A STUDY OF PATIENT ANXIETY AND STRESS AMONG WOMEN UNDERGOING HYSTEROSALPINGOGRAPHY PROCEDURES IN BENIN CITY , EDO STATE

BY

OKOH AWELE

BMS2005204

DEPARTMENT OF RADIOGRAPHY

SCHOOL OF BASIC MEDICAL SCIENCES

COLLEGE OF MEDICAL SCIENCES

UNIVERSITY OF BENIN CITY

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RESEARCH PROJECT

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CERTIFICATION

This is to certify that this project work with the topic: **A STUDY OF PATIENT ANXIETY AND STRESS AMONG WOMEN UNDERGOING HYSTEROSALPINGOGRAPHY PROCEDURES IN BENIN CITY** by OKOH AWELE with matriculation number BMS2005204 was carried out under the supervision of MRS OLAYIWOLA KEMISOLA and is being submitted to the department of Radiography, School of Basic Medical Sciences, University of Benin, Benin City in partial fulfillment of the requirements for the award of Bachelor of Radiography (B.Rad)

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External examiner Signature and Date

DEDICATION

I dedicate this project research work to God almighty the ultimate giver of life, knowledge and wisdom and my grandfather LATE OBI [DR] VICTOR ADIMUFENE NWAOKOBIA(OBI AGBOGIDI THE 5TH).

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ABSTRACT

Hysterosalpingography (HSG) plays an important role in the diagnostics and evaluation of infertility. Patients, however, face significant levels of anxiety and fear concerning the procedure which may be attributed to discomfort. This Study evaluated the levels of anxiety, understanding of HSG, clinician-patient communication, and the effect of music therapy as a distraction on anxiety in women undergoing HSG in Benin City Nigeria. The study design was a prospective cross-sectional design within the University of Benin Teaching Hospital and Raytouch Diagnostic Center. A total of 113 women undergoing HSG procedure were administered a structured questionnaire that included a demographics questionnaire, HSG knowledge test, and hysterosalpingography related anxiety levels, communication and interaction with health care providers, along with music experiences integration. The data were analysed using a descriptive statistics and chisquare test. The mean age was 34.6 years, with 72.6% married and 85.8% having tertiary education. While 85.0% received preprocedural information and 80.5% understood HSG's objectives, moderate to high anxiety levels were reported by 68.2% of participants regarding tension and 73.5% regarding pain concerns. Patient-provider communication was rated positively by 84.1%, and 70.8% felt it reduced their fears. All participants (100%) received music intervention, with 85.8% reporting increased relaxation and 77.9% experiencing reduced anxiety. Pain was the primary concern (38.1%), and 82.3% would recommend music to others. Although there was sufficient knowledge with women undergoing HSG, there is significant anxiety. Music intervention is an effective way to reduce anxiety and increase patient comfort supporting its integration into standard HSG protocols.

Keywords: Hysterosalpingography, Patient anxiety, Music therapy, Healthcare communication, Infertility investigation

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Hysterosalpingography is the radiographic evaluation of the cavity of the uterus and fallopian tubes after injection of a radio-opaque medium through the cervical canal (Theodore et al., 2005). An accepted diagnostic tool for infertility workup that is considered as an invasive procedure that is generally regarded uncomfortable and painful is hysterosalpingography. (Handelzalts et al., 2016). Furthermore, hysterosalpingography plays a crucial diagnostic role in identifying the causes of infertility and informing treatment decisions. However, it is also regarded as a daunting procedure within the infertility journey, with limited awareness surrounding it. Many women tend to experience anxiety and discomfort during the HSG procedure (Guvenc et al, 2020). Moreover, hysterosalpingography (HSG) is an invasive procedure that can be uncomfortable and painful making patients frequently face significant anxiety and stress in anticipation of the procedure (Tokmak et al., 2015). A study was carried were most patients were aware of the purpose of the examination, but only half had been informed about the technique before arriving at the department. It concluded that anxiety levels related to the examination were significant and as beforehand, noting that delays contributed to increased anxiety (Tyrrell et al,.1993).

Anxiety is typically characterized by feelings of fear, worry or apprehension. These are normal reactions to situations of perceived stress. Anxiety can become a clinical concern when the combination of stressful circumstances overwhelmed a person's ability and efforts to cope with those circumstances (Mohammad et al., 2017). Anxiety states are emotional reactions that consist of a unique combination of: feelings of tension, apprehension and nervousness;

unpleasant thoughts (worries), and physiological changes (Charles D. Spieldberger, 1990). Patients can experience anxiety in anticipation of their surgeries or may develop anxiety during the procedure (Yousif et al., 2023).

One of the effective ways to reduce patient anxiety is through effective communication and communication was defined by Merriam Webstar dictionary, as a process by which information is exchanged between individuals through a common system of symbols, signs, or behaviour. Furthermore, an article written by the School of communication and Journalism (University of Southern California), mentioned that communication can help develop a sense of trust between the patient and provider, making it easier for patients to adhere to a provider's recommendations. Also went onward to describe elements that can lead to several key potential long-term benefits, such as reduced patient visits, reduced costs and improved patient outcomes. Steve Alder (2025) explored the effect of poor communication in healthcare, highlighting that clinicians must listen carefully to what patients tell them, verbally and non-verbally, and need to gather information, reassure patients, and communicate important medical advice, that most patients will not have an extensive knowledge of medical matters, therefore care must be taken to ensure that any information that is communicated has been understood. Miscommunication, on the other hand, can result to medical errors, misunderstanding of medical conditions, and poor adherence to treatment. The research gap of this study is tied to the fact that despite the importance of patient-centered communication and perceived benefits of music, there is limited data on how well patient's concerns are addressed, their anxiety levels managed, and how effectively they are informed about the procedure.

1.2 Statement of Problem

Hysterosalpingography is explained to be a specialized radiological procedure that is used to assess tubal patency for female factor infertility evaluation. Patients who come for this procedure are understood to have anxiety (Mohammad et al., 2017). Moreover, hysterosalpingography (HSG) is a radiologic procedure commonly used to evaluate the uterine cavity and fallopian tubes, often in the context of infertility investigations. Despite its diagnostic importance, HSG is associated with significant levels of anxiety and discomfort among patients (Sidi et al., 2019) Hysterosalphingography is generally regarded as uncomfortable and painful procedure, (Szymusik et al., 2015). Anxiety can become a clinical concern when the combination of stressful circumstances overwhelmed a person's ability and efforts to cope with those circumstances (Mohammed et al., 2017).

At the University of Benin Teaching Hospital (UBTH) and RayTouch diagnostics there is a critical need to systematically evaluate the anxiety levels of patients who comes for an HSG investigation. Despite the importance of patient-centered communication and perceived benefits of music, there is limited data on how well patient's concerns are addressed, their anxiety levels managed, and how effectively they are informed about the procedure.

1.3 Research Question

1. What are the knowledge of women about HSG?
2. What is the level of patient's anxiety and stress about hysterosalpingography investigation?
3. What is the the impact of healthcare provider communication on reducing patient anxiety and stress?

4. What is the effect of music intervention on anxiety levels among women undergoing hysterosalpingography (HSG) procedures?

1.4 Hypotheses

There is no significant relationship between healthcare communication and patient's anxiety levels among women undergoing HSG.

There is no significant relationship between music and patient's anxiety levels among women undergoing HSG.

1.5 Aim of the Study

The primary aim of this study is to evaluate the levels of anxiety and stress among patients undergoing hysterosalpingography(HSG) examinations at the University of Benin Teaching Hospital (UBTH) and Raytouch diagnosis.

1.6 Objectives of the Study

1. Identify patients knowledge about HSG examination.
2. Evaluate patient`s levels of anxiety and stress about hysterosalpingography exam.
3. Determine the impact of healthcare provider communication on reducing patient anxiety and stress.
4. To evaluate the effect of music intervention on anxiety levels among women undergoing hysterosalpingography (HSG) procedures.

1.7 Significance of study

To the patient:-

- The study will help determine how to improve a patient's overall experience and comfort throughout the procedure by learning more about their anxiety levels before HSG.

To the Healthcare Providers:-

- The results of this study will aid in the development of more effective counselling and patient education strategies by the healthcare providers to assist people get emotionally and psychologically ready for HSG.
- This study will assess how effectively healthcare providers convey information to patients prior to the investigation, making sure that uncertainty is reduced and that the information of the procedure is well understood.

Contribution to Research:

- The study will add to the existing body of knowledge regards to patient anxiety before medical procedures, particularly in the Nigerian healthcare context. It will contribute important information regarding the correlation between communication and patient anxiety and the value of music intervention prior to medical diagnostic interventions such as HSG, which can inform subsequent research on related situations

- Policy Implications: The findings could have an impact on the hospital policy regarding patient. pre-invasive diagnostic procedures communication. The administration of the hospital could. adopt patient-centered communication, non pharmacological invention such as music to decrease anxiety and improving patient care outcomes.

By making changes in these areas, this research might bring about significant changes in the care of patients within the University of Benin Teaching Hospital and Raytouch diagnosis and provide a means of improving other healthcare patient outcome.

1.8 Scope of the study

This research was aimed at assessing the levels of anxiety and stress among patients, the effectiveness of communication between medical personnel and patients and the impact of music intervention on anxiety in women being subjected to hysterosalpingography (HSG) tests in the University of Benin Teaching Hospital (UBTH) and Raytouch Diagnostic Center, Benin City, Edo State.

The research was conducted on female patients booked for HSG examinations in the radiology departments of these facilities. The study is scheduled to last for a period of three months, from August 2025 to October 2025.

1.9 Operational Definition of terms

Anxiety: Anxiety can be defined as feelings of tension, uneasiness, nervousness, fear and high autonomic activity with varying degree of intensity (Bedaso et al, 2019). It is considered as a psychological and emotional state characterized by feelings of worry, nervousness, and unease, often related to the anticipation of a stressful or unfamiliar event, such as a medical procedure like HSG investigation. Patients undergoing investigations in the hospitals are prone to increased anxiety levels (Fatukasi et al., 2019).

State of Anxiety: this is a transitory emotional condition that varies according to the situation, indicating the patient's level of anxiety specifically in response to the HSG treatment. It will be measured using the State Anxiety subscale of the STAI before and during the HSG.

Trait Anxiety: a more broad, long-standing trait of anxiety that represents how vulnerable an individual is to experiencing anxiety across diverse settings throughout time. Trait anxiety will

be evaluated using the Trait Anxiety subscale of the STAI, indicating the patient's normal susceptibility to anxiety.

Communication: The exchange of information between healthcare providers and patients before and during the HSG procedure, including verbal explanations, responses to patient questions, and non-verbal cues (e.g., tone of voice, facial expressions). Communication is a fundamental clinical skill that, if performed competently and efficiently, facilitates the establishment of a relationship of trust between the medical staff and the patient-customer (Chichirez et al., 2018). Effective communication with patients can improve the quality of care (Wanko et al., 2020).

Music: In this study, music refers to a structured arrangement of rhythm, melody, and harmony used as a non-pharmacological intervention during hysterosalpingography (HSG).

Hysterosalpingography: A radiographic examination of the uterus and fallopian tubes, that is frequently done to diagnose anomalies or look into infertility in women. During the procedure, X-ray images are made prior to and after administration of contrast dye in the uterus. Based on the invasiveness of the investigation, probability of growth of the level of anxiety of the patient is high which must be evaluated, which provides HSG technique as the platform of patient assessment in this study and communication and anxiety.

CHAPTER TWO

LITERATURE REVIEW

2.1 CONCEPTUAL REVIEW

2.1.1 Understanding Hysterosalpingography (HSG)

Hysterosalpingography (HSG) is a specialized X-ray procedure that is used to examine the Fallopian tubes and uterine cavity (La Fianza et al., 2014). The process is through the injection of a radio-opaque contrast dye into the uterus through the cervix, where radiologists as well radiographers obtain detailed images of the female reproductive system. HSG, as it is fondly called, is important in the assessment and diagnosis of infertility. This is due to the fact that it assists not only in recognition of structural abnormalities in the uterus, but also in recognition of blockages in the fallopian tube that may make conception difficult. When it comes to infertility in women, picking a procedure such as HSG is significant to examine the fallopian tube patency and it is of great importance since tubal obstruction is a owing to a common cause of female infertility (Mohammad et al., 2017).

