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Incidence of Urinary Tract Infections Among Pregnant Women and Its Risk Factors in The Municipality of Baao, Camarines Sur: A Hidden Danger Lurking in Pregnancy

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RESEARCH ARTICLE

Abstract

This case presentation investigates the prevalence of urinary tract infections (UTIs) among pregnant women in the Municipality of Baao, Camarines Sur, Philippines, from February 2022 to November 2023. Urinary Tract Infections (UTIs) are a common concern among pregnant women globally, with up to 15% affected during pregnancy. UTIs, even without symptoms, are linked to adverse pregnancy outcomes like preterm birth, low birth weight, and neonatal death. With that, this research was conducted to understand the incidence of UTIs, develop effective strategies for prevention and treatment, and improve maternal and neonatal health outcomes. In this paper, 497 women were tested for urine analysis, of which 242 were pregnant. The data collection process involved reviewing Individual Treatment Records, Laboratory Records, and Logbooks from the Rural Health Unit of Baao. The incidence of UTIs among pregnant women was found to be 45%. The most common risk factors for UTIs were a history of UTIs, diabetes mellitus, and multiple sexual partners. The clinical presentation of UTIs included symptoms such as dysuria, frequency, urgency, and hematuria. Based on the study's findings, raising awareness among pregnant women about the importance of regular prenatal care is recommended to reduce the incidence of UTIs. There should be an emphasis on implementing tailored educational programs that provide comprehensive information about hygiene practices, including proper sanitation and personal hygiene, to pregnant women with lower educational attainment. Healthcare providers should also integrate routine UTI screenings into prenatal care packages, emphasizing the second trimester, as this is the most susceptible period to UTIs due to hormonal changes and anatomical adaptations in the urinary system. Furthermore, healthcare providers should tailor their approaches for older pregnant women (age 20 and above) by educating them about the increased risk of UTIs and the importance of proactive preventive measures. Lastly, interventions should be designed to specifically target women with multiple pregnancies by providing them with the necessary support and resources, such as organizing support groups or educational sessions, to address the unique challenges they face, including the increased risk of UTIs. Conclusively, this study contributes to understanding UTIs among pregnant women and provides implications and recommendations for better maternal and neonatal health in the Municipality of Baao and beyond.

Keywords: Urinary Tract Infection, Pregnancy Complications, Maternal Health, Child Health, Incidence Small Business Management, Business Management, Local Café Businesses, Training Manual

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1 INTRODUCTION

Urinary tract infection (UTI) is a common infection in women, and it is more likely to occur during pregnancy due to mechanical and hormonal changes in pregnant women. UTIs during pregnancy can cause complications for both mother and fetus (Osman et al., 2023). For the mother, UTIs can lead to pyelonephritis, a severe kidney infection that can require hospitalization. It can also cause anemia, sepsis, and, in rare cases, renal failure (Afzal, 2019). For the fetus, maternal UTIs have been associated with low birth weight, preterm birth, and, in severe untreated cases, neonatal death (Tud & Millar-Aquino, 2018). These adverse outcomes are thought to be due to the body's inflammatory response to infection, which can trigger early labor or affect fetal growth within the womb. Furthermore, a study by Salari et al. (2023) showed that the global prevalence of urinary tract infections (UTIs) in pregnant women has been reported to be approximately 23.9%, involving 30,641 pregnant women. Additionally, in the Philippines, a specific study conducted at a tertiary hospital in Manila reported a prevalence of 15.6% among pregnant patients receiving prenatal care. The most common isolates were still *E. coli* and *Staphylococcus*. Symptoms did not reflect the presence of UTI, and previous prenatal care did not affect the presence of UTI (Tud & Millar-Aquino, 2018). These studies emphasized the importance of early detection and treatment of UTIs during pregnancy, as symptoms may not always be indicative of an infection, and immediate intervention can mitigate potential complications for both the mother and the fetus.

With these, understanding the prevalence of UTIs in pregnant women is essential for developing effective prevention and treatment strategies and improving maternal and neonatal health. Knowing the prevalence of UTIs can help healthcare providers develop and tailor prevention programs for pregnant women. This could include educational campaigns about UTI symptoms and risk factors and encouraging routine prenatal care and urine testing. Understanding the prevalence of different bacterial strains causing UTIs in pregnant women can also guide the development of optimal treatment protocols. This is important for ensuring effective treatment and reducing the risk of complications. Studying the prevalence of UTIs over time further allows us to monitor trends and identify any changes. This can help us identify potential emerging risks and ensure that prevention and treatment strategies remain effective. Additionally, analyzing disparities in UTI prevalence between different demographic groups can help us address healthcare access and outcomes inequalities.

