spontaneous pregnancy loss (Gianaroli et al., 2012; Mendola et al., 2008; Woodruff, Carlson, Schwartz, & Gludice, 2007).

### **Implementation of Telemedicine**

The decision to set up a new regional clinic site is at the discretion of the Sanford Health Systems clinic manager. It involves collaboration with the Director of Telemedicine at SHS Sioux Falls to coordinate the purchase of telemedicine equipment. There are specific federal rules in which billing is defined, where noting third party payers will pay for a telemedicine visit

and when they will deny this type of care. Therefore, it is very important for key people to collaborate with and assure all aspects are met before ordering equipment.

The next timely item to complete is assurance of appropriate credentialing of the providers using telemedicine. Credentialing provisions are based on administrative consent, state licensing of the provider, preparation of the provider, and required references.

Once the providers are credentialed at the outreach clinic site, the next step is to purchase the equipment with assistance from the SHS Information Technology (IT) Department. The specific type of equipment used is called the Polycom CMA desktop version. The computer is required to be in an area designated for patient care use only. The IT staff provides a test computer and Polycom monitor at the Fargo telemedicine work site to assure the regional clinic site is set for operation.

Once the purchase order for the equipment has been placed, it takes approximately two to three weeks for the equipment to arrive. During this time, education with the coding staff is completed. A GT modifier is added at the distant telemedicine site for billing of the visit. A Q code is added to any visit when the visit is completed via telemedicine. The Q prior to the code delineates that telemedicine was used versus a face-to-face visit. The reception staff was informed at the originating site of the appointment as to the type of visit which was then noted in the computer system for a telemedicine visit. Each visit had a specific work type and flow unique for the telemedicine visits versus the face-to-face patients for billing purposes. The work type helped with the flow in the computer for the coders so the Q code could easily be populated by the providers and staff. This could delineate the visit as a telemedicine visit by the computer mitigating the likelihood for error.

Because the number of telemedicine visits is increasing, SHS set up a telemedicine help desk. The help desk was staffed with IT personnel six days a week, 8:00 am to 5:00 pm.

Because telemedicine did not have a high volume of visits after hours, the IT staff was on-call in the event of an emergency. The SHS IT staff was available for trouble shooting, equipment issues, connectivity problems, and upgrade monitoring. The IT staff was helpful in any type of event when telemedicine was causing issues for the staff.

Everyone participating in telemedicine, nurses, providers, and patients must learn to use a new type of technology. The use of the new technology involves active participation from the learner, with a social presence, a preference for face-to-face interaction, and a respect for diverse ways of learning (Burruss et al., 2009; Fincher et al., 2009). Women with infertility, who were participants, were interviewed for at least 15 minutes at each encounter with an expert RN or advanced practice nurse. The women were asked questions regarding pain, medication allergies, and medication reconciliation. These questions are part of the JCAHO required intake questions. Following the general questions, the expert RN continued the interview and asked specific questions related to their medication regimen and/or treatment plan.

At all sites where Sanford Reproductive Medicine provides teleconferencing for women, education was provided to the staff who works with the equipment. Trouble shooting and dial-up is reviewed with each individual so knowledge is acquired and assured. Information is provided so staff may contact. Education for coding and billing was also addressed.

### **Medical Treatment Options**

Medication treatments for infertility increase in complexity as the different types of regimens are attempted without success or a more complex diagnosis for infertility is established. One of the first methods of treatment for infertility is the use of clomiphene citrate for ovulation

induction. Many clinicians use different types of regimens depending on the patient history and diagnoses. Providers time the use of human chorionic gonadotropin (hCG) around ovulation followed by an intrauterine insemination (IUI) (Kosmas et al., 2007; The Practice Committee of the ASRM, 2006). During this regimen the patient is required to have monitoring at a clinic that provides same-day calculation of estradiol blood levels and same day ultrasounds to assure that the follicular size is maturing appropriately. Because it is cost prohibitive to the smaller regional clinics, they would typically send the lab work to be run in a larger health system such as Sanford Health System or Essentia Health Systems. These are usually done at Sanford Health System regional sites located in Fargo, Minot, Bismarck, North Dakota, or East Grand Forks, Bemidji, and Alexandria, Minnesota.

The clomiphene citrate dose can be altered if the follicular maturation is not progressing as planned. The ART provider makes decisions about any modifications and relays the information to the patient for the follow-up plan of care. Once the lead follicle measures 18 mm in diameter on ultrasound, ovulation is ready to occur. Careful attention is needed to assure that not too many follicles measuring 18 mm or more are present as a multiple gestation can occur as a result. If too many mature follicles appear, the patient needs to be counseled on the risks and benefits of continuing with the cycle. The Luteal Hormone (LH) surge can occur at various times in the cycle and during any follicle size. The primary intention with ovulation induction is to correlate follicle maturation with hCG injection and at the same time increase the predictive time for oocyte release thus increasing the possibility for pregnancy (Kosmas et al., 2007; The Practice Committee of the ASRM, 2006). Once the hCG injection has been timed and self-administrated by the patient, the next step is an insemination which is scheduled 35 hours later.

The woman receives an appointment email or call with the time to report to the clinic for the insemination. Instructions are given to the woman (couple) based on educational needs. Some women need education regarding medication administration, while other women may require information on limiting activity. However, the same information is readdressed when the woman reports to the clinic appointment.

The lab at the Sanford Reproductive Center is a College of American Pathologist (CAP) - accredited lab that meets special fertility accreditation guidelines to wash sperm for insemination purposes. After insemination, the patient is then instructed about further follow-up such as when to do their home pregnancy test. If the patient's menstrual cycle starts, she is instructed to call the reproductive center to start the treatment plan over again.

Another treatment option for the infertile women is ovulation induction which uses follicle stimulating hormone (FSH) medication of the ovaries using human chorionic gonadotropin administration followed by an intrauterine insemination (Gianaroli et al., 2012; Kosmas et al., 2007). This type of treatment regimen is called superovulation with injection medications. There is intense patient education needs because the patient monitoring is very precise. Without the patient understanding the complexity and risks involved, there is a much higher possibility of multiples pregnancies resulting in multiple babies. This treatment plan is complex and involves time and intense pharmacological intervention (Gianaroli et al., 2012; The Practice Committee of the ASRM, 2008). The medication that is used in superovulation is a urinary-based human gonadotropin (hmg) or a recombinant follicle stimulating hormone (FSH) gonadotropin. These medications are given by injection, starting on day 3 of the cycle and continuing until the greater follicle reaches maturation or size 18 mm in size. It is recommended that not more than 2 to 3 mature follicles be present with correlating estradiol blood levels. This



is to assure a low level likelihood of multiple gestational pregnancies occurring unless a patient does not follow guidelines. This underscores the need for education and support by the expert nurse. Same day blood results and ultrasound are also required to accurately relay test results to the patients so they can take their medication as necessary or schedule follow-up appointment as needed.

Controlling the number of follicles is the key factor when women are using superovulation as their treatment plan (Cedrin-Durnerin et al., 2006). The number of follicles present at the time of hCG administration is indicative of the number of possible oocytes available for fertilization and pregnancy. This increases the rate of hyperstimulation and multiple gestation if it is a multiple number (Cedrin-Durnerin et al., 2006).

### **Treatment Monitoring**

The average number of monitoring visits a patient may need ranges anywhere from three to seven visits, depending on the treatment plan. Due to the need for multiple monitoring visits, telemedicine has proven effective (Fincher et al., 2009) in decreasing stress and costs. The excessive cost of infertility treatment may hinder the patient's ability to seek fertility management, which also adds to emotional stress, including excessive time off work and travel. Thus, using telemedicine improves flexibility and access for women who would otherwise be unable to seek fertility care (Bohnenkamp, McDonald, Lopez, Krupinski, & Blackett, 2004).

During the monitoring period, if a woman has a question or concern, wants to review an injection with a nurse, or seek follow-up communication or medication counseling, the literature validates that telemedicine is an effective alternative. While the literature also shows similar positive outcomes for patient satisfaction with telemedicine in Parkinson disease education (Fincher et al., 2009), there are no studies that focus on infertility care and the use of telemedicine.

According to studies in Europe and in the United States, the rate of infertility has been on the rise since 1980 (Maheshwari et al., 2008; Sherrod 2004). The prevalence of infertility is approximately 12% in women of childbearing age (CDC, 2012). The issue addressed in this project is access for women in rural areas who have been diagnosed infertile and need specialty care to conceive (Sherrod, 2004). Much of the special care from a provider and an advanced practice nurse and/or expert nurse can be delivered using telemedicine.

### **Orem's Theoretical Framework**

The framework of this study was Orem's (2001) Self-Care Model and Theory of Nursing Systems. Orem's promotion of self-care is shared by the Sanford Health System. On the first visit, fertility patients are given a *What you need to Know on your Journey* binder which includes handouts on medication side-effects, a glossary of terms, financial information, lifestyle recommendations, and a section on each of the different treatment regimens. The expectation of self-care within a nursing framework is crucial to care of fertility patients.

Orem's self-care deficit theory of nursing is a general theory which is descriptive and explanatory. There are three constituent theories described in Orem's self-care theory which includes a self-care theory, a self-care deficit theory, and a theory of nursing systems (Denyes, Orem, & SozWiss, 2001). All three constituent theories are necessary for foundational understanding and care by the nurse.

Orem's self-care theory was first used in 1956 and was further developed in 1960. The concept of self-care is distinct from the other types of care, such as dependent-care and nursing-care, because people are the reason for their own well-being and actions. Other theories may promote dependent-care or nursing-care that does not encourage the patient to become involved

in decision making and goal setting. Self-care is the process of an individual acting on behalf of one's self or the person taking ownership of the action (Denyes et al., 2001).