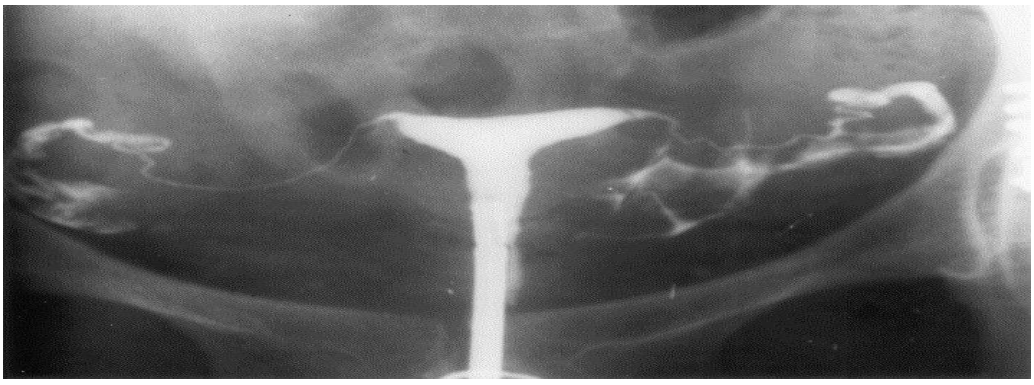

FIGURE2.1. Normal HSG with a Jarcho cannula.

Baramki. Hysterosalpingography. Fertil Steril 2005.

Procedure Details

The HSG procedure typically occurs in an outpatient setting and is recommended during the first half of the menstrual cycle to minimize interference from any potential menstrual fluid(The 10 days rule). The steps include:

1. Preparation: Patients are advised come fasting in order to reduce contrast media reaction, to take pain relief medication prior to the procedure to minimize discomfort (de Boer et al., 2017).

2. Positioning: The patient is positioned on an examination table in a lithotomy position, and a speculum is inserted to visualize the cervix.

3. Catheter Insertion: A thin catheter is passed through the cervix into the uterus, and the contrast material is injected.

4. Imaging: X-ray images are taken to visualize the distribution of the contrast medium throughout the uterus and fallopian tubes (Hernandez & Pineda, 2014; Sanei et al. 2020)

EQUIPMENTS USED IN HSG

Prior to the investigation, a sterile trolley is provided with the following equipment for the investigation:

1. Sterile tray - For carrying the equipment
2. Sterile kidney dish - For holding the sterilized forceps
3. Sterile vaginal speculum - used to hold the walls of the vagina to avoid its collapse.
4. Sterile vulsellum forceps - use to clip the anterior lip of the cervix.
5. Sterile cannula - use to introduce the contrast medium into the uterine cavity.

6. Sterile uterine sound - use to determine the length (depth) and direction of the cervical canal.
7. Sponge holding forceps - use to grasp the cotton wool for cleaning the vagina and cervix as an aseptic technique.
8. Plastic syringe - use to introduce contrast medium into the cannula.
9. Savlon (disinfectant) - for cleaning the vagina and cervix
10. Light bulb - for clear and proper viewing.

FIG. 2.2: Equipment used for/in HSG investigation.

(Adopted from Biomed medical diagnostic centre)

The role of HSG clinically stretches beyond the shores of infertility. This is shown in the way the procedure detects uterine abnormalities such as fibroids, polyps, and adhesions, which can interfere with implantation or increase the risk of miscarriage (Mohammad et al., 2017). Remarkably, some studies suggest that having an HSG procedure has its therapeutic effects. The contrast dye could clear any small fallopian tube blockages, which might increasing the chances of conception within a short time after the procedure (Daneshfar et al., 2024).

Although HSG is useful as a diagnostic tool and as a therapeutic agent, it is linked to physical pain, discomfort and nervousness among most of the patients. The pain and discomfort normally occurs due to the insertion of the catheter through the cervix, the distension of the uterus caused by the contrast dye, and the invasiveness in general of the procedure (Adeyekun et al., 2023). HSG causes pain not uniformly in all patients. This is closely connected with the fact that people have different pain thresholds. Coupled with this, the presence of uterine abnormalities and technique applied to perform this procedure also leads to the discomfort and paint related to HSG. The majority of the patients expect the pain and this may increase their preoperative anxiety that, in its turn, can increase perceived pain during the. exam (Handelzalts et al., 2016).

The psychological effect of HSG cannot be underrated as many patients complain about fear relating to the possible outcomes of the test. Women undergoing HSG tend to be worried regarding potential causes of infertility related problems, and this provides a burden of emotion to the physical discomfort of the procedure (Erkilinc et al., 2018). Mohammad et al., in 2017 spoke on the emotional component of HSG since the patients might be optimistic about acquiring an understanding about their fertile and fearful of the eventuality of unfavorable results. Adeyekun et al., 2023 emphasized the role of cultural and social variables can influence patient experiences of HSG. They observed that the differences in perception and anxiety of women towards HSG were different in various populations largely based on the cultural beliefs and previous experiences in relation to healthcare. This implies that through a cautious selection of various approaches to patient based on their individualization concern to the various women with differing social, cultural and religious beliefs, such as culturally sensitive communicating and anxiety-reducing we can in fact assist with. enhance patient satisfaction and general experience in HSG procedures.

2.1.2 Anxiety in Medical Imaging Procedures

Medical imaging (particularly invasive imaging, such as hysterosalpingography (HSG)) frequently perception high anxiety in the patients. According to Handelzalts et al., 2016, the definition of anxiety is as follows. It is a condition of agitation or unease, which is common before some stressful event. When it comes to medical imaging , anxiety may be provoked by many factors, such fear of radiation exposure, and fear of what may happen as the results of the test. (Mohammad et al., 2017). In such a procedure as HSG, where a woman feels physical pain as well as is exposed to radiation, possibility of emotional stress because of fertility results, anxiety is especially prevalent among patients (Daneshfar et al., 2024).

Before the procedure, anxiety about HSG may develop as a result of fear of the unknown. Studies signify that not all patients are aware of the expectations during HSG, which is why they know little about the procedure which increases their levels of anxiety (Erkilinc et al., 2018). The fear of pain is a significant factor since the process requires a catheter to be inserted in the uterus and contrast dye to be infused, which can. produce the feeling of tension or cramping. Studies have shown that anticipatory anxiety has the ability to increase the perception of pain in patients because nervousness and tension of muscle necessitate increased pain sensitive (Adeyekun et al., 2023).

The psychological disturbance that accompanies HSG does not necessarily revolve around the aspect of pain. Mumcu & Aydin in 2025 emphasized the fact that many women who undergo this procedure are already under the pressure of stress relating to infertility, and the fear of a possible negative outcome may intensify their anxiety. As such, research has revealed that patients who have fertility-related imaging experience impacts feeling of anxious regarding the procedure, as well as the fear of being with the conditions that may impair their ability to

conceive (Handelzalts et al., 2016). The clinical environment and contact with healthcare also have an impact on anxiety in patients with HSG.

Anxiety in HSG patients is also influenced by the clinical setting and interaction with healthcare providers. La Fianza et al., 2014 suggested that patients feel more anxious in environments where they perceive a lack of empathy or understanding from medical staff. This is where effective communication especially among healthcare workers, in these sense radiographers, is extremely important. When patients are well-informed about what to expect and feel supported by the medical team, their anxiety levels can be reduced (Daneshfar et al., 2024). Strategies like pre-procedural counseling, detailed explanations, and reassurances during the procedure have been shown to reduce the level anxiety and improve the patient experience (Adeyekun et al., 2023).

Overtime, studies on interventions to manage anxiety in HSG have pointed out several effective approaches.This type of interventions incorporates simple methods like deep breathing, distraction, and giving patients a chance to ask questions have been related with less anxiety and more positive attitude towards the procedure (Erkilinc et al., 2018). Some health facilities have adopted the emergence of social media and the advent of a digital age are starting to utilize multimedia materials, e.g. video information, to make patients feel more ready and less nervous before having HSG (La Fianza et al., 2014).

2.1.3 Role of Communication in Healthcare Settings

In healthcare, communication is significant because it is an element of providing efficient patient-focused treatment particularly during the high stress situation such as during diagnostic imaging. Effective communication assists in controlling the expectations of patients, decreases

anxiety and enhances medical compliance. instructions (La Fianza et al., 2014). For patients undergoing hysterosalpingography (HSG), clear and compassionate communication from healthcare providers can be particularly impactful. Erkılınç et al., reported in their findings in 2018 that well informed and supported patients had lower anxiety levels and followed necessary instructions during the procedure.

Pre-Procedure Communication: Before HSG, it is important to provide patients with full on details regarding what to expect. This will in turn promote trust and relieve stress. When patients do not have a slight understanding of HSG or what to expect it leads to what is termed "the fear of the unknown", which is a major source of anxiety according to Adeyekun et al., 2023. Simple explanations of each step of the procedure, possible sensations they might feel and the purpose of the test can motivate the patients and reduce their worries (Handelzalts et al., 2016). Research shows that patients who receive detailed, understandable information are more likely to report lower levels of anxiety (Erkılınç et al., 2018).

Provider-Patient Interaction and Trust: The interaction between provider and patient is an important factor on patient outcomes and satisfaction during HSG. According to the patient-centered care model, the starting point of a relationship based on empathy, Trust, respect and rapport increases patient satisfaction and can greatly enhance the overall Clinical experience (Institute of Medicine, 2001). For instance, La Fianza et al. (2014) discovered that when Practitioners meet patients in a way that is caring and attentive, patients are more likely to feel cared for and less likely to suffer from increased anxiety during the procedure. Furthermore, Research has found that trust in health care providers improves patient compliance, which is important during HSG as patients are given certain instructions to follow in order to have successful imaging (Daneshfar et al., 2024).

Cultural Sensitivity In Communication: Effective communication recognizes the importance of cultural factors. Every patient walks into the healthcare experience with certain expectations, and these expectations may be shaped by cultural backgrounds. Understanding and adaptation to Such factors may be helpful to healthcare workers in establishing rapport and overcoming concerns (Adeyekun et al., 2023). Increase in healthcare professionals' cultural competencies interactions with patients and giving the necessary basis for incorporated culturally competent Interdisciplinary communication in healthcare circuits (Daneshfar et al., 2024).

Communications about health care processes and particularly during the HSG procedures designed to reduce anxiety and satisfaction of focus around the efficacy of the procedure Culturally sensitive and emotionally sound communication skills are key in closing the healthcare quality gap and improving the patient experience.

2.1.4 Assessing Anxiety and Communication Level

Anxiety and communication can be significant predictors of patient experience during medical procedures such as hysterosalpingography (HSG). A variety of evaluation instruments and techniques are used to record feelings of the patient as well as the quality of communications with providers of health care. Accurate measurement is important as knowledge of the level of anxiety and the efficiency of communication can assist with clinician adjustments to improve patient comfort and satisfaction (Mohammad et al., 2017).

Measuring Anxiety: Anxiety is regularly measured in clinical settings utilizing standardized questionnaires, which are validated instruments intended to record subjective experiences of patients The most frequently used metrics for anxiety measurements are the State-Trait Anxiety Inventory (STAI). and the Visual Analog Scale (VAS) The STAI, developed by Spielberger,

Gorsuch, and Lushene (1983), evaluates both state anxiety (temporary feelings of anxiety that are related to a specific introduction: the interaction of trait anxiety (a tendency to be nervous) and situation This tool has been used in clinical studies to determine the shifts in patients' level of anxiety before, during, and after medical procedures. The Visual Analogue Scale (VAS) is a commonly used scale which asks patients to determine their level. Anxiety is graded on a continuum, usually of “no anxiety” through “extreme anxiety”. This is an easy-to-use, visual method that allows patients to describe how they are feeling. especially useful in high stress procedures such as HSG (Daneshfar et al. 2024). Studies have shown that higher scores on the following scales before HSG are more likely to be associated with more severe experiences of pain and discomfort in support of the hypothesis that anticipatory anxiety can influence procedural outcomes. By regularly screening for anxiety using these tools, healthcare providers can identify patients that are at increased risk for discomfort and offer increased support or interventions to effective management of anxiety (Adeyekun et al., 2023).

