Pregnant Women's Knowledge and Awareness of Sexually Transmitted Infections in Selected Public Health Facilities in the North West Province

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Abstract

Background: South Africa is considered to have a high prevalence of sexually transmitted infections (STIs), which continue to impose a major public health burden. Untreated STIs can lead to long-term, irreversible and potentially fatal outcomes in pregnant women. This study aimed to assess the knowledge and awareness of pregnant women in the North West Province (NWP) regarding STIs.

Methods: A quantitative cross-sectional descriptive design was applied to reach the objective. Five health facilities were selected within one district in the NWP. A self-administered 58-item questionnaire was administered to 151 (n = 151) pregnant women and a 100% response rate was achieved. Data were analysed through inferential and descriptive statistics.

Results: The mean knowledge for respondents in this study was 28.35 out of 50 questions. HIV was the most well-known type of STI and trichomoniasis, chlamydia and hepatitis B were the least known. The respondents had the least knowledge regarding transmission of STIs through breastfeeding. Only 21.9% of respondents were aware that STIs could be asymptomatic. Approximately 62.3% of respondents did not know that some STIs could be prevented through vaccination.

Conclusion: There is poor knowledge regarding types of STI and more awareness strategies by health professionals are needed. Socio-demographic aspects was a major contributing factor to the poor knowledge regarding the types of STI and method of transmission.

Keywords: awareness; knowledge; pregnant women; sexually transmitted infections; South Africa

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Introduction and Background

According to the World Health Organization (WHO), sexually transmitted infections (STIs) remain a public health concern with more than one million people getting new infections each day, and at least 4.5 million infections with human immune-deficiency virus (HIV), hepatitis B, and hepatitis C reported each year (WHO 2022). To illustrate the scale of this public health burden, WHO (2025) reported 374.1 million new infections from four STIs: chlamydia (129 million), gonorrhoea (82 million), syphilis (7.1 million) and trichomoniasis (156 million) in 2020. More than 520 million people are estimated to be living with genital herpes simplex virus (HSV) infection, and an estimated 300 million women have a human papillomavirus (HPV) infection, the primary cause of cervical cancer. An estimated 254 million people are living with chronic hepatitis B globally (WHO 2025). Surprisingly, WHO (2025) further reported that approximately 1.1 million pregnant women were infected with syphilis in 2022 alone. Some STIs are transmitted from mother to child during pregnancy, childbirth, breastfeeding and unsafe blood transfusions (WHO 2025). Pregnant women are considered a priority population in the response to HIV, hepatitis and STIs globally.

According to Grant et al. (2020), STIs are associated with an increased risk of poor maternal and neonatal outcomes. Haile et al. (2025) argued that STIs among pregnant women in Africa contribute to significant maternal and perinatal morbidity. The WHO (2025) confirmed that STIs are predominantly spread by sexual contact, including vaginal, anal and oral sex. These include infections such as syphilis, hepatitis B, HIV, chlamydia, gonorrhoea, HSV and HPV. A person can have an STI without having symptoms of the disease. Common symptoms of STIs include vaginal discharge, genital ulcers and abdominal pain.

The Department of Health (2023) reported that 4.9% of women of childbearing age tested positive for the hepatitis B surface antigen (HBsAg), and among these, 24% were also positive for hepatitis B viral protein, reflecting a high rate of positivity. To achieve a reduction in the incidence of four curable STIs (chlamydia, gonorrhoeae, trichomoniasis, and syphilis), the Department of Health (2023) prioritised and implemented interventions to scale up STI prevention by providing high-quality health information. Furthermore, the department through its National Strategic Plan for HIV, TB and STIs (2023–2028) focused on Goal 2 in that plan to adopt a people and community-centred approach to prevention, treatment and care programmes for HIV, TB and STIs. The participatory and inclusive priority actions consider the people and communities as equal partners in the fight against HIV, TB and STIs (Department of Health 2023).

The researchers contend that for the prevention strategy to be effective in any circumstance, the community must have knowledge and must be aware of the infections. In the South African context, there is limited literature on the awareness and knowledge of STIs from the perspective of pregnant women. This study therefore focused on

assessing the knowledge and the awareness concerning STIs among pregnant women in the NWP health facilities.

Research Methods

Research design

A quantitative, cross-sectional descriptive design assisted the researchers to obtain data from a population at a certain point in time and resulted in the data being gathered only once from the specific sample (Figueiredo et al. 2025).

Population and sample

This study was conducted in the NWP of South Africa, in the Dr Kenneth Kaunda (DKK) district; a hospital maternity section as well as four Primary Health Care (PHC) clinics were included. A sample of 151 (n = 151) women who met the inclusion criteria participated, and all of them returned completed questionnaires representing a 100% response rate. The inclusion criteria were pregnant women between the ages of 18 and 49 who were willing to complete the questionnaire. Women who were in labour were excluded. A convenience sampling technique was used to recruit participants (Ahmad and Wilkins 2025). The sample size was determined by the central limit theorem (Singer 2025).