Self-care includes practices specifically directed toward bringing a situation-specific action as a learned behavior. Self-care must be understood as a daily care function that is a result – seeking action creating positive change in the patient's environment. According to Denyes et al. 2001, Orem states the process of self-care must meet a few actions. First, the patient must be able to formulate the need to make a change in daily care functions. Second, the patient must be able to make decisions about her (his) care. Finally the patient must be able to perform the actions necessary to engage in self-care with known validity to health and well-being. The knowledge integration of self-care helps the women understand the infertility information and perform actions that are therapeutic to their environment and needs (Denyes et al., 2001).

Women seeking fertility treatment have frequent visits with the provider and expert nurse. Each encounter is considered a new situation for the woman. Conditions that are optimal for education are essential to patient learning for the woman to learn adequate amounts of information at each visit. This is a situational specific example of infertility teaching that would occur for an infertile woman. Orem's theory also discusses the individual's inability to cope with disease or illness (Renpenning & Taylor, 2003). The self-care deficit theory provides a third party to help promote well-being to the compromised individual. Nursing assists in meeting the needs for the individual. Women with fertility issues struggle due to stress and emotional turmoil. The treatment options offered are quite involved and require intramuscular and subcutaneous injections which can be quite stressful. Nursing can offer guidance and support for the education necessary for the learning needs of the women. Nursing can support the expectations given to the patient so self-care concepts can be achieved. The nurse can create an

individual learning objective for each patient so positive outcomes can occur. The nursing care is supportive, educational, and can offer guidance for the individual in nature.

The telemedicine visits are short in length but the information and timing is necessary for emotional and personal wellbeing of each woman during each encounter. Orem's theory states that the nurse must have the ability to understand the patients in ordinary and extraordinary conditions to meet their needs (Renpenning & Taylor, 2003). The nurse's ability to understand the needs of the patient helps the woman cope with the infertility diagnosis. The nurse can offer words of support if needed. Being able to care for the patient in such situations is an art.

Nursing as an art is more than the scientific knowledge a nurse possesses. The 'art of nursing' consists of creating a caring, compassionate, non-judgmental environment for patients. Nurses have many skills that are used on a daily basis in their practice. However, it is the relationship-nurturing type activities that create the bond between the nurse and the patient. It is how the nurses use their hands, it is the words they say, and it is how they express themselves towards others that creates a genuinely - present - caring nurse. It is the nurses' who give of themselves to their patients that have the true gift. That is the 'art of nursing' which creates a healing environment for patients (Enzman-Hagedorn, 2004).

Patients are given a standard guideline that provides a visual prompt for them to follow. The written information provides a representation of Orem's self-care model for the infertile patient. Orem's theory defines nursing as an art. Some women receiving medical treatments for medical related issues may feel personally inadequate to cope with the situation. Other women may only require nursing to assist with knowledge and skills and it is the art of nursing to know when to intervene and assist with the necessary needs of each patient (Renpenning et al., 2003).

## **CHAPTER THREE. TELEMEDICINE AND PATIENT RESPONSE**

Before telemedicine was available in rural sites, women diagnosed infertile traveled long distances to obtain necessary treatment from specialty physicians and expert nurses. Traveling involved loss of work, time, and financial hardship which contributed to their feelings of emotional stress. Telemedicine offers the opportunity to receive treatment at local rural clinics. This Practice Improvement Project sought to elicit patient perspectives and level of satisfaction with specialized nursing care provided via telemedicine at a rural clinic.

The objective of this project sought to obtain feedback from women who participated in a telemedicine experience. During the experience, patients received standardized educational materials related to self-care medication administration, or the Joint Commission Accreditation Healthcare Organization (JCAHO) intake process. The project focused most specifically, on the use of evidence-based reproductive health care via telemedicine, second, determining the patient satisfaction of care delivered via telemedicine, and third, the patient's perception of emotional support during telemedicine visits in the care of rural infertile women. It focused on the use of technology in providing nursing care in an alternative manner (Burruss, Billings, Brownrigg, Skiba, & Connors, 2009; Fincher et al., 2009).

### **Evaluation Tool**

The tool used was the Patient Post-Telehealth Questionnaire (PPTQ) which was adapted from Fincher (2009). The survey contains 15-items asking for the patient's opinions related to their telemedicine experience. The survey is based on a Likert scale of (4 = very useful, 3 = useful, 2 = limited usefulness, 1 = not useful, 0 = not applicable). The first five items of the PPTQ measure patient satisfaction ratings regarding the provider and staff. The next four

questions focus on the patient's perceived usefulness of the medication intervention. The last six questions measure patient perspective on the usefulness of the telemedicine experience.

The PPTQ was initially used in Linda Fincher's research article (2009), and approval to use this tool was granted with permission to change or adapt questions as needed. Appendix H contains the approval granted via note from Pamela Willson. The note requested acknowledgement using the following statement with an "Adaption from note within the article."

### **Data Collection**

Every woman who received telemedicine care for infertility at a rural site was given two letters of introduction about the project; Appendix A contains the letter of introduction from North Dakota State University; and, Appendix B contains a letter of introduction from Sanford Health Systems (SHS). Along with the letters, patients were also given a copy of the survey to complete (Appendix C) and a self-addressed, stamped, envelope to return the completed survey. Materials were provided to the patient by the receptionist, at each telemedicine appointment. A drop box was provided at each regional clinic site for completed survey drop-off or patients could mail it to the address on the self-addressed envelope. The self-addressed envelopes were sent to Sanford Health Systems in Sioux Falls.

### **Participants**

Potential participants in this project were women and their significant other from the rural areas seeking infertility treatment at a Sanford Health Care Systems clinic outside of Fargo, ND. Care from a Sanford Health reproductive specialist and the availability for telemedicine visits is present at the following regional clinic sites: Fargo, Minot, Bismarck, and Jamestown, ND, Bemidji, East Grand Forks, and Alexandria, MN. Participants' age ranged from 19-46. Instruction was provided to either fill out the survey at point of service or fill out and mail it in

when convenient using the self-addressed envelope. Pens were provided in each exam room for the women so completing the survey at point of service was an option.

### **Patient Experience**

The ART physicians travel to several outreach areas in the region such as Fargo, Bismarck, and Jamestown, North Dakota, or East Grand Forks, and Alexandria, MN for initial consults. The women can travel from their home to one of these locations for the initial consultation with one of the physicians. Once the initial consult has been done and a treatment plan established, the women may go to a regional outreach clinic site where telemedicine visits can occur with concurrent appointments.

When women in rural outreach areas decide to consult a physician for treatment, the first visit is done face-to-face. The information is gathered via this method to form an emotional bond with the patient and to assure the initial information is gathered and educational information given to the woman. The first visit allows the woman to feel she can ask questions and a treatment plan is created. Frequently, during the diagnostic and initial visit with the physician, the woman will attend the appointments alone. Typically, men don't attend the first visit, despite male factor infertility accounting for approximately thirty percent of infertility cases.

Historically, children have been thought to be the responsibility of women. Thus, creating an image in our culture, in which the responsibility is on the woman. Therefore the woman will attend the appointments and relay information to her husband; however, he may attend some of the consecutive appointments if he feels engaged with the plan of care (Resolve, 2013). The understanding of the physician creates the physician-patient bond. The physician-patient bond is formed increasing the likelihood of a positive outcome for increased patient satisfaction.

All treatment plans begin with the woman's menstrual cycle. The woman calls into the Fargo office when her menstrual cycle begins even if she plans to use a site with telemedicine. The Fargo office calls the regional outreach clinic site to set up an ultrasound and telemedicine visit and coordinates this visit with the provider's schedule. The woman is told the time to report to the outreach clinic site for her appointment. At the scheduled visit time, the woman will report to the regional outreach clinic site and register. Registration personnel check-in the patient and give her the appropriate insurance and healthcare documents. Registration personnel also give the woman the letter, telemedicine survey, and self-addressed stamped envelope. The woman will be informed that this information is given each and every time she has a telemedicine visit. She is informed that if she has any questions about the survey to contact staff members listed on the consent form.

The woman is taken to the ultrasound exam room for her exam. Once the ultrasound is performed, she is taken to the telemedicine examination room. The patient's ultrasound preliminary report is faxed to the Fargo Reproductive Medicine office to be viewed by the provider. The telemedicine liaison is called at the Fargo Reproductive Medicine office to make the provider aware that patient in the regional outreach clinic site is ready for the nurse to connect with the woman.

The expert RN or advanced practice nurse at the Reproductive Medicine Fargo site connects with the woman via telemedicine and discusses the JCAHO intake questions. The expert RN asks questions related to emotional stress and gives instructional information based on the individual needs of each woman's treatment plan. The telemedicine with the nurse can take 15 to 120 minutes based on each woman's needs. Then the provider will visit with the



woman about the ultrasound preliminary report and give an estimated plan of treatment based on the outcome of the lab results. The provider will send for lab work.

The lab work takes approximately two hours to be completed. Once the lab work is completed, the results will be either faxed or scanned into the electronic healthcare record (EHR). The results are viewed by the provider and orders are confirmed. The regional outreach clinic site is called and the next appointment for ultrasound and telemedicine visit date and return visit is established. The secured plan of treatment from the provider, the date the next return ultrasound and telemedicine visit, along with the results of the lab are emailed or called to the woman. The majority of the women are technologically savvy, thus email is the preferred method of notification for them. However, not all women have email capability so a phone call maybe necessary. Every patient is contacted with results, return visit information, and instructions by an expert RN.