Measuring the Quality of Communication: Communication quality between healthcare providers and patients can also be evaluated using patient feedback, surveys, and structured observation. The Patient Perception of Communication Scale (PPCS) is the most commonly used tool. It measures patients' perceptions of the communication between them and healthcare providers. including elements such as clarity, empathy and informativeness (La Fianza et al., 2014). Patients are asked to rate things such as "The doctor explained the procedure clearly" or "I felt supported during the procedure,” which is used for assessing the effectiveness of communication (Erkilinc et al., 2018).

Another way of measuring communication is using patient satisfaction surveys being done after the procedure. These surveys may have questions concerning patients' perceived level of

information. about the process, their comfort level in the communication and if they felt heard by the staff (Mohammad et al., 2017). By collecting feedback on communication in a systematic way, health professionals can find areas to improve, such as needing better explanations or showing more empathy, which are proven to lessen anxiety and increase patient cooperation. (Daneshfar et al., 2024).

Significance of Accurate Measurement: Anxious reactions and the quality of communication have been important topics for measurement relevance for clinical practice For example, if high levels of anxiety are noted, staff can Provide preprocedural intervention such as relaxation techniques, additional reassurance, preprocedural counseling (Erkilinc et al., 2018). Likewise, if the communication quality is systematically assessed, an effective way to train staff at healthcare institutions to do their jobs better ultimately improving the patient experience (La Fianza et al., 2014). Having a valid measurement tool to assess anxiety and communication quality is critical because it enables increased understanding of patient experiences during HSG, to help improve both Patient satisfaction and clinical practice.

2.1.5. Interventions to Reduce Anxiety and Improve Communication During HSG

Reducing Anxiety and Enhancing Communication During HSG Interventions to decrease anxiety and improve communication during hysterosalpingography (HSG) and plays an important role in enhancing patient experience and outcomes. Research provides that when healthcare providers take certain measures to reduce anxiety and If communication is effective, patients are less uncomfortable and more satisfied with the procedure (Daneshfar et al., 2024). These interventions could involve preprocedural education, Interventions such as relaxation strategies, staff communication training, which may also be beneficial to a more positive experience for the patient.

Pre-Procedural Education and Counseling: One of the best ways to decrease anxiety is through Pre-Procedural Education and Counseling. In order to do that, it is necessary to educate the patient before the procedure. This means that patients who are educated about what to expect in general, reports of anxiety levels during HSG are lower than those who are given minima. information. Pre-procedural education consists of verbal counseling, information brochures or videos which help patients understand the purpose, steps, and possible sensations they may experience during HSG (La Fianza et al., 2014).

Research has demonstrated this information to reduce the fear of the unknown and increase patients' perceived control thus decreasing anxiety (Adeykun et al., 2023). In addition, pre-procedure counseling sessions enable patients to ask questions and express any concerns they may have, which has been seen to help patients feel more supported and ease their anticipatory anxiety (Mohammad et al., 2017).

Relaxation Techniques: Relaxation techniques like deep breathing exercise, mindfulness. meditation, guided imagery have also been shown to reduce anxiety during medical procedures like HSG. These techniques act by relaxing the nervous system, which can lower heart rate and reduce the physical symptoms of anxiety. To support this argument, Mumcu and Aydin (2025) carried out a study and came up with results that background music had a significant role in lessening pain and anxiety levels during HSG. In practice, relaxation techniques can be introduced by health care professionals. Instructors should be given as part of a pre-procedural briefing or as a support tool during the procedure itself.

Effective Communication Strategies: Clear, empathetic and considerate communication is another important intervention. Training staff in how to communicate well through delivering

Patient reassurance about each step of the procedure, patient cues and feedback has been proven to decrease anxiety and improve the cooperation of the patient (Erkilinc et al., 2018). This approach includes listening to patients' concerns in a calm and understanding tone, which can make patients be less afraid and more secure. For example, Daneshfar et al. (2024) showed that patients in the group who were given the extensive procedural explanations and emotional support reported significantly less anxiety than those who received little interaction from staff.

Patient-Centered Communication and Empathy: Adopting a patient-centered communication approach, where healthcare providers listen to concerns of patients and respond empathy is an important factor in patient comfort and satisfaction. Patients feel more at ease when they perceive healthcare providers as understanding and supportive. According to the patient-centered care in which the relationship between the patient and his or her caregiver is one of partnership and trust. This is highly important for patients and providers when performing invasive or anxiety-provoking procedures. Handelzalts et al. (2016) reported that women who were active in seeking information and receiving empathetic interaction was less anxious and more emotion regulated during the procedure.

Environmental Modifications: Environmental modifications such as offering soothing music, warm environment or guaranteeing a private room can also help patients feel more comfortable during HSG. For example, Mumcu and Aydin (2025) pointed that the interaction of calming music during the HSG procedure increased anxiety significantly reduction. While these changes sound small, they can be important in increasing patient comfort and reducing stress levels in diagnostic high stakes environments. Pre-procedural education, relaxation techniques, effective communication and patient-centered empathy and environmental manipulations have shown to be effective ways to reduce anxiety and improving communication during HSG procedures.

These interventions, which are concerned with treating patients at the emotional and psychological level, is important in increasing patient satisfaction to achieve contentment and to reduce the distress caused by this diagnostic procedure,

2.1.6 Role of Music in Healthcare

Music has been known as a therapeutic aid in healthcare, and appreciated for its ability to have both psychological and physiological effects. As a non-pharmacological intervention, it has been used in various clinical environments to treat anxiety, pain, and stress. Unlike drug-based methods, music is easy to use, safe, inexpensive and free from side effects, making it an easy approach for patient-centred care (Liu & Petrini, 2015; Jasemi et al., 2016).

Research demonstrates the ability of music listening to control mood, increase relaxation, and promote emotional stability by triggering the release of neurochemicals like endorphins, dopamine, Serotonin and oxytocin which together have a role in reducing stress and modulating pain perception (Chanda & Levitin, 2013; Koelsch, 2014).

In addition to its biochemical effects, music provides distraction, diverting patients' attention from distressing experiences and toward more positive experiences This is consistent with the Gate Control Theory of pain, which proposes that non-painful stimuli such as music can help obstruct or reduce the perception of pain (Melzack & Wall 1965). Empirical studies have also demonstrated that music has been shown to have a positive effect in a variety of medical situations, including decreasing anxiety in cancer treatment (Epstein & Street, 2007), to offer relief from distress in intensive care (Bayindir & Kocyigit, 2017) For example, in improving emotional well-being of pregnant women (Gonzalez et al., 2017).

Music in healthcare goes beyond entertainment; it is a complementary therapy that supports holistic healing. Addressing psychological and emotional dimensions of health, music improves the quality of care and helps patients to better cope with invasive or stressful procedures (Mumcu & Aydin, 2025).

2.1.7 Music and Anxiety during HSG

Hysterosalpingography (HSG) is a useful diagnostic test for evaluating tubal patency in infertility investigations been carried out, tho they are often perceived by patients as painful, stressful, and anxiety provoking. (Mohammad et al., 2017; Adeyekun et al., 2023). Anxiety also exacerbates the subjective perception of pain but may also impact cooperation during the procedure and influence patients' general experience of care (Tokmak et al., 2015). Because pharmacological methods of pain relief may come with side effects, non-pharmacological interventions like music have none. It received increasing interest as complementary approaches (Atukasi et al., 2022; Guvenc et al., 2020). Recent randomized controlled trials have emphasised the effectiveness of music in reducing both pain and anxiety during HSG. In a study conducted by Mumcu and Aydin (2025) women who listened to Acemasiran Maqam a traditional Turkish musical mode during HSG reported significantly lower Post-procedure anxiety scores was compared to those who did not receive the procedure with music. The intervention also resulted in reduced pain scores on the Visual Analog Scale, highlighting the role of music in dual effect in providing better comfort to the patient. These findings are similar to previous reports demonstrating the ability of music interventions to decrease anxiety during gynecological procedures such as hysteroscopy (Angioli et al, 2014) and outpatient hysteroscopy (Law et al, 2021).

Music also functions as both a distraction technique and a relaxation strategy. It diverts attention from the procedure, reduces sympathetic arousal, and promotes the release of natural endorphins, which help regulate stress and discomfort (Mok & Wong, 2003; Mitchell & MacDonald, 2006). For women undergoing HSG, this can translate into a calmer psychological state, reduced anticipatory fear, and greater tolerance of the procedure.

Evidence strongly suggests that incorporating music therapy into HSG practice can mitigate anxiety, enhance patient experience, and contribute to more positive clinical outcomes. In essence music in radiological care is part of good patient care that can invariably help reduce anxiety and stress levels.

2.2 Empirical Review

A study conducted by Adeyekun, et al., (2023) titled "Preinvestigation psychological state and related demographic factors as predictors of pain perception in women undergoing hysterosalpingography" to examine the effects of anxiety and demographic variables on pain perception during HSG. Conducted in a tertiary hospital in Nigeria, the study set out to determine whether psychological and demographic factors were able to predict patient-reported levels of pain during the procedure. The researchers used a cross-sectional analytical design of 152 women undergoing HSG. Pre-investigation psychological status was determined by the Generalized Anxiety Disorder-7 (GAD-7) scale, pain was assessed immediately after the procedure using a Visual Analog Scale (VAS). As a result, the researchers found that higher anxiety scores significantly correlated to an increase in pain perception, and younger age groups reported greater anxiety. The authors concluded that pre-investigation anxiety plays an important role in pain perception during HSG and recommended routine psychological assessment and counselling before the procedure.

Daneshfar et al. (2024) conducted a randomised controlled trial, "A randomised controlled trial on the effect of specialized training program on anxiety and perceived pain in infertile women undergoing hysterosalpingography". The aim of the study was to investigate the effect of a structured education program in relation to reducing anxiety and pain for women scheduled for HSG. A total of 100 infertile women were randomly allocated to the intervention group (who received training on the HSG procedure, relaxation techniques and pain coping strategies) or the control group (routine care). Measures of anxiety were taken through the State-Trait Anxiety Inventory (STAI), pain was measured with the help of VAS. The findings showed a statistically significant decrease in anxiety as well as perceived pain in the intervention group. The authors concluded that targeted educational interventions can effectively reduce emotional and physical distress associated with HSG procedures.

A study conducted by Erkilinc, et al., (2018) titled "The effect of a pre-procedure information video on anxiety levels in patients undergoing hysterosalpingography: A prospective case control trial" investigated the effect of audiovisual information on patient anxiety. The research included 70 women, who were divided into two groups - one group was given standard verbal instructions; the other witnessed an educational video on the HSG process. The goals of the study were to determine if multimedia education could help to decrease anxiety before the procedure. Anxiety was measured using the STAI scale. Results showed that patients who viewed the video had significantly lower anxiety scores when compared with those who received verbal explanations only The study concluded that the use of simple educational videos can enhance patient preparedness and emotional comfort before HSG.

Handelzalts et al. (2016), in their study "Information seeking and perception of anxiety and pain among women undergoing hysterosalpingography," explored the relationship between the desire

for information by patients and the patients' reported levels of anxiety and pain.The cross-sectional study looked at 132 women scheduled for HSG using validated questionnaires on anxiety, (STAI), pain (VAS) and information needs. The results showed that women who actively sought information before the procedure resulted in lower anxiety and pain levels suggesting that knowledge acquisition as a psychological buffer. The authors concluded that medical staff should proactively provide comprehensive information to patients in order to decrease fear and discomfort associated with HSG.