This case presentation aims to determine the prevalence of UTIs among pregnant women in the Municipality of Baao from February 2022 to November 2023. In the Municipality of Baao, UTIs are among the leading causes of morbidity among women. Studying the prevalence of UTIs in pregnant women is essential to developing and implementing effective interventions to prevent UTIs, improve treatment, and, at length, contribute to a healthier future for all families, especially in the Municipality of Baao, Camarines Sur.

2 METHODOLOGY

This study was conducted through quantitative research because it emphasizes the data collection on UTI diagnoses and potential risk factors from medical records and laboratory reports. The proposed analysis involves calculating incidence rates and quantifying UTIs' incidence and risk factors to provide context and a richer understanding.

2.1 Participants

The participants in this study were recruited from the target population of pregnant women in the Municipality of Baao. A total of 497 women were included as participants in the study. To reach the desired number of respondents, the researcher utilized stratified sampling, which involves dividing the population into distinct groups or strata based on relevant characteristics. In this case, the characteristics considered were age group, educational status, and pregnancy status.

2.2 Data Gathering

The Rural Health Unit (RHU) of Baao has a functional laboratory conducting laboratory tests like urine analysis (Baao, 2023). The primary data collection used in this research were the Individual Treatment Records, Laboratory Records, and Logbooks of the Rural Health Unit of Baao from February 2022 to November 2023, with permission from the charge personnel. Data were collected, ensuring proper recording techniques and data quality standards. The recorded data were reviewed for completeness, accuracy, and consistency. To maintain data security, the researcher observed proper storage and access controls for the collected data, especially when dealing with sensitive information.

Urine analysis is conducted at the request of the municipal health officer or any healthcare provider for patients with symptoms of urinary tract infection. This procedure is also being performed as part of the package (Buntis Package) given to pregnant women in their second to third trimester. Urine samples are being collected midstream clean-catch urine samples from all participants with proper label samples with participant ID and collection date. The municipal medical technologist will perform the laboratory analysis. Urinalysis on each sample is performed using Physical examination (color, clarity, specific gravity), Chemical examination (pH, protein, glucose, blood, ketones), and Microscopic examination (red blood cells, white blood cells, bacteria, casts). Results are being recorded and released by the medical technologists.

2.3 Data Analysis

The data collected were summarized to give a basic overview of the data using descriptive statistics. The data were organized in a database, incorporating logbooks and information on treatment records. The researcher used the percentage technique to express the incidence of urinary tract infection (UTI) among pregnant women and its associated risk factors. The formula used to calculate percentages was:

$$\text{Percentage} = (\text{Number of cases in a category} / \text{Total number of cases}) * 100$$

The researcher then calculated the percentage of pregnant women with UTI in different categories such as age group, educational status, trimester of pregnancy, number of pregnancies, and referral for the Buntis Package. The findings were then visually represented using charts and graphs for easier understanding

2.4 Ethical Consideration

The research was conducted with ethical considerations in mind. Collected data using logbooks and medical records were performed with inherent ethical considerations due to the sensitive nature of the information involved. Strict confidentiality of all data collected was maintained. Anonymizing and de-identifying data was done to protect the patient's privacy. The limitations of the study and the potential risks that may be associated with them were communicated.

3 RESULTS AND DISCUSSION

Table 1 below shows the total number of urinalysis tests conducted from February 2022 to November 2023 in the Rural Health Unit of Baao, Camarines Sur. Of the 497 tests conducted on females, 299 were diagnosed with urinary tract infections (UTIs). Among those diagnosed with UTIs, 242 were pregnant, accounting for approximately 81% of the total. The high percentage of pregnant women diagnosed with UTIs indicates that this group is particularly vulnerable to urinary tract infections. Pregnancy can lead to physiological changes in the urinary system, such as increased bladder pressure and hormonal fluctuations, which can increase the risk of developing UTIs (Points, n.d.). The findings highlight the importance of regular pre-natal check-ups to conduct urinalysis screenings for pregnant women to detect and manage UTIs promptly. Early identification and treatment of UTIs in pregnancy are crucial to prevent complications that could affect both the mother and the developing fetus.