### **Protection of Human Subjects**

The North Dakota State University Institutional Review Board (IRB) granted an exempt approval PH13150 (Appendix D). The evaluation survey posed no risk to the women completing the survey. The survey invited the participating women to comment on their telemedicine visit. The principal investigator and co-investigator were available via e-mail and by phone to answer any questions posed by the women. The women were instructed by the cover letter to consent to the research project by marking the check box on the survey. Participants had the opportunity to opt out or discontinue the survey at any time. Names of the participants were kept anonymous. During the data collection period, the process of compiling the data in Sioux Falls, S.D. changed to compilation of data to Fargo, N.D. Therefore, an amended IRB was sent and approved by

North Dakota State University IRB. A new consent letter with the consent form information was written and sent with the questionnaires (Appendix E).

The project proposal also was sent to the Sanford Health System Institutional Review Board which considered the project a quality assurance project. The recommendations were to share the outcomes of the project with the Nursing Research Council upon completion (Appendix F).

### **Telemedicine Process in Rural Clinics**

Patients at the rural outreach clinic facility were checked in during the Practice Improvement Project by a receptionist. The women received the check-in paper work and a post-telehealth questionnaire (PPTQ) prior to each patient telemedicine visit. Not every woman will fill out the questionnaire. It is estimated that approximately 29% of patients will complete the questionnaire (Buyer & Miller, (n.d.)). Instructions will be given to the women in print form along with verbal instructions. The women could either fill out the questionnaire and place it in the survey drop box located near the reception desk or mail the completed survey using a self-addressed with the survey. After these initial instructions were given, they proceeded with the visit using telemedicine after completing their ultrasound and lab work. When the telemedicine visit was complete, a prompt was given to complete the survey in hopes of increasing survey response.

The receptionist at the regional outreach clinic sites collected the completed surveys on a monthly basis. The surveys were sent to Sanford Sioux Falls for data compilation and mailed to Sharri Lacher in a secure envelope.

## CHAPTER FOUR. EVALUATION

The data will be presented in parts. First, demographic information and reason for telemedicine, second, their satisfaction with provider, nursing, and telemedicine process, and third is patient comments.

Women diagnosed as infertile who live in rural areas must have a team of experts helping them with their treatment. Women are receiving care in rural areas that typically is provided in a metropolitan area. Because they are receiving the care via telemedicine, it is important they feel the same bonding they would as if they were receiving their care in person on a face-face visit. Therefore the team of experts conveying the care in Fargo must also provide empathy and concern which enable the woman to feel close to her health team member. Chapter Four discusses the survey responses and addresses the project objectives.

A total of 145 surveys were submitted by patients to either Sanford Health Systems (SHS) Sioux Falls, SD or in the survey box that was forwarded to the Project Director. Once the data was received, it was entered into the North Dakota State University (NDSU) Qualtrics Reporting System. Qualtrics is a data collection and analysis software system at NDSU that is available for students, faculty, and staff. Not all participants entered their age on the surveys; however, Figure 1 shows that 142 entered their responses about age. Figure 1 displays the range and number of participants. The age ranges was from 20 to 60. The majority of respondents were 20 to 40 years of age ( $n=133$ ). The other age group with participants was the group that ranged from 41 to 60 years of age with 9 participant responses.

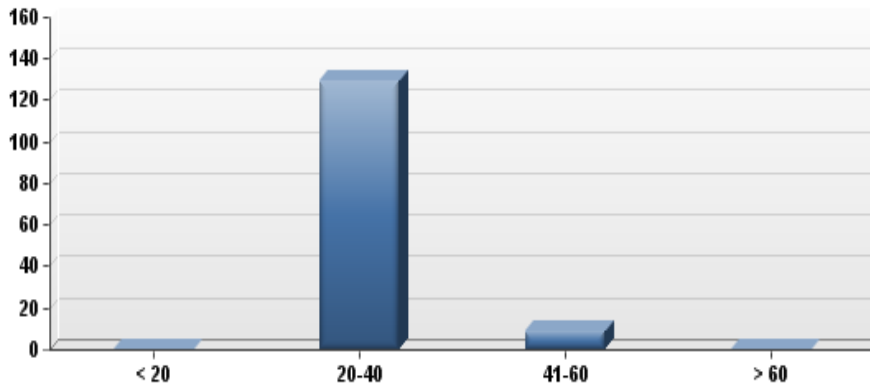


Figure 1. Ages and number of responses received.

When asked if telemedicine saved them travel expenses, 98% ( $n=137$ ) of those reported telemedicine saved them expenses. Loss of work or school is the second major issue for the respondents, thus 77% ( $n=108$ ) noted infertility treatment was a hardship for them if telemedicine was not available. Many women required family members to drive them to their appointments. So when asked about finding someone to drive to their appointments 6% ( $n=8$ ) reported the need to find a family member or friend to drive them to their appointment. Because family and friends also need to take time off work 23% ( $n=32$ ) responded that telemedicine saved family time and miles. Some women live in small rural areas, thus driving to another the metropolitan areas for treatment would be difficult. Thus 14% ( $n=20$ ) noted they would have forgone fertility treatment if telemedicine services were not available. The responses are listed in Figure 2.

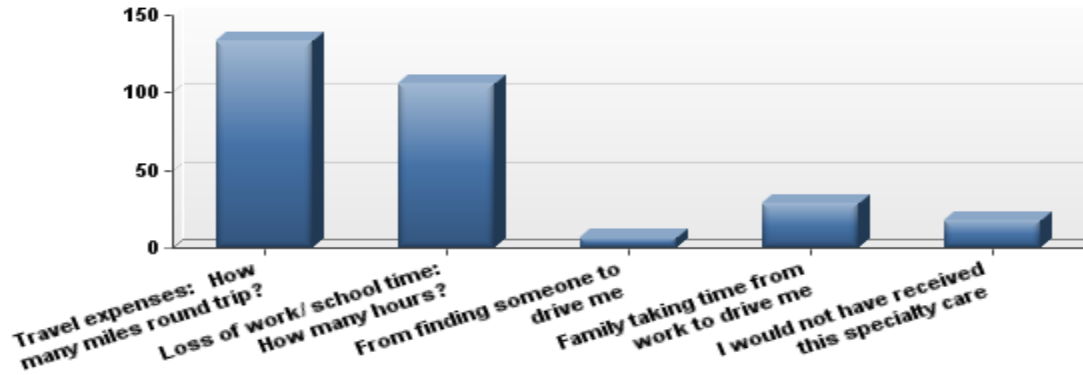


Figure 2. The reasons patients used telemedicine

Of the respondents ( $n= 130$ ) noted miles saved, telemedicine enabled them to avoid the need to drive 33,935 miles total. Women reported frustration with the need to drive from their residence to the regional clinic site for their telemedicine visit even though the clinic was closer than a metropolitan area for treatment. Survey results indicated the number of reported work hours saved by using the regional clinic telemedicine sites was 619 ( $n=100$ ).

When the women were asked if they were satisfied with the treatment received during the telemedicine appointment with their provider, 80% ( $n=116$ ) reported the provider treated them in a friendly manner during the use of technology. Four questions were used to check patient satisfaction with the provider as well as emotional connectedness with the use of technology. When asked, 75% ( $n=108$ ) reported the provider was sensitive to their needs which is very important for infertility patients. Of the women who responded, 72% ( $n=104$ ) reported they were able to express their concerns to their provider. When asked, 68% ( $n=99$ ) responded they were able to confirm their provider’s recommendations for treatment. Further data is found in Figure 3 and Table 1.

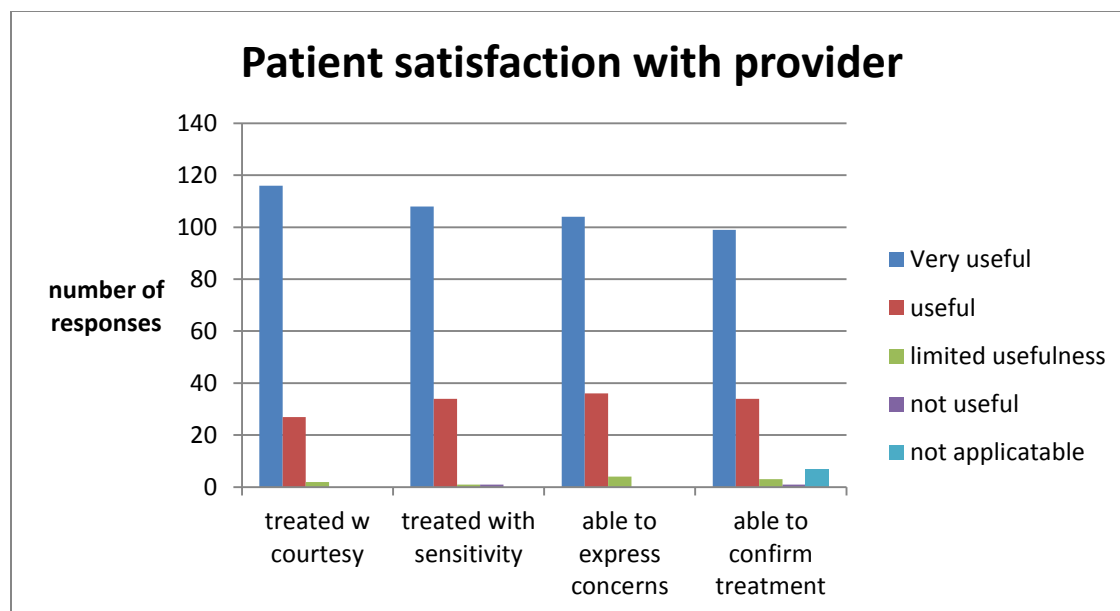


Figure 3. Patient satisfaction level with the provider

Satisfaction and emotional connectedness with the nurse is very important for the patient. One way to show the patient a caring attitude is to be intentional with the communication into the telemedicine monitor by maintaining appropriate eye contact while upholding a calm demeanor yet offering emotional support. Thus, 80% ( $n=115$ ) responded they were treated with courtesy and friendliness by staff.