In the study titled "Effectiveness of a single education and counseling intervention in reducing" anxiety in women undergoing hysterosalpingography: A randomised controlled trial," La Fianza et al. (2014) looked at the effect of a brief counseling session on the reduction of anxiety. The RCT where 120 women undergoing HSG were randomly assigned to either an intervention group (pre-procedural education and counseling) or a control (routine briefing) group. Anxiety was assessed using STAI. Findings showed a significant decrease of anxiety levels in the intervention group. The authors concluded that even one structured counseling session could meaningfully improve psychological outcomes of patients undergoing HSG.

Mohammad et al., (2017) in their study "Correlates of anxiety levels among patients undergoing" hysterosalpingography assessment for tubal factor infertility in Makurdi, Nigeria," explored socio-demographic and psychological variables associated with anxiety during HSG. The study sampled 80 women and used a self structured questionnaire accompanied by the Hospital Anxiety and Depression Scale (HADS). Results showed that marital status, previous HSG experience and level of education had a significant influence on the level of anxiety. Married women and those undergoing HSG for the first time had higher scores on anxiety. The authors

suggested that these findings underscore the need for tailored emotional support and pre-procedural counseling.

A study by Mumcu and Aydin (2025) titled "The effect of music on pain and anxiety during hysterosalpingography: A randomized controlled trial" examined the impact of music therapy in easing patient distress. The RCT involved 90 women randomized into a music group (listened to relaxing instrumental music during HSG) and a control group. Anxiety was measured pre- and post procedure with STAI, and pain was measured with VAS. The findings indicated that the music group experienced significantly lower anxiety and pain scores compared to the control group. The authors concluded that music therapy is a simple, low-cost intervention that can enhance the emotional well-being of women undergoing HSG.

2.2.1 Summary of Empirical Review

The empirical evidence underlines the importance of addressing anxiety by effective communication, education and supportive interventions in procedures such as HSG. Key strategies include:

- Providing clear, patient-centered information and empathetic communication.
- Using non-pharmacological interventions such as relaxation techniques and CBT.
- Incorporating cultural sensitivity into patient education.
- Empowering patients through shared decision-making.

These findings suggest that adopting a multifaceted approach that integrates education, communication, and relaxation techniques can significantly improve patient experiences and outcomes during HSG procedures.

2.3 Theoretical Framework

The theoretical framework for exploring the level of Anxiety and Communication of the patients during hysterosalpingography (HSG) is based on two important psychological and communication theories: the Transactional Model of Stress and Coping, and the Patient-Centered Communication Theory. These theories provide a whole picture of how anxiety develops and is managed within clinical settings, how effective communication may improve the outcomes of patients experiences.

2.3.1. Transactional Model of Stress and Coping

The Transactional Model to Stress and Coping developed by Lazarus and Folkman in 1984, views stress as a byproduct of a person's interaction with his environment in healthcare situations like HSG can be extremely stressful. The model explains how an individual's perception of an event as stressful (in this case, the HSG procedure) revolves around two main cognitive functions of primary appraisal and secondary appraisal. In primary appraisal, patients appraise the possible dangers HSG could pose. If an HSG procedure is perceived as a potential threat, then, in the secondary appraisal, patients evaluate their potential resources, knowledge, social support, and the emotional frameworks they might use.

The Transactional Model of Stress and Coping illustrates the variations in anxiety levels of HSG patients. Some patients may have a greater perception of threat around the procedure due to a lack of knowledge or stressful medical imaging experiences in the past. In contrast, other patients might be in a lower anxiety state because they have the emotional instruments to cope, detailed information about the imaging procedure, or supportive caregivers. This theory thus, highlights that the healthcare professional’s role in providing pre-procedural information and emotional

support and helping patients integrate coping resources is critical in altering the anxiety patients (Lazarus & Folkman, 1984).

2.3.2. Patient-Centered Communication Theory

Patient-Centered Communication Theory was developed out of thought grounded in patient care and works towards communication that values and hears a patient's needs, preferences, and values (Epstein & Street, 2007). Communication, as this theory dictates, is effective when you are able to see one's point of view, clarify, empathize, and facilitate participation. This is most important in HSG, as patients are in a uniquely vulnerable and anxious situation. Patient-centered communication practice allows caregivers to assist patients in articulating their concerns and every aspect of the procedure and provide the right consolation, thus anxiety reduction. Patient-centered communication has more patient satisfaction and adherence, and is particularly well-suited to HSG.

Epstein and Street (2007) describe that in the context of HSG, the absence of anxiety and concerns, which is a direct result of effective communication, increases a patient's compliance to cooperate. This is most important in the achievement of favorable imaging results and highly successful HSG imaging. In HSG, patient-centered communication decreases a patient's anxiety but increases cooperation in a partnership to enhance trust and their empowerment.

2.3.3. Application of Theories to HSG Procedures

By integrating the Transactional Model of Stress and Coping and the Patient-Centered Communication Theory, a comprehensive framework for reducing anxiety and improving communication during HSG emerges. Healthcare providers can apply this framework by:

• Using patient-centered communication skills to assess and respond to each patient's primary and secondary appraisals of the procedure.

• Providing ample pre-procedural education to increase coping resources and decrease perceived threats.

• Giving empathetic and understandable communication throughout the HSG procedure to meet the emotional needs of patients, making the process less stressful and hence more bearable. These theories based on threat perceptions and coping of patient anxiety in HSG resources and can be mitigated by communicating with patients in a patient-centered way that acknowledges and addresses these. The model supports interventions in the areas of education, reassurance and empathy to enhance patient experiences in HSG.

CHAPTER THREE

METHODOLOGY

3.1 Research setting

This study was conducted at Radiology Department, University of Benin Teaching Hospital (UBTH) as well as at Raytouch Diagnostic Center both in Benin City, Edo State, Nigeria.

The University of Benin Teaching Hospital is a tertiary healthcare institution that was founded in 1973. It is geographically located within the Ugbowo community, between the boundaries of Egor and Ovia North-East Local Government Areas of Edo State. The hospital is strategically sited along Benin - Lagos Expressway and is in a boundary with the Federal Government Girls college Road. UBTH is a teaching and referral center as well as a providing advanced healthcare services to the public as well as training medical professionals, including doctor, nurse, physiotherapist, radiographer and midwives. The Radiology Department, in which the research was conducted, provides a wide variety of diagnostic imaging services, including hysterosalpingography.

Raytouch Diagnostic Center is a private medical imaging facility located in Benin City and known for providing specialized radiological services using modern imaging equipment. It plays a complementary role in healthcare delivery through provision of prompt and accessible diagnostic investigations, including special x-ray and contrast investigations, such as hysterosalpingography. The inclusion of both UBTH and Raytouch Diagnostic Center ensures that the study captures experiences from a large tertiary hospital as well as a private diagnostic facility, thus and therefore providing a wider perspective about patient anxiety and stress during hysterosalpingography procedures.

3.2 Study Design

A prospective cross-sectional survey design was used to assess the patient's anxiety and stress levels when undergoing examination on hysterosalpingography at the university of Benin Teaching Hospital and RayTouch Diagnostics center. This method used quantitative data to provide a deeper knowledge of patient experiences.

3.3 Target population

This study involved only patients who were scheduled for Hysterosalpingography(HSG) investigation in the University of Benin Teaching Hospital and RayTouch diagnostics between August 2025 to october 2025. The target population for this study comprised of patients registered for the investigation within the period of this study at the radiologic department.

3.4 Sampling Techniques/Sample Size

Convenience sampling was used as a viable method for conducting the research on patient anxiety or stress levels prior to hysterosalpingography (HSG) investigation because it is convenient, and is also applicable in real-world settings, feasible in clinical settings. The sample size for this study was determined using a Cochran formula for estimating sample sizes in surveys.

I'll used a 95% confidence level and a 9.8% margin of error. Using the following formula, I can calculate the sample size:

$n = (z2 * p * (1 - p)) / e2$

Where:

n = the required sample size

z = the z-score, which is 1.96 for a 95% confidence level

p = the estimated proportion of people in the population

e = margin of error

n = (1.962x1.962 x 0.07 x (1 -0.07)) / (0.05x0.05)
= 100 participants

A minimum of 100 participant was included in this study.

3.5 Instrument for Data Collection

This study's instrument design included a structured questionnaire designed to collect information directly from the patients undergoing HSG. The questionnaire included five sections: demographic information, knowledge of HSG, patient anxiety and stress level from the State-Trait Anxiety Inventory, communication with healthcare providers, and patients' experiences with music intervention during the HSG procedure to evaluate its effect on anxiety levels.

3.6 Validity of the instrument

To ensure the validity of the research a copy of the questionnaire was submitted to the researcher's supervisor in the radiography department at the School of Basic Medical Sciences, University of Benin, Ugbowo Campus for expert review. The supervisor assessed the instrument for content validity ensuring that each item adequately captured the objectives and constructs of the study. Suggestions and corrections were made regarding the wording, clarity and relevance of the items to improve the accuracy and authenticity of the questionnaire. Furthermore, face validity was established by presenting the instrument to other experts in radiography for further assessment of the comprehensibility, layout and appropriateness of the questions for the intended respondents. Finally, a pilot study was conducted using 15 patients undergoing HSG at Lily Hospitals Limited, Benin city who were not included in the main study. The purpose of the pilot

test was to determine if the respondents understood the questions clearly, whether the questionnaire items measured what they were intended to measure.

3.7 Reliability of the Instrument

To ensure the reliability of the instrument, reliability was determined through test re-test consistency, the consistency with which the items in the questionnaire evaluated the target constructs was measured using statistical techniques like Cronbach's Alpha. A value of 0.7 or higher was deemed acceptable. Also to assess stability, the identical questionnaires were given to another patients undergoing HSG at Lily Hospitals Limited, and the results was compared.

3.8 Method of Data Collection

The questionnaire was administered to the study participants after a thorough explanation of the subject, as they await their turn for the examination. The questionnaires was immediately collected before the start of the investigation. This process went on until the required sample size was reached.

3.9 Method of Data Analysis

Data was analysed using descriptive and inferential statistical analysis methods SPSS version 25. Descriptive statistics such as frequencies, means and percentages was used to summarise the data. Inferential statistics, including Chi-square tests, was used to find the associations between communication between patient and healthcare giver (prior to investigation level) and anxiety levels.

3.10 Ethical Considerations

Ethical standards are important in research with human participants so that the protection of their rights, dignity and well-being, The following subheadings define the ethical protocols that guided this study.

Ethical Approval

Prior to the commencement of data collection, ethical approval was obtained from the Research Ethics Committee of University of benin teaching hospital. This confirmed that the research protocol complies with institutional and national ethical guidelines for studies involving human participants.

Informed Consent

All participants was adequately informed about the purpose, procedures, potential risks and benefits of the study. Participation was completely voluntary and each participant had to sign an informed consent form prior to completing the questionnaire. They will also be informed of their right to withdrawal from the study at any time without any consequences.

Confidentiality and Anonymity

All information given by the participants was handled with the highest degree of confidentiality. Names and other identifying information was written on the questionnaires to ensure anonymity. Data was encoded and safely stored to avoid unauthorized access.

Risk Minimization

This study poses minimal or no risk to participants. The questions are non-invasive and focused solely on knowledge, attitudes, and practices related to sexually transmitted diseases. Care was

taken to create a safe and non-judgment: environment during data collection to reduce any potential discomfort.

Voluntary Participation and Right to Withdraw

Participants were clearly informed that their participation was voluntary. They had the freedom to decline participation or withdraw from any stage of the study without encountering any disadvantage or loss of benefit.

CHAPTER FOUR

RESULTS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter provides the results obtained from the study and discusses the findings in relation to existing literature. The study focused on patient levels of anxiety and stress, knowledge about HSG, the effectiveness of healthcare provider communication and the effect of music intervention of 113 women having hysterosalpingography at the University of Benin Teaching Hospital and Raytouch Diagnostic Center, Benin city.