Table 1. Total number of performed urinalysis from February 2022 to November 2023)

SEX	TOTAL URINALYSIS DONE	DIAGNOSED WITH UTI	PREGNANT	Percentage
FEMALE	497	299	242	0.81

Source: Rural Health Unit of Baao, Camarines Sur, ITRs & Laboratory Records and Logbooks, February 2022- November 2023

Table 2 provides the breakdown of pregnant women who tested positive for UTIs according to different age groups. Among the age groups specified, no pregnant women between 10 and 14 were diagnosed with UTIs. However, 16 out of the 242 pregnant women (7%) in the age group 15-19 years old tested positive for UTIs. The majority of UTI cases (226 out of 242 or 93%) were found in pregnant women aged 20 years and above. These findings suggest that the risk of UTIs increases with age during pregnancy. The higher prevalence of UTIs among pregnant women aged 20 years and above is attributed to the factor that as women get older, they have a higher likelihood of exposure to potential UTI-causing pathogens due to sexual activity or other factors (Matalaka, 2019). Additionally, physiological changes in the urinary tract during pregnancy, such as decreased bladder tone and increased urine retention, contribute to the increased susceptibility to UTIs in older pregnant women (Kashif et al., 2021).

Table 2. Pregnant Women Tested Positive with UTI per Age Group

AGE GROUP	NUMBER OF PREGNANT WOMEN
10-14 years old	0
15-19 years old	16
20 years old and above	226

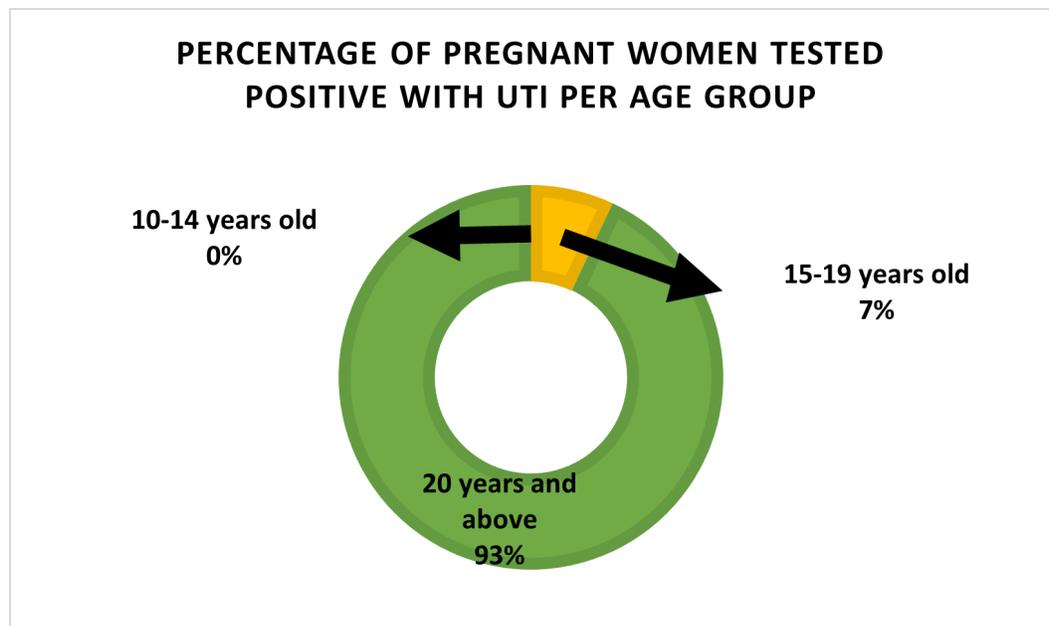


Figure 1. Percentage of Pregnant Women Tested Positive with UTI per Age Group

Source: Rural Health Unit of Baao, Camarines Sur, ITRs & Laboratory Records and Logbooks, February 2022- November 2023

Table 3 presents the educational status of pregnant women who tested positive for UTIs. Among the educational statuses provided, high school graduates accounted for the highest number of UTI cases (168 out of 497, or 33.8%). This was followed by college graduates (46 out of 497, or 9.3%) and elementary graduates (28 out of 497, or 5.6%). The educational status of pregnant women reflects their awareness and understanding of hygiene practices, which could potentially impact the likelihood of developing UTIs. Women with higher educational attainment, such as high school and college graduates, appear to have a higher prevalence of UTIs compared to those with lower educational backgrounds, such as elementary graduates [Navarro et al. \(2019\)](#). This indicates that education can play a role in raising awareness about hygiene practices, including proper sanitation, personal hygiene, and the importance of urinary health. Thus, higher education levels indicate a better understanding of these practices and a higher likelihood of implementing preventive measures to reduce the risk of UTIs.