The telemedicine portion of the visit was used to ask many of the JACHO questions that are required to meet safety standards for every patient visit. This offered an opportunity to ask questions related to the women's medication treatment regime. The nurse would question if the patient had enough medication or if medications should be ordered. Emotional support was given prior to the provider's visit. When the women were questioned if they reported the nurse's portion of the telemedicine visit was beneficial, 48% ( $n=68$ ) reported it was very useful while 33% ( $n=48$ ) reported it was useful. Classes are given via telemedicine such as in-vitro fertilization class and injection class which require a return demonstration by the patient. When

asked if the women understood the instructions given by the nurse, 61% ( $n=87$ ) responded it was very useful, while 25% ( $n=36$ ) reported it was useful to their treatment. Because patient education by nurses is very important to the outcome, satisfaction of the patient regarding nursing is important. When asked, 58% ( $n=82$ ) reported the quality of information received was very useful and 29% ( $n=41$ ) reported it was useful. Results are found in Figure 4.

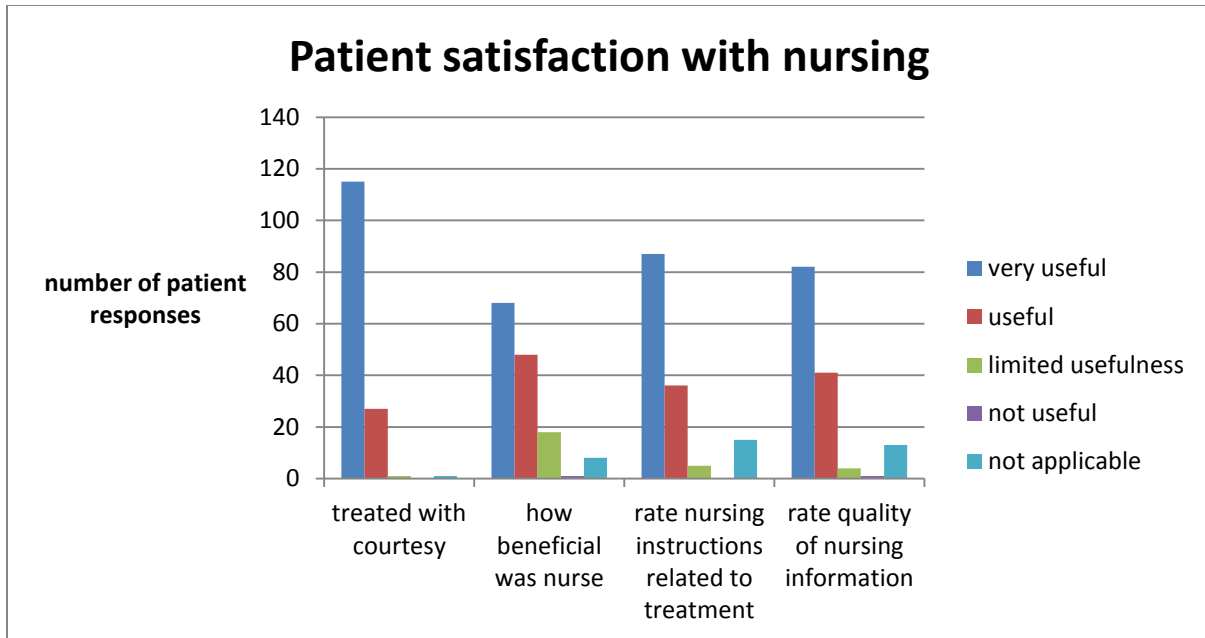


Figure 4. Patient satisfaction levels with the nurse

Telemedicine is a form of technology that should offer services to the rural population that they would not otherwise receive (Agency for Healthcare Research and Quality [AHRQ], 2008). Questions were asked of the respondents about the telemedicine visit to see their satisfaction level with the technology and ability to connect with the staff and provider via this method. The first question addressed patient understanding of information gathered via technology versus face-to-face. The majority of participants (73%,  $n=106$ ) reported they understood the information given to them; however 23% ( $n=33$ ) reported it was useful. Infertility treatment involves medication treatment of some type. Instructions are important for

patient's understanding of self-care. When questioned regarding their understanding of the treatment plan, 66% of patients reported they were adequately instructed via telemedicine. Patients appreciate the availability of telemedicine; however, the face-to-face visit cannot be replaced with technology. When asked, 70% ( $n=100$ ) reported that technology was very useful as well as 25% ( $n=36$ ) responded it was useful. The ability to openly communicate is very important to the patient-provider relationship. The use of technology could put a wedge in the relationship between the patient and provider if it is not nurtured appropriately. Therefore, the need to discuss questions comfortably is very important for patients, especially infertility patients. When asked, 74% ( $n=106$ ) responded it was very useful to discuss their questions via telemedicine as well as if they were in person 22% ( $n=31$ ) reported it was useful. The number of respondents that reported that telemedicine added to the quality of care they received in their home community was 73% ( $n=105$ ). In addition, 75% ( $n=107$ ) of respondents replied they reported overall satisfied with their telemedicine visit. The results of the telemedicine satisfaction level are in Figure 5.



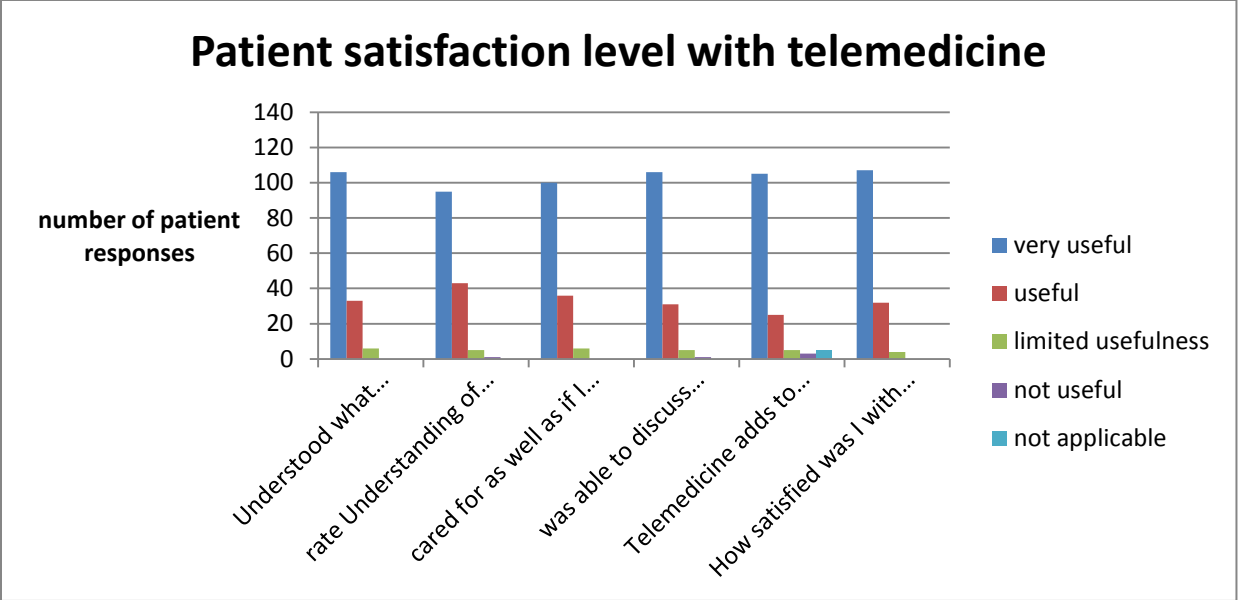


Figure 5. Patient satisfaction level with telemedicine (Survey questions listed in Appendix I)

**Survey Data**

Data collected from respondents completing the survey showed 99% intended to use telemedicine services again. Comments from the patients include “I believe this is the best idea ever; it’s very convenient and perfect” to “This is a wonderful tool. Finally, using technology that makes my life easier.” Patterns noted the need for expansion of telemedicine services by comments such as “I suggest adding telehealth capabilities to Dickinson clinic” and “Add telehealth to a Minot facility - there is Sanford Walk-in Clinic there may be at that location.” Participants were given the opportunity to offer comments or make suggestions to improve the service. Responses are listed in Appendix J and are categorized as positive, median, and negative comments.

**Discussion**

Technology certainly has made many advances to improve the care people receive. Telemedicine has shown that patients can receive specialty care in their communities without traveling to the metropolitan areas. The focus of telemedicine was to allow patients to receive

care closer to home to reduce the amount of travel and time off work (AHRQ, 2008). Having care within the community can also help to assure decreased time away from work along with emotional support from staff educated treating infertility.

Telemedicine is offered by SHS at several regional clinic sites. Some clinic facilities are more easily accessible for rural women and travel to that facility for monitoring is easier due to location and feasibility. Some women would forgo treatment if telemedicine options were not available. The goal of telemedicine is to increase access while decreasing travel and time off work for patients in rural areas.

Patient satisfaction via telemedicine with each member of the healthcare team was also evaluated and was noted to be an important part of the visit. The surveys confirmed that 80% of the women reported that when receiving care from both the nurse and the provider via telemedicine, they were treated with courtesy and support. When asked, if the information they received from the nurse was a beneficial to their telemedicine visit, 48% commented it was very useful. The nurses ask JACHO intake questions that the patient's feel are repetitive and do not add value to their visit. However, if the expert RN did any type of class for the patient 61% reported it was very useful.