Instrument

The data collection instrument was a pre-tested self-reporting questionnaire (Craig et al. 2025) adapted from Anwar et al. (2010). The STIs knowledge and awareness questionnaire is a 58-item tool with three parts: (1) the socio-demographic aspects section (Part A) has seven items; (2) the knowledge-related section (Part B) consists of five constructs. The first construct has 11 items on types of STI; the second has 12 items on mode of transmission, the third has 11 items on signs and symptoms, the fourth has nine items on prevention and treatment, and the fifth has seven items on the effects of STIs; (3) awareness of STIs (Part C) consists of eight items on the sources by which the respondents were made aware of STIs. The items on Part B have three options, namely “yes”, “no” and “I don't know”. One point was given for a correct answer and zero for an incorrect answer. Ratings were categorised into very poor knowledge (0–20%); poor knowledge (21–40%); average knowledge (41–60%); good knowledge (61–80%) and excellent knowledge (80–100%). The questionnaire was sent to the statistician at the NWP university for evaluation and consequently approved by the ethics review committee.

Ethical considerations

The Research Ethics Committee approved the study, which was a Master’s degree project (NWU-00031-22-S1). The provincial Department of Health granted permission for the study (NW_202204_009) as did the Chief Executive Officer (CEO) and the

District Manager for the PHCs. The study adhered to ethical principles including respect for persons, justice, fairness, autonomy, privacy and confidentiality.

Data collection

Data collection was conducted between October and November 2022; those who were willing to participate signed informed consent forms. Thereafter, respondents were given questionnaires for completion. Completed questionnaires were collected by the ward clerks who put them in a sealed envelope, which was later collected by the researchers.

Data analysis

Inferential statistics was applied as only a representative sample of the population of the respondents would have been selected in healthcare settings (Zlokovich et al. 2023). As the researchers are not experts in statistics, data were analysed with the assistance of a qualified statistician from the university. Statistical Package for Social Services (SPSS) Version 25.0 was used for data analysis. Descriptive statistics was used to summarise the data; bivariate statistics (analysis of variance [ANOVA] and independent T-test) and reliability measures are presented in a table format (Vandever 2020). The Cronbach's alpha values for this study ranged between 0.65–0.85; this is acceptable as it is above the guideline value of 0.7 or at least 0.5 (Muhammad et al. 2020).

Comparative analyses were done by means of crosstabs, seeing that only categorical data resulted from the questionnaire. Effect sizes instead of p-values were used for interpretation purposes because of lack of generalisability. The following guideline values were used for interpretation: 0.2 small or practical non-significant effect, 0.5 medium or practical visible effect and 0.8 large or practical significant effect (Singer 2025; Muhammad et al. 2020).

Results

The results of this study are discussed starting with the socio-demographic aspects and followed by findings from each part of the questionnaire.

Part A: Socio-demographic Aspects

A total of 151 respondents participated in this study. The results of the questionnaires are depicted in Table 1.1.

Table 1.1: Socio-demographic aspects

Variable	Categories / Options	% Respondents
Age	18–25 years	39.1
	26–36 years	51.7
	37–49 years	9.2
	50+ years	0
Months pregnant	0–3 months	10.6
	4–6 months	31.8
	7–9 months	57.6
Previous pregnancies	1–3	90.1
	4–6	8.6
	More than 6	1.3
Antenatal facility	Facility A	19.9
	Facility B	19.9
	Facility C	19.9
	Facility D	19.9
	Facility E	20.5
Employment status	Full-time	24.5
	Part-time	7.9
	Unemployed	52.3
	Student	11.3
	Contract worker	3.3
	Other	0.7
Ethnicity	Black	86.0
	Indian	1.3
	Coloured	11.3
	Asian	0
	White	1.3
	Other	0
Marital status	Single	39.1
	Committed relationship	40.4
	Married	20.5
	Divorced/Separated	0
	Widowed	0
	Other	0

The largest proportion of respondents were between the ages of 26 and 36 (51.7 %) and between 7 and 9 months pregnant (57.6 %). Of the respondents, 90.3 % had 1–3 previous pregnancies, 52.3% were unemployed and 40.4% were in committed relationships. The majority of the respondents were Black at 86.0%; no Asian respondents took part in this study. This might be due to the geographical location in which the study was conducted. The following discussion focuses on the remaining two subscales of the questionnaire.

Part B: Knowledge of STIs (Construct 1)

This section evaluates the knowledge of respondents regarding the types of STI and the results are depicted in Table 1.2.