Table 3. Educational Status of Pregnant Women Tested Positive with UTI

EDUCATIONAL STATUS	NUMBER OF PREGNANT WOMEN
Elementary Graduate	28
High School Graduate	168
College Graduate	46

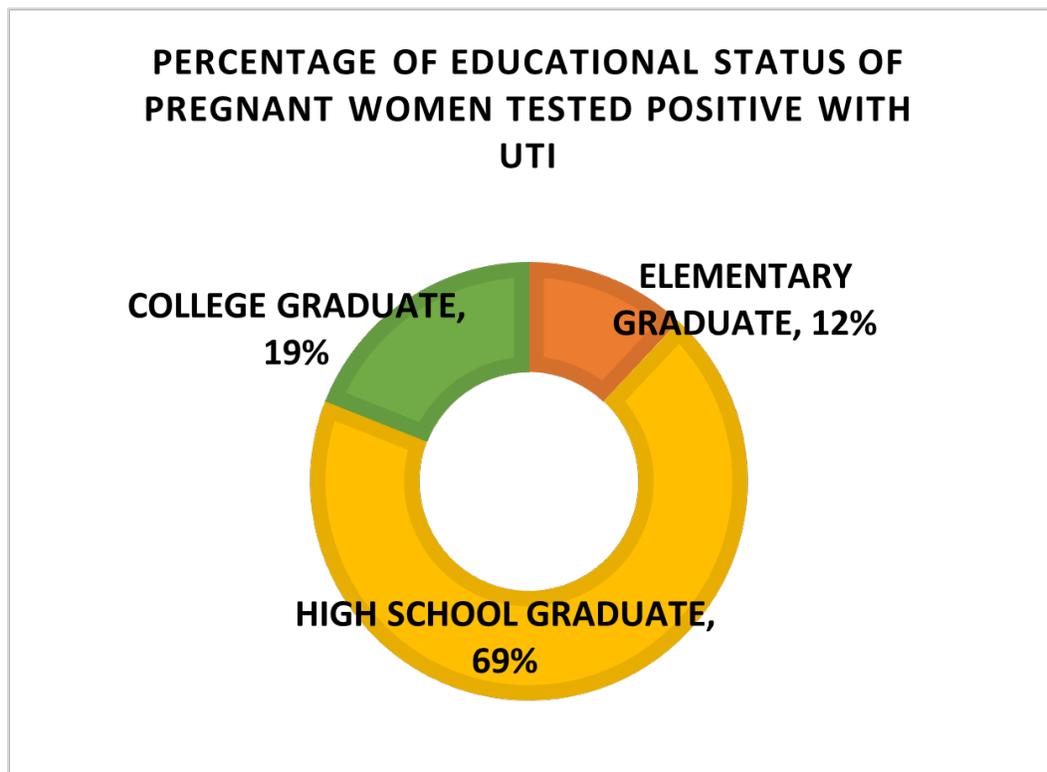


Figure 2. Percentage of Educational Status of Pregnant Women Tested Positive with UTI

Source: Rural Health Unit of Baao, Camarines Sur, ITRs & Laboratory Records and Logbooks, February 2022- November 2023

Table 4 displays the distribution of pregnant women with UTIs based on their gestation age. None of the UTI cases were found in the first trimester, while the majority (213 out of 497, or 42.8%) occurred in the second trimester. A smaller proportion of UTI cases (29 out of 497, or 5.8%) were diagnosed in the third trimester. These findings suggest that pregnant women in their second trimester are more susceptible to UTIs compared to other stages of pregnancy. During the second trimester, hormonal changes and anatomical adaptations in the urinary system increase the risk of UTIs Myles et al. (2020). For instance, the growing uterus can exert pressure on the bladder, leading to incomplete emptying and stagnant urine, which can facilitate bacterial growth and infection (Shagana et al., 2018). Additionally, hormonal changes affect the immune response and make pregnant women more susceptible to UTIs (Lateef et al., 2020).