4.2 Sociodemographic Characteristics of Respondents

Table 4.1 Sociodemographic Characteristics of Respondents

Table 4.1. Sociodemographic Characteristics of Study Participants (N = 113)

Characteristic	Frequency	Percentage
Age (years)		
18–24	2	1.8
25–29	20	17.7
30–34	32	28.3
35–39	52	46.0
≥40	7	6.2
Marital status		
Single	31	27.4
Married	82	72.6
Educational level		
Secondary	9	8.0
Tertiary	97	85.8
Postgraduate	7	6.2
Occupation		
Unemployed	4	3.5
Self-employed	73	64.6
Civil servant	36	31.9
Previous HSG experience		
No	64	56.6
Yes	49	43.4

Table 4.1 presents the sociodemographic profile of the study participants. The majority of respondents (46.0%, n=52) were aged 35-39 years, followed by 30-34 years (28.3%, n=32). The mean age was approximately 34.6 years, indicating that most participants were in their peak reproductive years. Regarding marital status, 72.6% (n=82) were married, while 27.4% (n=31) were single. Educational attainment was notably high, with 85.8% (n=97) having tertiary education and 6.2% (n=7) holding postgraduate degrees. Only 8.0% (n=9) had secondary education as their highest qualification.

Occupationally, the majority were self-employed (64.6%, n=73), followed by civil servants (31.9%, n=36), with only 3.5% (n=4) unemployed. More than half of the participants (56.6%, n=64) were undergoing HSG for the first time, while 43.4% (n=49) had previous HSG experience.

4.3 Patient Knowledge and Perceptions of HSG

Table 4.2. Patient Knowledge and Perceptions of HSG (N = 113)

Variable	Frequency	Percentage
Received preprocedural information		
Yes	96	85.0
No	17	15.0
Type of information received		
Verbal explanation only	75	66.4
Verbal explanation and video	12	10.6
Video only	9	8.0
None	17	15.0
Understands purpose of HSG		
Yes	91	80.5
No	22	19.5
HSG explained by healthcare provider		
Yes	84	74.3
No	29	25.7
Believes HSG is helpful for diagnosis		
Yes	103	92.0
Not sure	9	8.0
No	0	0.0

Table 4.2 presents data on patient knowledge about HSG. A substantial majority (85.0%, n=96) received preprocedural information, while 15.0% (n=17) did not. Among those who received information, verbal explanation was the most common method (66.4%, n=75), followed by verbal explanation combined with video (10.6%, n=12), and video only (8.0%, n=9).

Regarding understanding, 80.5% (n=91) reported knowing why HSG is performed, though 19.5% (n=22) did not. Furthermore, 74.3% (n=84) indicated that a healthcare provider (doctor, nurse, or radiographer) had explained the procedure to them before their appointment, while 25.7% (n=29) reported no such explanation. Almost all participants (92.0%, n=103) believed HSG is helpful for understanding causes of infertility, with only 8.0% (n=9) unsure and none expressing disbelief in its utility.

4.4 Patient Anxiety and Stress Levels

Table 4.3. Anxiety and Stress Levels During HSG Procedure (N = 113)

Item	Not at all	A little	Moderate	Very much
Feel calm about procedure	19 (16.8)	44 (38.9)	17 (15.0)	33 (29.2)
Feel tense during procedure	17 (15.0)	29 (25.7)	30 (26.5)	37 (32.7)
Worried about test results	15 (13.3)	48 (42.5)	15 (13.3)	35 (31.0)
Nervous about procedural pain	14 (12.4)	45 (39.8)	21 (18.6)	33 (29.2)
Infertility increases anxiety	27 (23.9)	31 (27.4)	25 (22.1)	30 (26.5)

Table 4.3 presents anxiety and stress levels measured across five dimensions. Regarding feeling calm about the procedure, 45.2% (n=61) reported feeling "not at all" or "a little" calm, while 15.0% (n=17) felt moderately calm, and 29.2% (n=33) felt "very much" calm. This indicates that a majority (54.8%) experienced low to moderate calmness.

For feeling tense during the procedure, 58.4% (n=67) reported moderate to very much tension, with 32.7% (n=37) expressing "very much" tension. Worry about test results was also prevalent, with 44.3% (n=50) reporting moderate to very much worry, and 31.0% (n=35) being very worried about results.

Nervousness about procedural pain was widespread: 47.8% (n=54) felt moderate to very much nervousness, with 29.2% (n=33) reporting "very much" nervousness. Regarding infertility-related anxiety, responses were more evenly distributed across categories, with 26.5% (n=30) reporting "very much" anxiety related to infertility concerns during HSG.

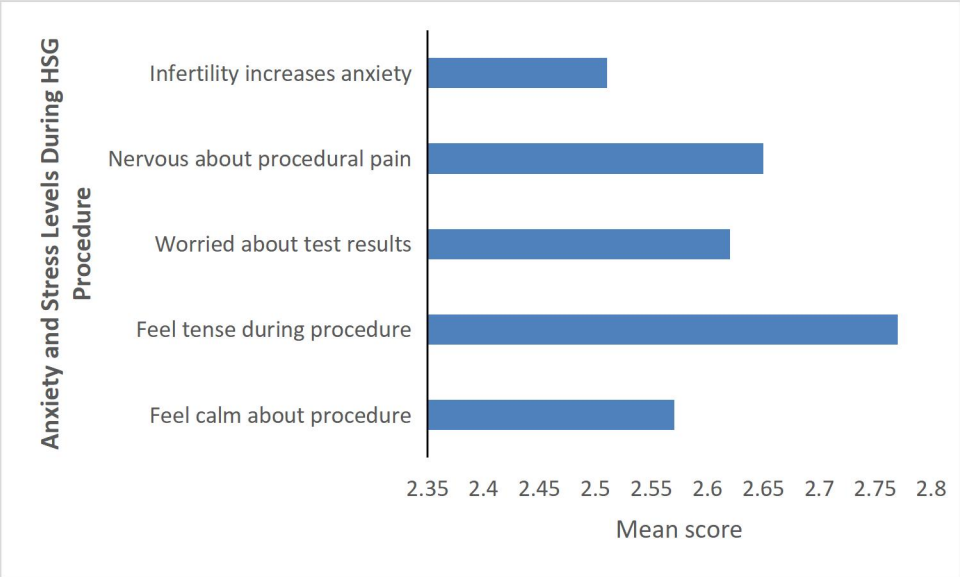

Figure 4.1: Anxiety and stress mean scores during HSG procedures.

Figure 4.1 shows the anxiety and stress mean scores during HSG procedures. It shows that Feeling tensed during procedure is the main source of stress with a mean score of 2.77, while the least source is that infertility increases anxiety with a mean score of 2.51.

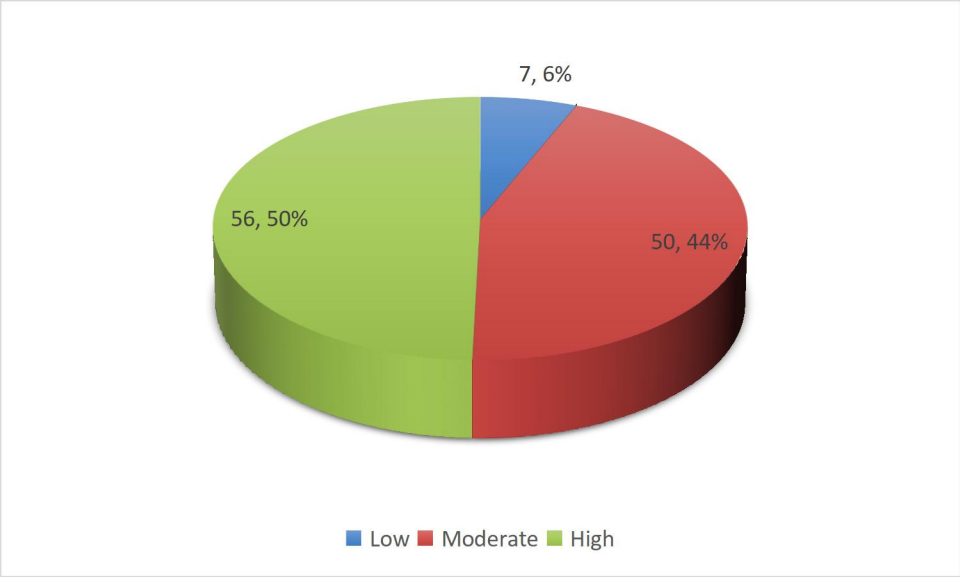

Figure 4.2: Anxiety Levels Among Participants

Figure 4.2 shows the level of anxiety among participants. It reveals that 7(6%) have low anxiety level, 59(44%) have moderate anxiety level while 56(50%) have high anxiety level.

4.5 Communication with Healthcare Providers

Table 4.4. Patient–Provider Communication Quality (N = 113)

Communication aspect	Yes	Not sure	No
HSG explained clearly	95 (84.1)	3 (2.7)	15 (13.3)
Allowed to ask questions	90 (79.6)	5 (4.4)	18 (15.9)
Treated with respect	103 (91.2)	10 (8.8)	0 (0.0)
Healthcare provider listened to concerns	98 (86.7)	7 (6.2)	8 (7.1)
Communication reduced fear/worry	80 (70.8)	26 (23.0)	7 (6.2)

Table 4.4 presents patient perceptions of communication quality with healthcare providers. A strong majority (84.1%, n=95) reported that healthcare workers explained the HSG test clearly, though 13.3% (n=15) felt it was not explained clearly, and 2.7% (n=3) were unsure.

Most participants (79.6%, n=90) felt allowed to ask questions before the test, while 15.9% (n=18) did not, and 4.4% (n=5) were unsure. Nearly all (91.2%, n=103) felt treated with respect, with 8.8% (n=10) unsure and none reporting disrespectful treatment.

Regarding whether healthcare workers listened to their worries, 86.7% (n=98) responded positively, while 7.1% (n=8) felt unheard, and 6.2% (n=7) were unsure. When asked if communication helped reduce fear or worry, 70.8% (n=80) agreed, 23.0% (n=26) were unsure, and 6.2% (n=7) felt it did not help.

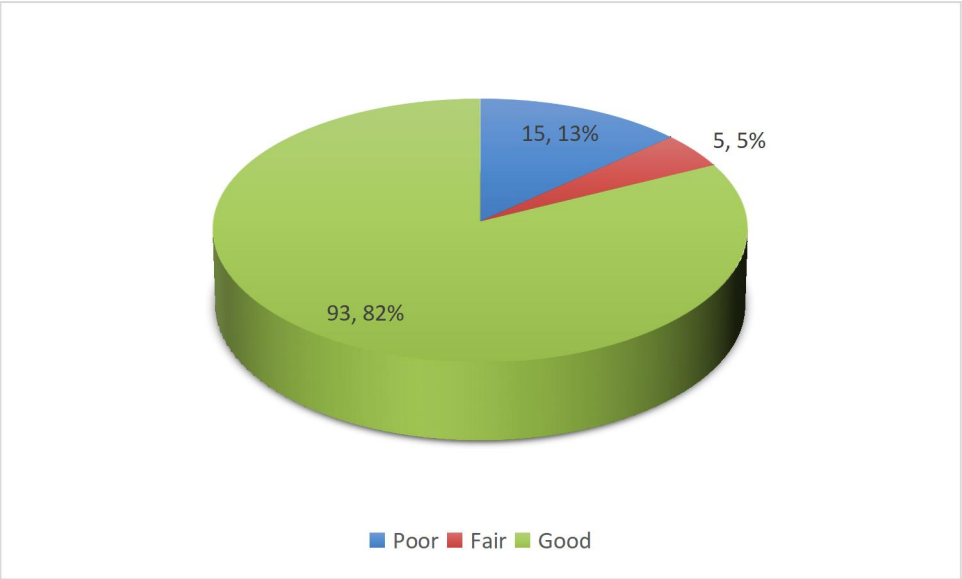

Figure 4.3: Communication Levels Among Participants

Figure 4.3 shows the communication level to participants. It reveals that 15(13%) have poor communication, 5(5%) have fair communication while 93(82%) have good communication level.