When the woman visited with the provider via telemedicine, 75% reported the provider was able to be sensitive to her needs via this method of communication. To show connectedness to patients the provider needs to be conscience of keeping good eye contact, talking into the monitor, speaking with good verbal tone, and noting good posture into while talking using a new method of communication.

Seventy three percent of the women noted that the information they gathered via telemedicine was very useful and of those who responded 99% commented they would use

telemedicine again for a visit. The results were alarmingly positive and showed the continued need for the program.

The qualitative data collected confirmed that patients were satisfied with the telemedicine visits; however, based on the requests from the patients, Sanford Health System (SHS) took action to support further expansion to the outlying region. A map with the expansion sites of telemedicine is located in (Appendix G).

The survey asked the participants if they were treated in a friendly and courteous manner. It is important that staff welcome patients. Staff must also be approachable and respect the patient's attitude while maintaining a positive attitude toward the patient. Upholding an open-mind requires a professional staff and clear communication. These standards can be followed by nurses and providers when patients are seen face-to-face; however, when patients are seen via technology it adds a new dimension to the equation. The provider and nurses need to be more aware of the room the patient is seated in at the outreach area as well as be more aware of the visual cues exhibited by the patient.

Some patients have concerns talking to their providers about very sensitive issues. The problem may be magnified when they need to discuss those issues via technology. Thus, the reason patients reported they were less likely to feel comfortable expressing concerns with the provider was due to the use of technology. The providers give the patients lots of information regarding their treatment. The providers have the patients return and the expert nurse will re-explain the treatment plan to the patient. It helps the patient better understand the information and it gives the patient time to learn self-care items.

Many of the patients reported the nursing portion of the telemedicine visit was not as important to their treatment due to some of the information the nurses gathered was standard

information necessary for JACHO. It is questions related to pain, medication reconciliation, medication allergies, safety at home, and healthcare directives. Patients don't feel these items are as important as the treatment plan; however, for safety related outcomes these standard questions are necessary to have documented in each patient's record. The patients ask the expert RN or advanced practice nurse questions without realizing what role each person has to the information dissemination. This creates confusion for the patient which thus causes some confusion on the survey.

Patients were overall satisfied with the use of telemedicine. Patients reported they were able to understand what the provider was telling them as well as if they saw the provider in person. Face-to-face interviewing between a provider and a patient is the gold standard; however, telemedicine is changing that. For patients to recognize that technology is creating a variation and that approach is working toward a positive change. Patients did note that the use of technology did make a positive impact in their lifestyle which also added to the quality of their community. Thus, patients overall satisfaction supported them to decide to continue to use telemedicine for further visits.

### **Implication for Nursing Practice**

Some of the implications for nursing practice include setting up a help desk at SHS, doing an upgrade at SHS to improve efficiency, continue to survey patients for satisfaction using email, and share results of patient satisfaction with patients.

Among some of the common issues reported by patients were the inability to connect to the outreach site which caused delays or missed appointments. SHS set up a technology help support desk especially designed for telemedicine which provided a triage of technology topics and system overview. The SHS telemedicine support help desk has staff available Monday-

Friday, 8:00 am – 5:00 pm, with someone on call twenty four hours a day in the event that help is necessary. The help desk telephone number is distributed to areas offering telemedicine.

Patients reported occasional system issues such as audio and visual freezing of the picture during their visit. To assist with the system issues reported on telemedicine, SHS did a telemedicine system upgrade to assist with audio and visual problems that were occurring. The upgrade assured that all telemedicine units were advanced to a Real Presence System. The Real Presence System is the newer desktop version that connects a camera to a computer. The computer can be placed anywhere for easier usage. Because infertility is so emotional for women, it is very important that confidentiality is maintained. Therefore the computer must be a secure and private area for women to feel they can discuss private issues and concerns with their provider and nurse. Thus the Real Presence System works more efficiently to assure better patient satisfaction which leads to better patient centered outcomes.

Recommendation for further practice would be to continue to survey patients by email using the telemedicine patient survey for point of service outcomes data instead of having the patient fill out the data and mailing it back or dropping it in the drop- box. The outcomes would be point of service and the respondent rate maybe higher. Recommendation would be to continue to monitor and evaluate patient satisfaction rates to make upgrades and as necessary per patient requests.

Another recommendation would be to share results of the patient survey data with patients. The visibility of data with patients is important to show commitment and future improvement in the organization. It also shows how their comments make a difference to change and improvement within the company.

The recommendation to continue to monitor and evaluate the satisfaction relates to nursing for future use because alternative methods of technology are helpful when patients are unable to travel the distance to metropolitan areas. It offers specialty medicine in rural areas where distance is a hindrance and patients would otherwise forgo treatment. Technology is the way of the future. Patients are looking for ways to decrease cost while increasing access. Telemedicine is one option that is available to assist in increasing specialty care to rural areas.

### **Conclusion**

One limitation to the data presented was that the data was not viewed to include inter-professional teamwork. Another option to explore for future projects would be to look at the roles individually and evaluate the standardization of the content of each based on patient satisfaction. The survey addressed the satisfaction of the patients visit as a multidisciplinary assessment. The survey didn't break down the visit into different sections. When a telemedicine visit occurs, multiple health team members visit with each patient. The patient is sometimes unsure about the difference between the expert RN the advance practice nurse or the advance practice nurse and the physician. Emotional support is given to the patient in many of the visits by each team member thus the overlapping of each role occurs for the patient. Therefore clear communication is important and the relationship between each specific role is important and should be further investigated in future quality assurance.

A drawback to telemedicine medicine is the perceived care via this option. The personal touch is lacking and in some cases patients feel it necessary to be heard and cared for face-to-face. Another drawback is the visual acuity and the acoustic system of the telemedicine option. The equipment is at times less than optimal and can hinder the patient's ability to see and hear

the care provider. Even with the up-grade the pixels and the speaker systems are at a limited status and may create a disadvantage for the patient.

Future quality assurance could be to further investigate each team member's role as it pertains to the perceived care given via telemedicine. Many of the roles were not clearly defined. Several team members work with the patients when setting up the telemedicine visit and the patients get confused to each team member. Clearly defining each role and setting clear parameters on the survey could give better feedback, for a richer outcome.

## REFERENCES

- Agency for Healthcare Research and Quality, (2008). Using telehealth to improve quality and safety findings from the AHRQ health IT portfolio. Retrieved from <http://www.innovations.ahrq.gov/content.aspx?id=2469>
- Allahbadia, G., (Ed.). (2001). *Manual of ovulation induction*. Mumbai, India: Bhalchandra Printing Press.
- American Nurses Association, (2003). *Nursing's social policy statement, 2<sup>nd</sup> edition*. Silver Spring, MD; American Nurses Association
- Atack, L., Luke, R., & Chien, E., (2008). Evaluation of patient satisfaction with tailored online patient education information. *Computers, Informatics, Nursing, 26(5)*, 258-264.
- Balamurugan, A., Hall-Barrow, J., Blevins, M. A., Brech, D., Phillips, M., Holley, E., & Bittle, K., (2009). A pilot study of diabetes education via telemedicine in a rural underserved community opportunities and challenges: A continuous quality improvement process. *The Diabetes Educator, 35*, 147-154.
- Benyamini, Y., Gozlan, M., & Kokia, E., (2004). Variability in the difficulties experienced by women undergoing infertility treatments. *Fertility and Sterility, 83(2)*, 275-283.
- Bliss-Holtz, J., (2009). Using EBP flashcards for magnet preparation. *Nursing Management, 13-14*. Retrieved from [www.nursingmanagement.com](http://www.nursingmanagement.com)
- Bohnenkamp, S. K., McDonald, P., Lopez, A. M., Krupinski, E., & Blackett, A., (2004). Traditional versus telenursing outpatient management of patients with cancer with new ostomies. *Oncology Nursing Forum, 31(5)*, 1005-1010.
- Bureau of Labor Statistics, (2012). County employment and wages in North Dakota –



- quarter 2011. US Department of Labor retrieved from <http://www.bls.gov/ro5/qcewnd.htm>
- Burruss, N. M., Billings, D. M., Brownrigg, V., Skiba, D., & Connors, H., (2009). Class size as related to the use of technology, educational practices, and outcomes in web-based nursing courses. *Journal of Professional Nursing, 25(1)*, 33-41.
- Buyer, L., Miller, K., (n.d.) Increasing survey response rates: Combining experimental manipulations. Retrieved from [http://www.govst.edu/uploadedFiles/Institutional Research/Survey%20Response%20Rates%206.pdf](http://www.govst.edu/uploadedFiles/Institutional%20Research/Survey%20Response%20Rates%206.pdf)
- Carter, J., Applegarth, L., Josephs, L., Grill, E., Baser, R., & Rosenwaks, Z., (2010). A cross-sectional cohort study of infertile women awaiting oocyte donation: The emotional, sexual, and quality-of-life impact. *Fertility and Sterility, 95(2)*. 711-716.
- Cedrin-Durnerin, I., Massin, N., Galey-Fontaine, J., Bry-Gauillard, H., Roger, M., Lahlou, N., & Hugues, J. N., (2006). Timing of fhs administration for ovarian stimulation in normo-ovulation women: Comparison of an early or a mid-follicular phase initiation of a short-term treatment. *Human Reproduction, 12(11)*, 2941-2947.
- Center for Disease Control and Prevention, (2012). Infertility FAQ'S. retrieved from <http://www.cdc.gov/reproductivehealth/infertility/index.htm>
- Chang S. & Mu P., (2007). Infertile couples' experience of family stress while women are hospitalized for ovarian hyperstimulation syndrome during infertility treatment. *Journal of Clinical Nursing, (17)* 531-538.
- Denyes, M. J., Orem, D. E., & SozWiss, G., (2001). Self-care: A foundational science *Nursing Science Quarterly, 14(1)*, 48-54.
- Donald, F., Bryant-Lukosius, D., Martin-Misener, R., Kaasalainen, S., Kilpatrick., K., Carter, N., Harbman, P., Bourgeault, I., & DiCenso, A., (2010). Clinical nurse specialists and nurse