Table 4. Age of Gestation of Pregnant Women Tested Positive with UTI

AGE OF GESTATION	NUMBER OF PREGNANT WOMEN
First Trimester	0
Second Trimester	213
Third Trimester	29

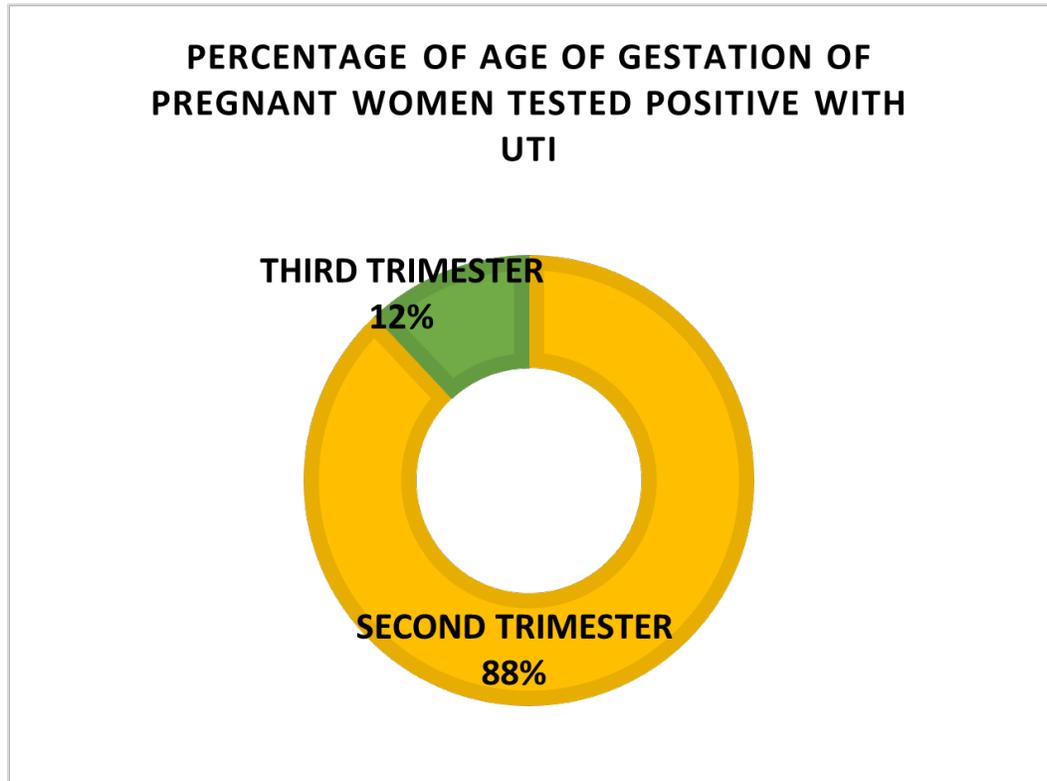


Figure 3. Percentage of Age of Gestation of Pregnant Women Tested Positive with UTI

Source: Rural Health Unit of Baao, Camarines Sur, ITRs & Laboratory Records and Logbooks, February 2022- November 2023

Table 5 provides information on the parity of pregnant women diagnosed with UTIs. Among the specified categories, pregnant women with 2-4 pregnancies had the highest number of UTI cases (174 out of 497, or 35%). Pregnant women with five or more pregnancies accounted for 47 out of 497 cases (9.5%), while those with only one pregnancy represented 21 out of 497 cases (4.2%).

These findings suggest a relationship between parity and the likelihood of developing UTIs during pregnancy. Pregnant women who have had multiple pregnancies. Specifically, 2-4 pregnancies appear to have a higher prevalence of UTIs than those with fewer pregnancies or those with a higher number of pregnancies (5 or more) (Johnson et al., 2021). With multiple pregnancies, cumulative physiological changes in the urinary tract increase susceptibility to UTIs (Cohen et al., 2019). Additionally, lifestyle factors, such as sexual activity or hygiene practices, differ among women with varying parity that further influences the risk of UTIs (Ema, 2018).