4.6 Experiences with Music Intervention

Table 4.5. Music Intervention Characteristics and Outcomes (N = 113)

Variable	Frequency	Percentage
Music provided during procedure		
Yes	113	100.0
No	0	0.0
Music delivery method		
Headphones	91	80.5
Speaker	22	19.5
Type of music		
Religious	54	47.8
Patient-chosen	52	46.0
Natural sounds	5	4.4

Instrumental	2	1.8
Perceived outcomes		
Felt more relaxed		
Yes	97	85.8
Not sure	4	3.5
No	12	10.6
Music reduced anxiety		
Yes	88	77.9
Not sure	10	8.8
No	15	13.3
Music distracted from procedure		
Yes	90	79.6
Not sure	13	11.5
No	10	8.8
Would recommend music to others		
Yes	93	82.3
Not sure	7	6.2
No	13	11.5

Table 4.5 presents detailed data on music intervention experiences. All participants (100%, n=113) received music during their HSG procedure. The majority (80.5%, n=91) listened via headphones, while 19.5% (n=22) experienced music through speakers.

Regarding music type, preferences were nearly split between religious music (47.8%, n=54) and patient-chosen music (46.0%, n=52), with smaller proportions choosing natural sounds (4.4%, n=5) or instrumental music (1.8%, n=2).

The perceived outcomes were highly positive. A substantial majority (85.8%, n=97) felt more relaxed due to the music, while only 10.6% (n=12) did not, and 3.5% (n=4) were unsure. Similarly, 77.9% (n=88) reported that music reduced their anxiety, though 13.3% (n=15) did not experience anxiety reduction, and 8.8% (n=10) were unsure.

Regarding distraction, 79.6% (n=90) agreed that music took their mind off the procedure, while 8.8% (n=10) disagreed, and 11.5% (n=13) were unsure. When asked about recommending music to others, 82.3% (n=93) would recommend it, 6.2% (n=7) were unsure, and 11.5% (n=13) would not recommend it.

4.7 Primary Patient Concerns

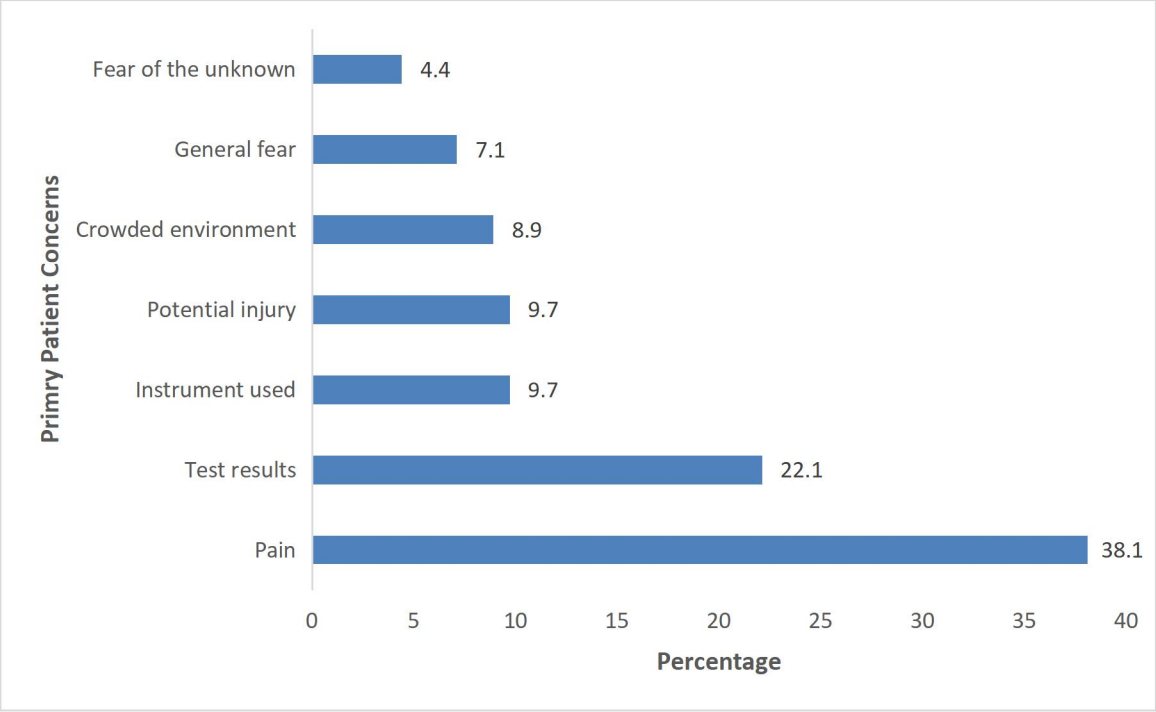

Figure 4.4. Primary Patient Concerns Regarding HSG Procedure (N = 113)

Figure 4.4 presents participants' main worries about the HSG procedure. Pain emerged as the dominant concern, mentioned by 38.1% (n=43) of participants. Concern about test results was the second most common worry (22.1%, n=25). The instruments used and potential injury were each reported by 9.7% (n=11). Crowded environments concerned 8.9% (n=10), general fear was expressed by 7.1% (n=8), and fear of the unknown was mentioned by 4.4% (n=5).

4.8 Testing of Hypotheses

Hypothesis 1: There is no significant relationship between healthcare communication and patient anxiety levels among women undergoing HSG.

Table 4.6Crosstabulation of Communication Level by Anxiety Level

Communication Level	Anxiety Level			Total
	Low	Moderate	High	
Poor	1(6.7)	5(33.3)	9 (60.0)	15(100.0)
Fair	0(0.0)	2(40.0)	3 (60.0)	5 (100.0)
Good	(6.5)	43(46.2)	44(47.3)	93(100.0)
Total	7 (6.2)	50 (44.2)	56 (49.6)	113(100.0)

$\chi^2 = 1.444; p = 0.837$

Table 4.6 shows the association between communication and anxiety level. It shows that there is no significant association between communication level and anxiety level. We therefore accept the null hypothesis

Hypothesis 2: There is no significant relationship between music and patient anxiety levels among women undergoing HSG.

Table 4.7: Crosstabulation of Music Intervention by Anxiety Level

Music Given	Anxiety Level			
	Low	**Moderate**	**High**	**Total**
Yes	7 (6.2)	50 (44.2)	56 (49.6)	113 (100.0)
Total	7 (6.2)	50 (44.2)	56 (49.6)	113 (100.0)

Table 4.8 shows the association between music intervention and anxiety level. Since all the respondents were given music intervention, we couldn't crosstab. Hence the hypothesis is inconclusive.

4.9 Discussion of Findings

Based on the demographic profile, the participants appear mostly to have been married women of middle age and within their reproductive years, which is aligned with the profile of the population who approaches the clinic for evaluation of infertility. A married profile is to be expected, since the socio-cultural context of Nigeria places value on marriage, childbearing, and, in cases of infertility, passing the requisite medical evaluation (Mohammad et al., 2017). The fact that a single status was recorded in 27.4% of cases indicates that dependence on fertility work-up in these cases is more socially accepted these days, which probably points to growing societal liberalization with unfinished reproductive health goals.

The relevance of the findings rests on the fact that a significant proportion of the participants were highly educated (91.8% with university or postgraduate education). Such women are more

likely to approach the healthcare system, understand health-related issues, and be more active in health decision-making (Adeyekun et al., 2023). A possible explanation for these findings is the contrary view of Mohammad et al. (2017) on studies conducted in Makurdi, Nigeria, where education was said to influence anxiety in cases studied and where lack of education was said to correlate with increased anxiety. Having a highly educated population in the study could, in part, explain the reasonably high knowledge level recorded for this study concerning the objectives of HSG.

The fact that a significant proportion of participants (64.6%) are classified as self-employed likely mirrors the economic context of Benin City, as well as the possible flexibility these women have in scheduling medical visits.

Still, at private clinics, such as Raytouch, this may also mirror the financial capability needed to afford the investigation. Importantly, the majority (56.6%) were first-time HSG patients which has important consequences on anxiousness. Earlier work has shown time and again that first-time patients are no doubt the most anxious due to fear of the unknown (Mohammad et al., 2017; Erkılınç et al., 2018). This underlines the essential importance of preprocedural education and the effective deployment of communication strategies for this group.

The 85% of the participants who received preprocedural information indicates an encouraging direction regarding the patient education initiatives at the sites of the study. This is significantly higher than the figure provided by Tyrrell et al. (1993), which showed only 50% of the patients were informed of the procedure beforehand. This, in all likelihood, is due to the growing recognition of the importance of patient-centered care in value-based contemporary healthcare.

Nonetheless, the 15% who received no information is still concerning since lack of information is a documented factor in increasing anxiety (Handelzalts et al., 2016). The majority of verbal

explanation (66.4%) as the information delivery technique coincides with standard patient education practices but may not be optimum for all learning styles. Erkılınç et al.

Those viewing printed instructions were found to have lower anxiety levels compared to those who had only verbal instructions in HSG. This indicates that those who received both verbal and video instruction (10.6%) may have been psychologically more prepared for the treatment. Considering the large number (80.5%) who understood the HSG objective, it is reasonable and positive to conclude that the educational level of the group is relatively high. This is contrary to certain pieces of research in other settings which reported lower levels of knowledge (Sidi et al., 2019). Knowing the purpose of a procedure is important is for informed consent and to help patients situate their experience within their wider fertility journey, which in turn helps to alleviate anxiety arising from the uncertainty of the situation. It is interesting that while 85% received information, only 74.3% reported that a healthcare provider gave a personal explanation of the treatment. This 10.7% gap indicates that some information may have been obtained from other avenues (e.g., materials, internet, or friends) without direct provider input.This speaks to the need to make sure that all patients receive an individual explanation from a suitable direct advice, allowing misconception to be removed and precise problems addressed (La Fianza et al., 2014). Most patients (92%) seeing HSG as useful to diagnose the reasons for infertility is encouraging and reflects appropriate understanding of the patients about the procedure.

Patients appreciate the procedure as a step towards their fertility goals, which may help them overlook discomfort and provide more acceptability during the procedure.This may help overlook discomfort and provide more acceptability during the procedure. Assessing the metrics of anxiety reveals a more intricate structure. A total of 29.2% of respondents felt “very much” calm, yet most of the respondents, 70.8%, experienced only low to moderate calmness. This

indicates a rather substantial baseline anxiety that was present before and during the procedure. Literature, as referenced previously, also characterized HSG as anxiety inducing.

The high levels of tension reported, specifically 58.4% expressing moderate to very high tension, align with findings that preprocedure anxiety levels significantly predict postprocedure pain scores (Tokmak et al., 2015). The association of anxiety and pain perception is explained by the Transactional Model of Stress and Coping (Lazarus & Folkman, 1984). Individuals may perceive a situation as a threat, and subsequently, apply their perceived resources to cope. Women scheduled to have HSG and other painful procedures may experience considerable fear of the surgery and result, especially if they feel unsupported with information or social resources.

The complexity of emotions tied to HSG, beyond the mere physical discomfort that was described, is also illustrated by the significant worry about the HSG results. 44.3% of respondents reported moderate to high worry. Women conducting this type of investigation may already be going through psychological pain and discomfort due to infertility (Handelzalts et al., 2016). The treatment represents not only a physical struggle but also a possible moment of truth about their fertility status, thereby adding to their psychological distress on top of the physical one. This research highlights the need for care that not only deals with anxiety caused by the procedure but also addresses fertility-related emotional problems that may lie deep in the patient's mind.

Anxiety about pain (47.8% with moderate to high levels) is significantly notable since pain was the major concern for 38.1% of the participants (Table 6). Adeyekun et al. (2023) pointed out that the psychological state prior to the investigation, particularly, anxiety was the greatest variable that affected the experience of pain during HSG. This shows that there is a cyclical relationship: the expectation of pain makes people anxious, which in turn makes the experience

of pain to be more painful, hence establishing a loop in reinvention. So, the authors believe that the existence of such a cycle demands not only the introduction of pain management practices that not only involve pharmaceutical treatment. though also anxiety-reducing interventions.