- practitioners: Title confusion and lack of role clarity. *Nursing Leadership*, 23, pages 189-210. Retrieved from <http://www.longwoods.com/content/22276/print>
- Enzman-Hagedorn, M., (2004). Caring practices in the 21<sup>st</sup> century: The emerging role of nurse practitioners. *Advanced Practice Nursing eJournal*, 4(4). Retrieved from [http://www.medscape.com/viewarticle/496372\\_2](http://www.medscape.com/viewarticle/496372_2)
- Fincher, L., Ward, C., Dawkins, V., Magee, V., & Willson, P., (2009). Using telehealth to educate parkinson's disease patients about complicated medication regimens. *Journal of Gerontological Nursing*, 35(2). 16-24.
- Gianaroli, L., Racowsky, C., Geraedts, J., Cedars, M., Makrigiannakis, A., & Lobo, R., (2012). Best practices of ASRM and ESHRE: A journey through reproductive medicine. *Fertility and Sterility*, 98(6), 1380 – 1394.
- Groff, A., Covington, S., Halverson, L., Fitzgerald, O., Vanderhoof, V., Calis, K., & Nelson, L., (2004). Assessing the emotional needs of women with spontaneous premature ovarian failure. *Fertility and Sterility*, 83(6), 1734-1741.
- Harvard Mental Health Letter, (2009). The psychological impact of infertility and its treatment. *Harvard Health Publication*, 25(11), Supplement, Retrieved from <http://www.health.harvard.edu>
- Joint Commission Perspectives, (2009). Accepted: New and revised hospital elements of performance related to CMS application process, *Joint Commission Resources*, 29(4), 16-19.
- Kosmas, I., Tatsioni, A., Fatemi, H. M., Kolibianakis E. M., Tournaye, H., & Devroey, P., (2007). Human chorionic gonadotropin administration vs. luteinizing monitoring for intrauterine insemination timing, after administration of clomiphene citrate: A meta-analysis. *Fertility and Sterility*, 87(3), 607 – 612.

- Macaluso, M., Wright-Schnapp, T., Chandra, A., Johnson, R., Satterwhite C., Pulver A., Berman, S., Wang, R., Farr, S., & Pollack, L., (2010). A public health focus on infertility prevention, detection, and management. *Fertility and Sterility*. 93(1), 16e1-16e10.
- Maheshwari, A., Porter, M., Shetty, A., & Bhattacharya, S., (2008). Women's awareness and perceptions of delay in childbearing. *Fertility and Sterility*, 90(4), 1036-1042.
- Mendola, P., Messer, L., & Rappazzo, K., (2008). Science linking environmental contaminant exposures with fertility and reproductive health impacts in the adult female. *Fertility and Sterility*. 89(2). E81-E94.
- Marquis, B., & Huston, C., (2009). *Leadership roles and management functions in nursing: Theory and application sixth edition*. Philadelphia, PA: Wolter Kluwer Health/ Lippincott Williams & Wilkins Company.
- Nallella, K., Sharma, R., Aziz, N., & Agrawal, A., (2005). Significance of sperm characteristics in the evaluation of male infertility. *Fertility and Sterility*. 85(3), 629-634.
- Olivius, C., Friden, B., Borg, G., & Bergh, C., (2004). Why do couples discontinue in vitro fertilization treatment? A cohort study. *Fertility and Sterility*. 81(2). 258-261.
- Renpenning, K., & Taylor, S., (2003). *Self-care theory in nursing selected papers of Dorothea Orem*. New York, NY: Springer Publishing Company, Inc.
- RESOLVE The National Infertility Association. (2013). *Men and emotions*. McLean, VA, Retrieved from <http://www.resolve.org/diagnosis-management/infertility-diagnosis/men-and-emotions.html>
- Sevean, P., Dampier, S., Spadoni M., Strickland, S., & Pilatzke, S., (2008). Patients and families experiences with video telehealth in rural/remote communities in northern Canada.

*Journal of Clinical Nursing*, 18, 2573- 2579.

Sherrod, R. A., (2004). An assessment of infertility in a rural area. *Online Journal of*

*Rural Nursing and Health Care*, 4(1), Retrieved from

[www.rno.org/journal/index.php/online-journal/articl/viewfile/130/128](http://www.rno.org/journal/index.php/online-journal/articl/viewfile/130/128)

Smith, J., Eisenberg, M., Millstein S., Nachtigall R., Sadetsky, N., & Katz, P., (2010). Time costs of fertility care: The hidden hardships of building a family. *Fertility and Sterility*, 94(4),

S167 – 168,

Starren, J., Tsai, C., Bakken, S., Aidala, A., Morin P., Hilliman C., Weinstock R., Goland

R., Teresi, J., & Shea S. (2005). The role of nurses in installing telehealth

technology in the home. *Computers, Informatics, Nursing*, 23(4), 181-189.

Stokowski, L., (2011). Ambulatory care nursing: Yes, It's a Specialty. *Ambulatory Care*

*Nursing* Retrieved from [http://ww.medscape.com/viewarticle/749906\\_2](http://ww.medscape.com/viewarticle/749906_2)

The Practice Committee of the American Society for Reproductive Medicine. (2004). Aging and infertility in women. *Fertility and Sterility*, 82(1), 102-106.

The Practice Committee of the American Society for Reproductive Medicine, (2006).

Use of clomiphene citrate in women. *Fertility and Sterility*. 86(5). S187-S193.

The Practice Committee of the American Society for Reproductive Medicine, (2008).

Use of exogenous gonadotropins in anovulatory women: A technical bulletin.

*Fertility and Sterility*, 90(3), S7-S12.

The Practice Committee of the American Society for Reproductive Medicine, (2012). Evaluation and treatment of recurrent pregnancy loss: A committee opinion. *Fertility and Sterility*,

98(5), 1103-1111.

Van Voorhis, B., (2010). What do consistently high-performing in-vitro fertilization programs

in the U.S. do? *Fertility and Sterility*, 94(4), 1346-1349.

Woodruff, T., Carlson, A., Schwartz, J., & Gludice, L., (2007). Proceedings of the summit on environmental challenges to reproductive health and fertility: Executive summary.

*Fertility and Sterility*. 89(2). 281-300.

**APPENDIX A. LETTER OF INVITATION TO PARTICIPATE**

**NDSU** **NORTH DAKOTA STATE UNIVERSITY**  
701.231.7395  
*Department of Nursing*  
*College of Pharmacy, Nursing, and Allied Sciences*  
*NDSU Dept. 2670*  
*136 Sudro Hall, P.O. Box 6050*  
*Fargo, ND 58108-6050*

**Patient Post-Telehealth Visit Survey**

You are being invited to participate in a research study because you have taken part in a telehealth visit at Sanford Reproductive Medicine. From March thru November 2013 all patients who have a telehealth visit will be asked to complete the Post-Telehealth Visit Survey. Your participation in this research study is voluntary and you may withdraw at any point if you wish to do so. Your input is requested so that Sanford Health may continue to improve outcomes for all telehealth patients. Whether or not you choose to participate will not influence your care. This research study is being conducted by Sharri Lacher, RN as part of her Master of Science Degree in Nursing at North Dakota State University. Your identity will not be revealed to anyone. However, if you are interested in being contacted for follow-up by the telehealth team, you will have the opportunity at the end of the survey to sign, enter your email and/or your phone number. All patient responses will be compiled by Sanford Health Systems (SHS) in Sioux Falls, SD and forwarded to SHS in Fargo, ND for analysis in which only summary information will be shared with others.

You will be invited to participate in this survey each time you have a visit by Telehealth. Please read each question carefully. The survey will take approximately 15 minutes to fill out. If you choose to fill out the survey please return it in the self-addressed envelope provided or leave it in the box labeled "Telehealth Surveys" near the receptionist desk.

If you consent to participate in the study, please check the box on the survey.

If you have any questions regarding this study please contact one of the following: Sharri Lacher, RN, her adviser at NDSU, Dr. Mary Wright, or the Human Research Protection Program at North Dakota State University:

<b>Sharri M. Lacher RN</b>	<b>OR</b>	<b>Mary M. Wright PhD RN</b>
<b>CNE</b>		
<b>1111 Harwood Drive South</b>		<b>Associate Professor</b>
<b>Sanford Health Systems</b>		<b>Department of Nursing</b>
<b>NDSU</b>		
<b>Fargo, North Dakota, 58122</b>		<b>Fargo, North Dakota</b>
<b>58108-6050</b>	<b>701-234-8055</b>	
<b>701-231-9416</b>		
<a href="mailto:Sharri.lacher@my.ndsu.edu">Sharri.lacher@my.ndsu.edu</a>		<a href="mailto:mary.wright@ndsu.edu">mary.wright@ndsu.edu</a>

**OR**

**Human Research Protection Program**  
**North Dakota State University**  
**701-231-8908 or toll free 1-855-800-6717**

## APPENDIX B. LETTER OF INVITATION SANFORD HEALTH SYSTEM



### Patient Post-Telehealth Visit Questionnaire:

You are being invited to participate in this research study because you have taken part in a telehealth visit at Sanford Reproductive Medicine at Sanford Health Systems. From February thru June 2013 all patients who have a telehealth visit will be asked to participate in the Post-telehealth visit questionnaire to help improve care.