Table 5. A parity of Pregnant Women Tested Positive with UTI

PARITY	NUMBER OF PREGNANT WOMEN
1 Pregnancy	21
2-4 Pregnancies	174
Five and above Pregnancies	47

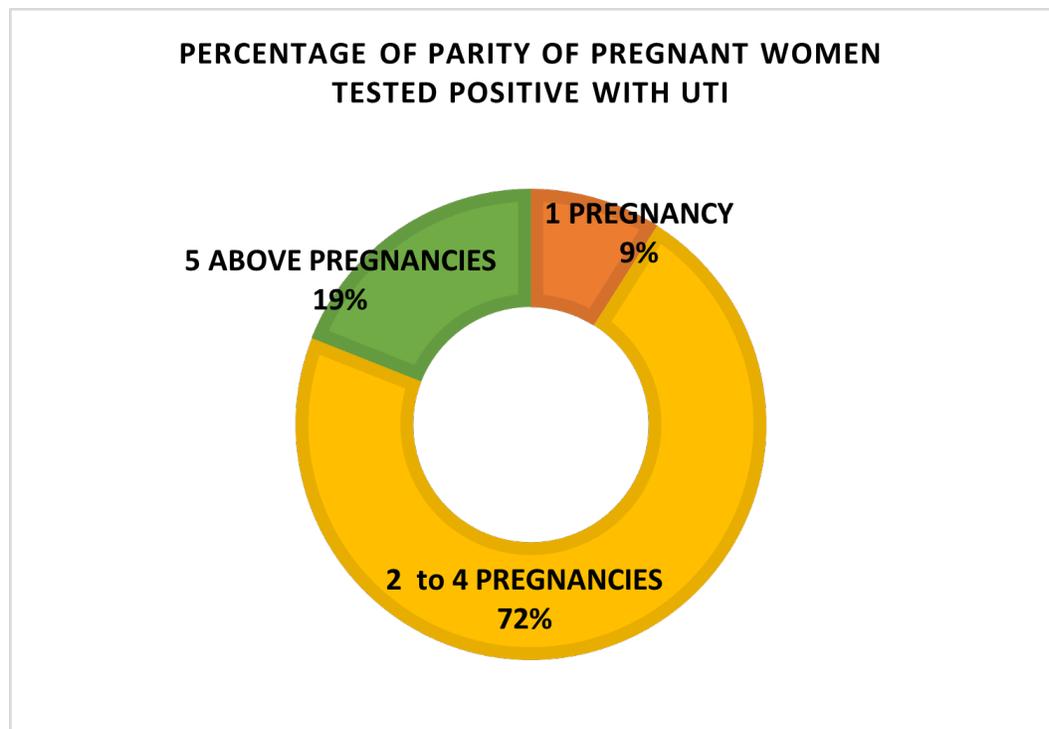


Figure 4. Percentage of Parity of Pregnant Women Tested Positive with UTI

Source: Rural Health Unit of Baao, Camarines Sur, ITRs & Laboratory Records and Logbooks, February 2022- November 2023

Table 6 provides information on why pregnant women were tested for UTIs. It indicates that among the specified reasons, the majority of pregnant women (174 out of 497, or 35%) were referred for the "Buntis Package." The Buntis Package includes routine testing for various pregnancy-related health conditions, including UTIs. This suggests that healthcare providers proactively screen pregnant women for UTIs as part of their comprehensive prenatal care (Morado & Wong, 2022). Additionally, 21 out of 497 pregnant women (4.2%) were tested for UTIs due to the presence of symptoms. These symptoms include a burning sensation during urination, frequent urination, cloudy or strong-smelling urine, or lower abdominal pain, which are commonly associated with UTIs. The fact that a significant number of pregnant women sought medical attention for UTI-

related concerns is encouraging, as it indicates that they were proactive in addressing potential health issues during pregnancy.

Table 6. Reasons for Pregnant Women

REASONS	NUMBER OF PREGNANT WOMEN
With Symptoms	21
Referred for Buntis Package	174