The fact that anxiety about infertility was quite significant (48.6% reporting moderate to very considerable anxiety) is an indication of a general psychological history within which HSG has been carried out. The operation is not only a medical one but an aspect of the long process of many women emotional painful road to parenthood. This is in line with the finding of Mohammad et al. (2017) that the combination of anxiety caused by infertility and that caused by the procedure can be too much for patients' coping skills and may even become clinically significant.

From a theoretical point of view, these anxiety levels could be explained by the Gate Control Theory of pain (Melzack & Wall, 1965) that suggests how psychological factors, such as anxiety, affect pain perception by altering brain processes that deal with the pain signals. Very anxious patients may "open the gate" for pain perception making them more sensitive to the discomfort caused by the procedure. The presence of a theoretical explanation here provides a rationale for the use of anxiety-reduction interventions such as music therapy.

The generally positive communication ratings (>79% for all measures) indicate that healthcare providers at the locations of the study employ patient-centered communication techniques to a considerable extent. This inference is an affirmative one and is in line with the Patient-Centered Communication Theory (Epstein & Street, 2007) that identifies as main features of the quality of care: clear explanations, respect, the doctor's active listening, and the response to patient's concerns.

The 84.1% of people who thought that the operation was clearly explained is indicative of good practice, however, the 13.3% of people who were not clearly explained remain problematic. Clear and easily understandable explanations are essential to informed consent and have been linked to anxiety reduction (La Fianza et al., 2014). The 2.7% who were "unsure" if the explanations were clear might be a group where communication was technically correct but not tailored to the patient's level of understanding, thus highlighting that healthcare staff need to check the understanding of the patient rather than just giving the information.

That 79.6% of people felt that they were allowed to ask questions is a good thing, however, it still leaves nearly one in five patients (15.9%) who did not feel that they could ask their questions. This could represent the existence of subordinate healthcare relations, time constraints or environment in clinical settings that are intimidating and hence do not encourage patient participation (Keshavarzi et al., 2022). The Patient-Centered Communication Theory makes the emphasis on good communication is a two-way process through which the patients can be actively engaged in their care. The providers must not only be open to questions but also create a friendly environment that supports patients interaction.

It is particularly notable that nearly all patients (91.2% of them) stated that they were treated with respect, and this actually places the quality of healthcare delivery in such institutions in spotlight. Respect is essential to the dignity of the patient and patient satisfaction can be compromised and will be negated by the lack of it, resulting in psychological harm and healthcare avoidance (Daneshfar et al., 2024). However, the 8.8% who were "unsure" about respectful treatment should not be ignored as uncertainty about respect may point to more subtle kinds of disrespect or cultural insensitivity which can be dealt with by staff training. The 86.7 percent of those who believed that they had been listened to when raising issues is an indication

that the health practitioners have successfully applied the listening skills, that is among the key characteristics of patient-centered communication (Wanko et al., 2020). Active listening does not involve merely listening to what the patient is saying but demonstrating that through action. non-verbal and verbal responds.When Patients feel that they are heard, they have more trust in their medical practitioners and will be more willing to listen to them (Chichirez et al., 2018).

Especially significant is the finding that 70.8% believed that communication helped in decreasing their fear or worry. This is a direct proof of the therapeutic effectiveness of effective communication, and it supports La Fianza et al.'s (2014) finding that even a single education and counseling intervention can bring a significant decrease in anxiety. However, the 23.0% of people who were "unsure" whether communication helped might mean that some patients got the right knowledge but did not experience emotional relief, maybe because the way the information was given lacked empathy or emotional support. This is consistent with the difference between informational support and emotional support; both are equally important for effective patient-centered care.

For 6.2% of people fear was not decreased through communication and this fact needs to be explored further. These individuals may have had extremely high anxiety levels as a starting point which could not be alleviated by communication alone, or they might have been given communication that was technically correct but emotionally deficient. The authors argue that communication, though very important, may have to be accompanied with other anxiety-reduction methods (like music therapy) for certain patients as indicated in this finding.

The fact that music intervention was available to everyone (100%) is indicative of a deliberate and systematic non-pharmacological method for anxiety-relief in place at the study locations. This comprehensive method demonstrates the institution's commitment to patient-centered care

and corresponds with the growing body of research that supports music therapy in medical settings (Liu & Petrini, 2015; Jasemi et al., 2016).

The prevalent use of headphones (80.5%) as opposed to speakers (19.5%) may be significant for different reasons. Headphones make the listening experience more immersive and personal and thus better separate patients from the possibly anxiety-inducing sounds of the clinical environment (e.g., medical equipment, staff interactions). This distribution strategy enhances the distraction effect and may be more effective in catching patients' attention and thus minimizing their focus on procedural discomfort (Mumcu & Aydın, 2025).

Almost equal preference for both religious music (47.8%) and patient-selected music (46.0%) provides valuable cultural and individual insight. For instance, in the Nigerian context, religion is an integral part of everyday life and, along with its physiological anxiety-reducing effects, religious music can provide spiritual comfort as well. The substantial preference for religious music aligns with the findings of Atukasi et al. (2022) concerning the importance of culturally appropriate interventions in hospitals in Nigeria. Also, patient-selected music (46.0%) is indicative of individual choice and autonomy, which is the basic principle of patient-centered care. The minuscule preference for natural sounds (4.4%) and instrumental music (1.8%) can be due to the participants' cultural music preferences or unfamiliarity with these genres.

The decision of 85.8% of the respondents to attribute their relaxation to music clearly indicates that they consider music as an effective relaxation tool. This conclusion is in line with the finding of Mumcu and Aydın (2025) in their randomized controlled experiment where anxiety scores in women who listened to music during HSG were significantly lower than in the control group. Besides, the mechanisms of the human body that are responsible for music's relaxation effect are very well known: music stimulates the production of endorphins, dopamine, serotonin,

and oxytocin—neurochemicals that together have a calming effect and lower stress levels (Chanda & Levitin, 2013; Koelsch, 2014).

Moreover, 77.9% of participants who claimed that their anxiety was alleviated further underlines the view that music has a calming effect during HSG. This result is consistent with Guvenc et al.'s (2020) finding that music intervention was effective in anxiety reduction in women undergoing hysterosalpingography. Nevertheless, the 13.3% who did not report any anxiety reduction and the 8.8% who were uncertain suggest that music therapy may not be effective for everyone. The effectiveness of music may be influenced by factors such as individual differences in musical preferences, baseline anxiety levels, and personal coping strategies (Mitchell & MacDonald, 2006).

The distraction effect of music as reported by 79.6% of the participants is in line with the Gate Control Theory of pain (Melzack & Wall., 1965) which argues for the possibility of non-painful sensory input (e.g music) controlling pain perception by engaging the patient's attention with it rather than pain signals. When patients immerse themselves in music and divert their attention away from the process, they might experience less pain. This finding is in accord with the research of Mok and Wong (2003) who found that music served as a very effective means to divert patients' attention from painful medical procedures.

It is a vivid expression of patient satisfaction in the high rate of strong recommendation (82.3%) along with the music intervention and, therefore, its acceptability and perceived value. This in turn is highly significant to the implementation of sustainability as the intervention appreciated by patients will be more likely to be continued and demanded in the future. On the other hand, the 11.5% of those who would not refer others to music must receive attention. These people may have found music distracting and preferred silence or had another reason of their preference.

This explains why patients should be offered the option of using music or not, thereby appreciating their freedom and personal tastes.

In theoretical terms, the effectiveness of music can be attributed to a number of mechanisms: neurochemical modulation (Chanda and Levitin, 2013), attention deflection (Gate Control Theory), managing emotion, and modifying the environment (turning the clinical setting into a less austere and anxiety-inducing place). Most likely, it is the combination of these processes that accounts for the huge improvement observed in this study.

The predominance of pain as the major concern (38.1%) is in line with a large body of significant research that describes HSG as a painful procedure (Szymusik et al., 2015; Adeyekun et al., 2023). This finding reiterates the frequent evaluation of HSG as an unpleasant experience and hence emphasizes the necessity for thorough pain relief measures. The considerable prevalence of pain as a concern also accounts for the increased nervousness about procedure pain as shown in Table 3 (47.8% with moderate to very high nervousness).

Pain during HSG may be due to various reasons: cervical manipulation during catheter insertion, uterine distension due to contrast medium injection, tubal spasm, and peritoneal irritation caused by the leakage of contrast into the peritoneal cavity (Guvenc et al., 2020).

Each person's pain threshold varies and psychological aspects especially fear can significantly contribute to the sensation of pain (Adeyekun et al., 2023). According to Tokmak et al. (2015), there was a direct correlation between fear of the procedure and post-procedural pain therefore, showing the pain-anxiety relationship is mutual.

The fact that most concerned about test results are 22.1 percent is a definite reflection of the psychological weight heavier than the physical pain. Among infertile women investigation, the result of HSG will not only make their life objectives different, but also influence their

relationship and self-concept. Simply the thought of receiving bad news (e.g. bilateral tubal occlusion) may create much anxious anticipation. Handelzalts et al. (2016) maintained that HSG is not only a diagnostic procedure but also a psychologically relevant event of the infertility process, usually is a moment of truth about the possibility of reproduction.

The issue of device (9.7%) and potential harm (9.7%) imply that individuals may be apprehensive about the invasive nature of the process.. Speculums, catheters and others equipments may become a source of apprehension particularly to those undergoing the process for the first time and they do not know what to expect. What may increase these concerns are what they have heard or as they have read on the Internet. Erkilinc et al. (2018) observed that the anxiety level was very much less when individuals were informed in a visual way about the method and instruments used, thereby implying that familiarization can serve to mitigate these worries.

The 8.9% who were worried about overcrowding (categorized as "plenty of people") probably indicates that they were concerned about their privacy, dignity, and the teaching hospital setting where students or a large number of healthcare providers may be present. In many healthcare facilities in Africa, privacy is often compromised due to the lack of resources and the demands of training (Mohammad et al., 2017). This concern is a strong argument for the need to not only preserve patient dignity but also to make sure there are no unnecessary people in the examination room.

General fear (7.1%) and fear of the unknown (4.4%) are examples of undifferentiated anxiety that might result from lack of information or from the person's psychological makeup. These results point to the need for thorough preprocedural education and counseling. La Fianza et al. (2014) found that even one structured session of counseling greatly alleviated such undefined

anxiety through giving concrete knowledge that replaced vague worries with specific, manageable ones.

They feared barefacedness on such breadth of fears (physical, emotional, environmental, and informational) which demonstrates that the anxiety was not only complex but it needed a very intricate and individual approach to work through it. An integrated approach that consists of pain relief, emotional support, information provision, privacy, and anxiety relief. (via means such as music therapy) is needed to maximize the experience of HSG in the patient.

CHAPTER FIVE

CONCLUSION, RECOMMENDATIONS, LIMITATIONS, AND SUGGESTIONS FOR FURTHER STUDIES

5.1 Introduction

This chapter presents a summary of the study findings, draws conclusions based on the research objectives, offers recommendations for clinical practice and policy, acknowledges study limitations, and proposes directions for future research.

5.2 Conclusion

In addressing the primary aim of evaluating anxiety and stress levels among patients undergoing HSG at UBTH and Raytouch Diagnostic Center, this study confirms that HSG-related anxiety remains a significant clinical concern despite relatively good patient knowledge and effective healthcare provider communication. Women undergoing HSG at the study sites demonstrated relatively good procedural knowledge, with 85% receiving preprocedural information and 80.5% understanding its purpose, though gaps remained as 19.5% did not understand why HSG is performed and 25.7% received no explanation. Despite this knowledge and generally effective healthcare provider communication—with 84.1% reporting clear explanations, 91.2% respectful treatment, and 86.7% active listening—substantial anxiety persisted, as more than half experienced moderate to high tension (58.4%), 47.8% were nervous about pain, and 44.3% worried about results, with pain being the predominant concern (38.1%). However, music intervention proved highly effective in addressing this anxiety, with 85.8% feeling more relaxed, 77.9% experiencing reduced anxiety, 79.6% being distracted from the procedure, and 82.3% willing to recommend it, suggesting that while knowledge and communication are valuable, a different approach incorporating non-pharmacological interventions like music—particularly

religious and patient-chosen music via headphones—represents a simple, low-cost strategy that should be considered a standard component of HSG protocols to significantly enhance patient comfort.