This is a study being conducted by Sharri Lacher, RN as part of her Master of Science Degree in Nursing at North Dakota State University. Your identity will not be revealed to anyone as the results are compiled. However, if you are interested in being contacted for follow-up by the telehealth team you will have the opportunity at the end of the survey to sign, enter your email and/or place your phone number if you are interested in being contacted for follow-up by the telehealth team at Sanford Health. All of your responses will be analyzed and compiled by Sanford Health Systems in Sioux Falls, SD to improve your care.

You will be invited to participate in this survey **each time** you have a visit by Telehealth. Please read the question carefully. The survey will take approximately 15 minutes to fill out. Participation in this survey is voluntary and if you choose not to fill out the survey it will not alter your care in any way. If you choose to fill out the survey please return it in the self-addressed envelope provided or leave it in the box labeled "Telehealth Surveys" near the receptionist desk.

If you consent to participate in this study, please check the box on the survey labeled **please check this box if you allow your information to be used for quality improvement.**

If you have any questions regarding this study please contact one of the following: Sharri Lacher, RN, her adviser at NDSU, Dr. Mary Wright, or the Institutional Review Board at North Dakota State University:

[mary.wright@ndsu.edu](mailto:mary.wright@ndsu.edu)

Mary M. Wright PhD RN CNE  
Associate Professor  
Department of Nursing NDSU  
Fargo, North Dakota 58105  
701-231-9416

[Sharri.lacher@my.ndsu.edu](mailto:Sharri.lacher@my.ndsu.edu)

Sharri M. Lacher RN  
1111 Harwood Drive South  
Fargo, North Dakota, 58122  
701-234-8055

Institutional Review Board  
1735 NDSU Research Park Dr.  
Fargo, ND 58102  
701-231-8908 or 1-855-800-6717  
[www.ndsu.edu/irb](http://www.ndsu.edu/irb)

The survey is being done to improve your Telehealth care at Sanford Health Systems and your input is valuable to us. We are asking for your input to improve outcomes which will not influence your care if you choose not to participate.

## APPENDIX C. PATIENT POST-TELEHEALTH SURVEY

### Patient Post-Telehealth Visit Survey

Your responses to the following questions will help Sanford Health Systems provide high quality care.

If you are also willing to share your responses for the NDSU Nursing study that was described in the letter you were given, please check this box

Specialty \_\_\_\_\_ Location \_\_\_\_\_ Date \_\_\_\_\_

Please check all that apply:

Female: \_\_\_\_\_ Male: \_\_\_\_\_ Age: \_\_\_\_\_ <20 \_\_\_\_\_ 20-40 \_\_\_\_\_ 41-60 \_\_\_\_\_ >60

My visit was with which provider: Physician \_\_\_\_\_ Nurse \_\_\_\_\_ Nurse Practitioner \_\_\_\_\_

Please circle the comment that most likely represents your feelings about your telehealth experience.

1. I was treated with courtesy and friendliness by my providers				
4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable
2. I was treated with courtesy and friendliness by the care staff				
4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable
3. I was treated with sensitivity to my needs by my providers				
4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable
4. I was able to express any concerns to my providers				
4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable
5. I understood what the provider was telling me as well as if I had seen them in person.				
4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable
6. I was able to confirm my providers recommendations				
4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable
7. How would you rate your understanding of the medication treatment plan you are participating in?				
4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable
8. How beneficial is the nurse's portion of the telemedicine session to your care?				
4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable
9. How well would you rate the nurse's instructions to your understanding of your treatment plan?				
4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable



Please circle the comment that most likely represents your feelings about your telehealth experience

10. How would you rate the quality of the information you received from the nurse?

4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable

11. I was cared for as well as if I would have seen the provider in person.

4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable

12. I was able to discuss questions comfortably at my telehealth consultation with my provider

4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable

13. The availability of telemedicine adds to the services and quality of care available to me in my home community.

4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable

14. Overall, how satisfied were you with this telehealth visit?

4	3	2	1	0
Very useful	Useful	Limited usefulness	Not useful	Not applicable

15. I would use telehealth services again

Yes	No
-----	----

This telemedicine consult saved me (check all that apply)

\_\_\_\_ Travel expenses: How many miles round trip? \_\_\_\_\_

\_\_\_\_ Loss of work/ school time: How many hours? \_\_\_\_\_

\_\_\_\_ From finding someone to drive me

\_\_\_\_ Family taking time from work to drive me

\_\_\_\_ I would not have received this specialty care

Comments or suggestions to improve this service:

---

---

---

---

\_\_\_\_\_  
Signature (optional)

\_\_\_\_\_  
Phone number (optional) if you  
Want to be contacted for follow-up

\_\_\_\_\_  
Email Address (optional)

## APPENDIX D. IRB APPROVAL

**NDSU**

**NORTH DAKOTA STATE UNIVERSITY**

*Institutional Review Board*

*Office of the Vice President for Research, Creative Activities and Technology Transfer*

*NDSU Dept. 4000*

*1735 NDSU Research Park Drive*

*Research 1, P.O. Box 6050*

*Fargo, ND 58108-6050*

701.231.8995

Fax 701.231.8098

Federalwide Assurance #FWA00002439

Thursday, February 28, 2013

Mary M. Wright  
Nursing  
Sudro Hall Rm 136

Re: IRB Certification of Exempt Human Subjects Research:  
Protocol #PH13150, "Patient Satisfaction with Nursing Care of Rural Infertile Patients via  
Telemedicine"

Co-investigator(s) and research team: **Sharri Lacher**

Certification Date: 2/28/13 Expiration Date: 2/27/16

Study site(s): **varied**

Funding: **n/a**

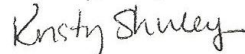
The above referenced human subjects research project has been certified as exempt (category # 2) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, *Protection of Human Subjects*). This determination is based on consent and survey (received 2/26/2013).

Please also note the following:

- If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
- Conduct the study as described in the approved protocol. If you wish to make changes, obtain approval from the IRB prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Report any significant new findings that may affect the risks and benefits to the participants and the IRB.
- Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.

Sincerely,



Kristy Shirley, CIP, Research Compliance Administrator

NDSU is an EO/AA university.

## APPENDIX E. AMENDED CONSENT AND INTRODUCTION FROM NDSU

**NDSU**

**NORTH DAKOTA STATE UNIVERSITY**

701.231.7395

*Department of Nursing  
College of Pharmacy, Nursing, and Allied Sciences  
NDSU Dept. 2670  
136 Sudro Hall, P.O. Box 6050  
Fargo, ND 58108-6050*

### Patient Post-Telehealth Visit Survey

You are being invited to participate in a research study because you have taken part in a telehealth visit at Sanford Reproductive Medicine. This research study is being conducted by Sharri Lacher, RN as part of her Master of Science Degree in Nursing at North Dakota State University under the supervision of Mary Wright, Associate Professor of Nursing. Your input is requested so that Sanford Health may continue to improve outcomes for all telehealth patients.

From March thru November 2013 all reproductive medicine patients who have a telehealth visit will be asked to complete the Post-Telehealth Visit Survey. You will be invited to participate in this survey each time you have a visit by Telehealth. Your participation in this research study is voluntary and you may withdraw at any point if you wish to do so. Whether or not you choose to participate will not influence your care.

Your identity will not be revealed in the results. However, if you are interested in being contacted for follow-up by the telehealth team, you will have the opportunity at the end of the survey to sign, enter your email and/or your phone number. While your responses will be sent to Sanford Health Systems (SHS) in Sioux Falls, SD, the surveys will be forwarded to Sharri Lacher, RN for analysis. Only summary information will be shared with Sanford Health or in any research publications.

Please read each question carefully. The survey will take approximately 15 minutes to fill out. If you choose to fill out the survey please return it in the self-addressed envelope provided or leave it in the box labeled "Telehealth Surveys" near the receptionist desk.

If you consent to participate in the study, please check the box on the survey. If you do not consent to participate in the study, your information will only be shared with Sanford Health for quality improvement.

If you have any questions regarding this study please contact one of the following: Sharri Lacher, RN, her adviser at NDSU, Dr. Mary Wright, or you may contact the Human Research Protection Program at North Dakota State University :

**Sharri M. Lacher RN**  
1111 Harwood Drive South  
Sanford Health Systems  
Fargo, North Dakota, 58122  
701-234-8055  
[Sharri.lacher@my.ndsu.edu](mailto:Sharri.lacher@my.ndsu.edu)

OR

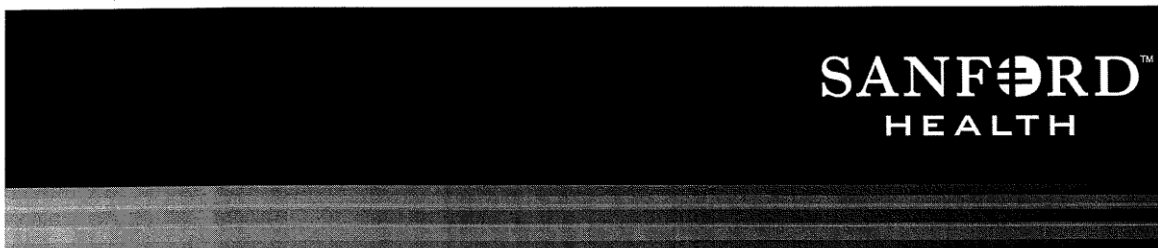
**Mary M. Wright PhD RN CNE**  
Associate Professor  
Department of Nursing NDSU  
Fargo, North Dakota 58108-6050  
701-231-9416  
[mary.wright@ndsu.edu](mailto:mary.wright@ndsu.edu)

OR

**Human Research Protection Program**  
North Dakota State University  
701-231-8908 or toll free 1-855-800-6717

NDSU is an equal opportunity institution.