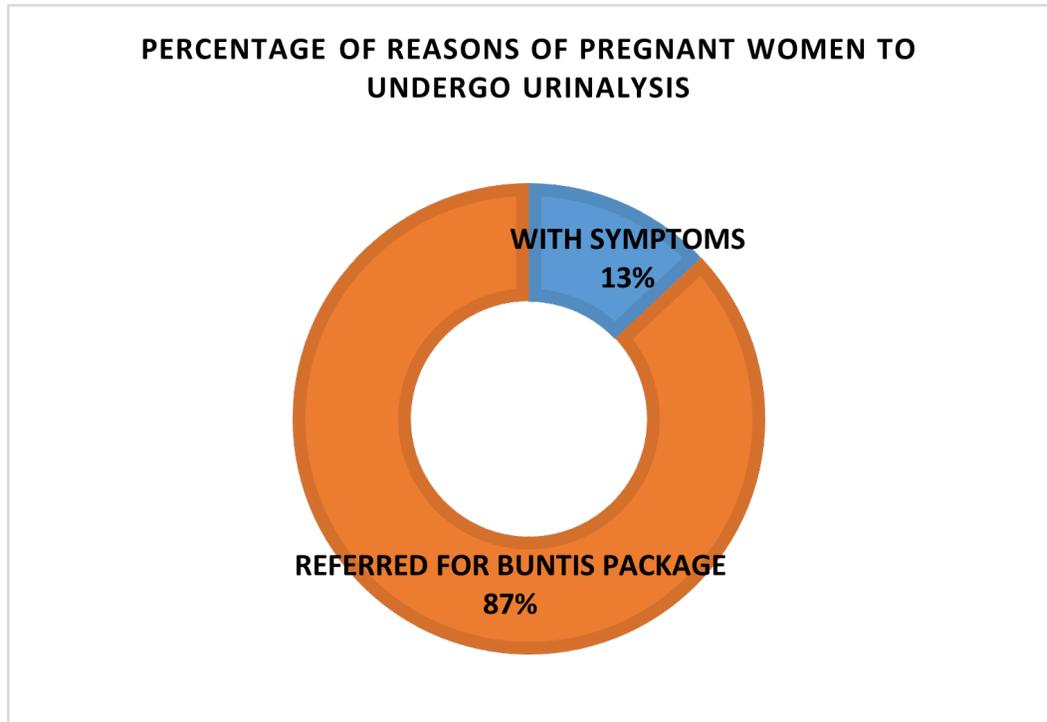


Figure 5. Percentage of Reasons for Pregnant Women

Source: Rural Health Unit of Baao, Camarines Sur, ITRs & Laboratory Records and Logbooks, February 2022- November 2023

4 CONCLUSION

The study found that a high percentage of pregnant women, approximately 81% of those diagnosed with UTIs, were pregnant. This highlights the importance of regular pre-natal check-ups to perform urinalysis screenings for pregnant women to detect and manage UTIs promptly. The findings also indicate that the risk of UTIs increases with age during pregnancy, with the majority of cases occurring in pregnant women aged 20 years and above. Additionally, the educational status of pregnant women was found to be associated with the prevalence of UTIs, with higher educational attainment suggesting a better understanding of hygiene practices and a higher likelihood of implementing preventive measures. The second trimester of pregnancy was identified as a period of increased susceptibility to UTIs due to hormonal changes and anatomical adaptations in the urinary system. Furthermore, parity was found to be correlated with the likelihood of developing UTIs during pregnancy, with women who had multiple pregnancies having a higher prevalence of UTIs. The high prevalence of urinary tract infections (UTIs) among pregnant women in the Baao, Camarines Sur region of the Philippines indicates the need for targeted interventions. One identified barrier is the association between educational status

and UTI prevalence. To address this barrier, tailored educational programs should be developed and implemented. These programs should provide comprehensive information about hygiene practices, including proper sanitation and personal hygiene, to pregnant women with lower educational attainment so they can adopt preventive measures and reduce the risk of UTIs.

Another barrier identified is the increased susceptibility to UTIs during the second trimester of pregnancy. Healthcare providers should integrate routine UTI screenings into prenatal care packages to address this, particularly emphasizing the second trimester. Through this, UTIs can be detected early and managed promptly. Strengthening prenatal care packages to include regular UTI screenings will ensure that pregnant women receive necessary and timely medical attention. Moreover, the association between age and the prevalence of UTI suggests the need for age-specific interventions. Healthcare providers should tailor their approaches based on the age group of pregnant women. For instance, for older pregnant women (age 20 and above), additional emphasis should be placed on educating them about the increased risk of UTIs and the importance of proactive preventive measures and also addressing the specific needs and vulnerabilities of pregnant women in different age groups. Furthermore, the correlation between parity and UTI prevalence highlights the importance of addressing the needs of women with multiple pregnancies. Interventions should be designed to specifically target this subgroup and provide them with the necessary support and resources, such as organizing support groups or educational sessions that address the unique challenges faced by women with multiple pregnancies, including the increased risk of UTIs. By implementing these specific recommendations, healthcare providers can overcome the identified barriers and make significant strides in reducing the prevalence and impact of UTIs among pregnant women in the Philippines Baao, Camarines Sur region.

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