5.3 Recommendations

According to the results of the study, the following are the main recommendations:

1. **Make Music Therapy Standard Practices**: Music therapy was effective, safe and affordable and well accepted by patients. It should be offered to all HSG patients as part of routine care, not as an optional extra.
2. **Improve Patient Education:** While 85% received adequate information, we need to close that 15% gap. Develop simple educational videos and brochures that patients can access before their appointment. Every patient deserves to know what to expect, including realistic information about pain and available management options.
3. **Strengthen Pain Management:** Pain was the most important issue among the 38% of patients, it need better protocols. This implies taking preventive pain medication, using gentle techniques and smaller catheters whenever feasible, and integrating medical strategies and non-pharmacological interventions, such as music and relaxation. Above all, allow patients to indicate when they need a break.
4. **Train Staff in Better Communication:** Even though 84% felt communication was clear, there's room to improve. Regular training should focus on empathy, active listening, and creating an environment where patients feel comfortable asking questions. Staff need skills to address emotional concerns, not just provide technical information.

5. **Protect Patient Privacy and Dignity:** Nearly 9% worried about crowded rooms. Keep unnecessary personnel out, use proper draping, and always get consent before bringing in students or observers. Small changes here make a big difference in patient comfort.
6. **Support Ongoing Quality Improvement:** Hospitals should regularly survey patients about their experiences, track anxiety levels, and use this feedback to keep improving. Allocate resources for equipment, materials, and staff training. This isn't a one-time fix—it requires sustained commitment.

5.4 Limitations of The Study

1. This was a cross-sectional study - we only looked at patients at one point in time, not how their anxiety changed before, during, and after the procedure. Also, since everyone got music therapy, we can't definitively prove it was the music that helped versus just the relief of finishing the procedure or other factors.
2. We used convenience sampling from two facilities in Benin City, which limits how widely we can apply these findings.
3. Everything was based on what patients told us, which can be influenced by what they think we want to hear (self-report bias). We didn't use standardized anxiety scales or objective measures like heart rate or blood pressure that could have backed up what patients reported. We also didn't track anxiety at multiple time points to see the full picture.
4. We identified pain as a major concern but didn't actually measure how much pain patients experienced during the procedure. We also didn't account for differences between healthcare providers—some might naturally be better at calming patients than others. And there was no follow-up to see if benefits lasted after patients went home.

5. These findings come from well-resourced urban hospitals. What works here might not work in rural clinics with fewer resources. Cultural factors specific to Nigeria (like the strong preference for religious music) might not apply elsewhere.

5.5 Suggestions for further studies

1. **Do Proper Randomized Trials** Compare music versus no music, different types of music against each other, and music combined with other interventions like counseling or virtual reality. This would tell us what actually works and what works best.
2. **Follow Patients Over Time** Track women from their first consultation through the procedure and months afterward. Does managing anxiety during HSG affect whether they continue with fertility treatment? Does it impact their mental health long-term? These are important questions we couldn't answer.
3. **Study Different Groups of Women** We need research that includes women with primary and secondary education, women from rural areas, different age groups, and those from various cultural backgrounds. Does anxiety look different for a 25-year-old versus a 40-year-old? For someone having their first HSG versus their third?
4. **Understand How It Actually Works** Use heart rate monitors, blood pressure cuffs, and even brain imaging to see what's physically happening when music reduces anxiety. Does it actually lower stress hormones? Does it change how the brain processes pain?
5. **Figure Out the Pain-Anxiety Connection** We found pain is the biggest concern, but how exactly do pain and anxiety feed into each other? If we reduce anxiety beforehand, does the procedure actually hurt less, or does it just feel more manageable?

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APPENDIX I

Questionnaire for Women Undergoing Hysterosalpingography Procedures in Benin city

Section A: Demographic Information

1. Age:

☐ 18–24 years ☐ 25–29 years ☐ 30–34 years ☐ 35–39 years ☐ 40 years and above

2. Marital Status:

☐ Single ☐ Married ☐ Divorced ☐ Widowed

3. Educational Level:

☐ Primary ☐ Secondary ☐ Tertiary ☐ Postgraduate

4. Occupation:

☐ Unemployed ☐ Self-employed ☐ Civil Servant ☐ Others (specify) _____

5. Have you done HSG before?

☐ Yes ☐ No

Section B: Knowledge of HSG

1. Did you receive information about the HSG procedure beforehand? □ Yes □ No

2. If yes, what type? □ Verbal explanation □ Pamphlet/brochure □ Video □ Mobile message □ Other: _____

3. Do you know why HSG is usually done?

☐ Yes ☐ No ☐ Not Sure

4. Did any doctor, nurse, or radiographer explain HSG to you before your appointment?

☐ Yes ☐ No ☐ Not Sure

5. Do you think HSG can help doctors understand some causes of infertility in women?

☐ Yes ☐ No ☐ Not Sure

Section C: Patient Anxiety and Stress Levels

(Please tick the option that best shows how you feel before and during the procedure.)

1. I feel calm about this procedure.

☐ Not at all ☐ A little ☐ Moderate ☐ Very much

2. I feel tense during the procedure.

☐ Not at all ☐ A little ☐ Moderate ☐ Very much

3. I am worried about the result of this test.

☐ Not at all ☐ A little ☐ Moderate ☐ Very much

4. I feel nervous about pain during the test.

☐ Not at all ☐ A little ☐ Moderate ☐ Very much

5. Thinking about infertility makes me more anxious during HSG.

☐ Not at all ☐ A little ☐ Moderate ☐ Very much

Section D: Communication with Healthcare Providers

1. Did the healthcare worker explain the HSG test clearly to you?

☐ Yes ☐ No ☐ Not Sure

2. Were you allowed to ask questions before the test?

☐ Yes ☐ No ☐ Not Sure

3. Did the healthcare worker treat you with respect?

☐ Yes ☐ No ☐ Not Sure

4. Did the healthcare worker listen to your worries?

☐ Yes ☐ No ☐ Not Sure

5. Did the way the healthcare worker spoke with you help reduce your fear or worry?

☐ Yes ☐ No ☐ Not Sure

Section E: Experiences with Music Intervention

1. Were you given music to listen to during the HSG test?

☐ Yes ☐ No ☐ Not Sure

2.If music was used how was it delivered? □ Headphones □ Speaker □ VR headset □ Not applicable

3. If you listened to music, what type? □ Patient-chosen □ Instrumental □ Religious □ Nature sounds □ Other: _____

4. Did the music make you feel more relaxed?

☐ Yes ☐ No ☐ Not Sure

5. Did the music help reduce your anxiety during the procedure?

☐ Yes ☐ No ☐ Not Sure

6. Did the music take your mind off the procedure?

☐ Yes ☐ No ☐ Not Sure

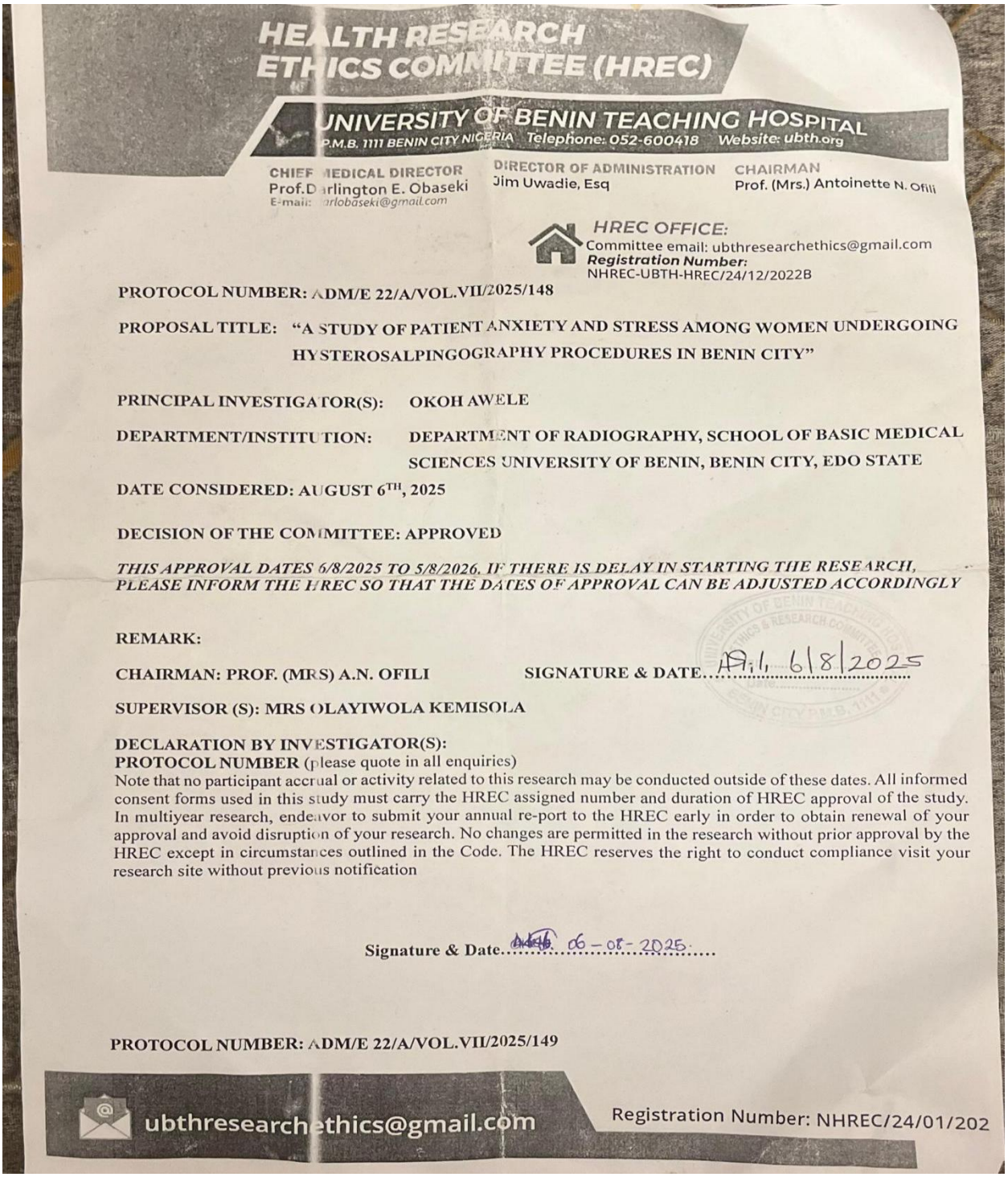
7.What worried you most about the procedure? _____

8. Would you advise that other patients should also have music during HSG?

☐ Yes ☐ No ☐ Not Sure

THANK YOU FOR PARTICIPATING

APPENDIX II



HEALTH RESEARCH ETHICS COMMITTEE (HREC)

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NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/148

PROPOSAL TITLE: "A STUDY OF PATIENT ANXIETY AND STRESS AMONG WOMEN UNDERGOING HYSTEROSALPINGOGRAPHY PROCEDURES IN BENIN CITY"

PRINCIPAL INVESTIGATOR(S): OKOH AWELE

DEPARTMENT/INSTITUTION: DEPARTMENT OF RADIOGRAPHY, SCHOOL OF BASIC MEDICAL SCIENCES UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

DATE CONSIDERED: AUGUST 6TH, 2025

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 6/8/2025 TO 5/8/2026. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI **SIGNATURE & DATE**..... 6/8/2025

SUPERVISOR (S): MRS OLAYIWOLA KEMISOLA

DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification

Signature & Date..... 06-08-2025.....

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/149

ubthresearchethics@gmail.com Registration Number: NHREC/24/01/202