## APPENDIX F. SANFORD HEALTH SYSTEM IRB RESPONSE



January 29, 2013

**PI:** Mary M. Wright, PhD, RN, CNE

**Project:** 03-13-010 Patient Satisfaction with Nursing Care of Rural Infertile Patients via Telemedicine

The study submission for the proposal referenced above has been reviewed via the procedures the Sanford Health Institutional Review Board.

The activities described in your application are intended to contribute to quality improvement / assessment. Based on these findings, your project proposal does not meet the definition or regulatory requirements for human subject research. If in the future, you decide to collect information with the intent to develop or contribute to generalizable knowledge, you will be required to submit an application to the IRB for prospective review.

Please maintain a copy of this letter in your study file for documentation that your study does not meet the regulatory requirements for human subjects research.

Sincerely,

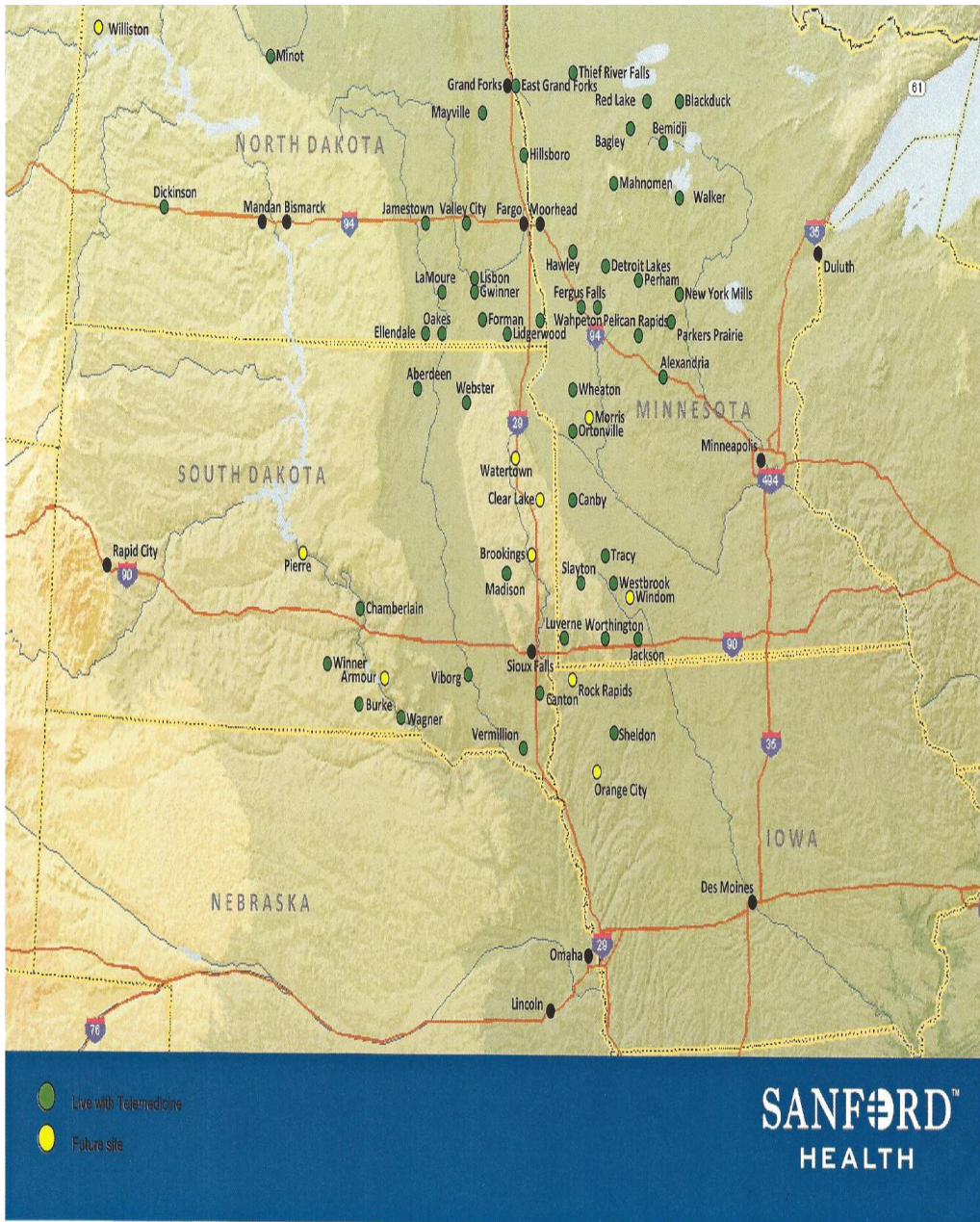
A handwritten signature in black ink, appearing to read "Deb Langstraat".

Deb Langstraat, CIP

Sanford Health

Director-Human Research Protection Program

**APPENDIX G. MAP OF TELEHEALTH SITES USED FOR REPRODUCTIVE HEALTH BY SANFORD HEALTH SYSTEM**



## **APPENDIX H. APPROVAL LETTER FROM PAMELA WILLSON**

Good Morning Sharri,

You certainly have our permission to alter the questionnaire, please give credit with an "Adapted from...." note. Do you need a copy of the instrument or are you going to recreate it via the article?

Please let me know and I will retrieve it for you from our files at the VA, which will take a few weeks, as I am not scheduled to be at that site for a couple of weeks.

Best of research,

Pam Willson

## **APPENDIX I. LIST OF QUESTIONS FROM FIGURE 5**

1. I understood what the provider was telling me as well as if I had seen them in person.
2. How would you rate your understanding of the medication treatment plan you are participating in?
3. I was cared for as well as if I would have seen the provider in person.
4. I was able to discuss questions comfortably at my telehealth consultation with my provider
5. The availability of telemedicine adds to the services and quality of care available to me in my home community.
6. Overall, how satisfied were you with this telehealth visit?

**APPENDIX J. LIST OF PATIENT COMMENTS AND SUGGESTIONS ON  
TELEHEALTH SERVICES**

**Positive Comments**

I believe this is the best ever: it's very convenient and perfect!

I have always been thankful to have telehealth. It is very convenient and time saving.

I feel this is a great service. The convenience of being able to receive an advanced level of care while staying in the state of ND. Dr and nurses are all very professional making you feel comfortable.

This is an outstanding service and is greatly appreciate especially in the sensitive reproductive medicine area.

I have been happy with all my telehealth visits to date. #13 really states the biggest benefit for me and my family. I am glad this is an option.

Very happy with telehealth thus far!

I think telehealth is a great service to stay connected to my RE.

This is a wonderful tool. Finally using technology that makes my life easier.

Everyone is great.

The care I receive from the Reproductive Medicine team is unbelievable all the nurses are great as well as the providers. They have great communication with one another.

Thank you for all your help.

Sanford is the only place I'll go for my health needs! The staff is always cheerful and willing to help in any way! 100% satisfaction.

Was easier than a regular face to face visit. I was able to easily take notes.

I think it's great to have this option!!

None - wonderful way to communicate with my specialty physician from afar!

I love that this service is available to me. It would make it more difficult if it wasn't available to be honest. I have lab work every other day and I had 2 ultrasounds within two weeks. Telehealth is wonderful!!



I love the telehealth option.

Telehealth is great!

### **Median Comments**

EGF site has such a big room - I like the smaller room from 2 years ago. Feels more Private

I still drive 130 miles round trip to East Grand Forks Fertility and still miss 2 -3 hours of work for each visit as telehealth services are not available at TRF site.

Nurses are always friendly and typically verifying meds and how I am feeling but have not given out instructions thus the slightly lower ratings. Telehealth is a good option and makes receiving care more accessible and convenient

The only discrepancies I have is when I check in what Reproductive medicine emails me and what Sanford Bismarck shows are 45 minutes different. I wait for 45 minutes to use telehealth.

I have to drive from Minot to Bismarck so have it available in Minot would be more beneficial. I miss at least 1/2 day of work 2 x/ month.

I suggest adding telehealth capabilities to Dickinson clinic/hospital

The wait for the MD today was 1 hour normally only 15 minutes so unsure what the hick-up was

The telehealth is nice for time and distance. Appointment does take longer because results take longer to get, but it is worth it.

I wish I could do some of my visits in Dickinson.

### **Negative Comments**

There sometimes is a delay in voice response, see lips moving but no sound then will catch up eventually.

It would be so helpful if this was available in Williston then I would have better access to the healthcare services I need

The telehealth visit saved in travel expenses, but I still had to travel 100 + miles to get there

Add telehealth to a Minot facility - there is Sanford Walk-in Clinic there may be at that location

More information to the up-front staff. I felt the reception didn't know answers to my questions but didn't offer to transfer me to someone else on the phone

I still had to round trip travel 6 hours to access the telehealth services...

The option of telehealth is very nice but would be nicer if the appointment time for the telehealth visit did not always run late. This particular day I waited over 30 minutes which is very frustrating.

The sound cut in and out a little

My husband and I are very appreciative of having telehealth visits. It would very nice to have all of our infertility treatment here in Bismarck and not have to travel to Fargo for services.

Hopefully, Bismarck can receive the same services.

### **Negative Comments**

I would like to visit with the provider at this East Grand Forks location. I am happy with my service and convinced it would increase my happiness.

Felt comfortable with overall care but would rather make the drive to be seen in person verses utilize telehealth. Feels more real and personal. Financially we are able to drive to appointments without making other sacrifices.

There is a lot of feedback from the speakers causing an echo that is very disrupting!! If it wasn't so echoy it would be fine.

Make sure the appt is scheduled at both Fargo and Bismarck

Does not replace seeing someone face to face. But the nurse was friend.

The sound cuts out once or twice on Fargo's end. Other than that it was great!