Table 1.2: Types of STI

	Questions	Correct answer	Correct (%)	Incorrect (%)
1.	Is the human immunodeficiency virus (HIV) an STI?	Yes	73.5	26.5
2.	Is hepatitis B a sexually transmitted infection?	Yes	27.2	72.8
3.	Is syphilis a sexually transmitted infection?	Yes	40.7	59.3
4.	Is human papilloma virus (HPV) a sexually transmitted infection?	Yes	32.0	68.0
5.	Is trichomoniasis a sexually transmitted infection?	Yes	21.2	78.8
6.	Is gonorrhea a sexually transmitted infection?	Yes	30.5	69.5
7.	Is chlamydia a sexually transmitted infection?	Yes	22.5	77.5
8.	Is herpes simplex virus (HSV) a sexually transmitted infection?	Yes	28.5	71.5
9.	Is measles a sexually transmitted infection?	No	62.3	37.7
10.	Is pneumonia a sexually transmitted infection?	No	53.0	47.0
11.	Is tuberculosis a sexually transmitted infection?	No	66.9	33.1

Part B: Knowledge of STIs (Construct 2)

This section evaluates knowledge regarding the transmission of STIs and the results are presented in Table 1.3.

Table 1.3: Mode of transmission of STIs

Questions	Correct answer	Correct (%)	Incorrect (%)
12. Can STIs be transmitted through mosquito bites?	No	70.7	29.3
13. Can STIs be transmitted through sharing food?	No	88.0	12.0
14. Can STIs from an infected mother be transmitted to the unborn baby during pregnancy?	Yes	53.0	47.0
15. Can STIs from an infected mother be transmitted to the newborn baby during delivery?	Yes	38.4	61.6
16. Can STIs be transmitted to the baby during breastfeeding?	Yes	19.9	80.1
17. Can STIs be contracted through shaking hands?	No	80.5	18.5
18. Can showering/washing genitals after sexual intercourse keep a person from contracting STIs?	No	62.3	37.7
19. Can reusing needles increase the risk of transmission of STIs?	Yes	47.0	53.0
20. Can STIs be transmitted through sharing a toothbrush?	No	64.2	35.8
21. Can STIs be transmitted through sharing a toilet with an infected person?	No	31.8	68.2
22. Is unprotected intercourse a mode of transmission for STIs?	Yes	76.2	23.8
23. Can STIs be transmitted through blood transfusion?	Yes	42.4	57.6

In this sub-set, the most correctly answered question was question 13, whereby almost nine out of every 10 respondents were correct (88.0%). The most incorrectly answered question was number 16, with only two out of every 10 respondents getting the question correct at 19.9%. In this section, seven out of 12 questions answered scored above 50% with the remaining five scoring below 50%. That means that a large proportion of respondents have knowledge on mode of transmission of STIs.

Part B: Knowledge of STIs (Construct 3)

This section evaluates the knowledge on the signs and symptoms of STIs and the results are presented in Table 1.4.

Table 1.4: Signs and symptoms of STIs

Signs and symptoms	Correct answer	Correct (%)	Incorrect (%)
24. Headache	No	49.0	51.0
25. Itching on the genitals	Yes	72.8	27.2
26. Abnormal vaginal discharges	Yes	81.5	18.5
27. Coughing	No	69.5	30.5
28. Vomiting	No	60.3	39.7
29. Pain during intercourse	Yes	76.5	23.5
30. Ulcers on the genitals	Yes	44.0	56.0
31. No signs and symptoms	Yes	21.9	78.1
32. Genital warts	Yes	48.3	51.7
33. Lower abdominal pains	Yes	67.5	32.5
34. Burning feeling when urinating	Yes	80.8	19.2

The most correctly answered question was question 34 with 80.8% of the respondents. The most incorrectly answered question was question 31, and only 21.9% of the respondents got the question correct. In this section, seven of the 11 questions answered scored above 50% with the remaining four scoring below 50%. That means that a large proportion of the respondents know about signs and symptoms of STIs.

Part B: Knowledge of STIs (Construct 4)

This section evaluates knowledge regarding prevention and treatment of STIs and results are presented in Table 1.5 below.

Table 1.5: Prevention and treatment of STIs

Questions	Correct answer	Correct (%)	Incorrect (%)
35. Does usage of condoms reduce the risk of contracting STIs?	Yes	76.2	23.8
36. Can STIs be cured?	Yes	82.8	17.2
37. Can having one sexual partner prevent you from contracting STIs?	Yes	51.7	48.3
38. Can one be protected by being vaccinated against some STIs?	Yes	37.7	62.3
39. Getting tested for STIs while pregnant is important.	Yes	90.7	9.3
40. Getting treatment early with your partner is important.	Yes	90.1	9.9
41. Getting treatment with your partner is important.	Yes	92.1	7.9
42. Can syphilis, trichomoniasis, chlamydia and gonorrhea be cured by antibiotics?	Yes	54.3	45.7
43. Is there a cure for HIV?	No	54.3	45.7

The most correctly answered question was 41, in which 92.1% of respondents got the answer correct. It is interesting to note that this was also the most correctly answered question within the whole knowledge section of the questionnaire. The most incorrectly answered question was number 38, where only 37.7% of the respondents answered correctly. In this section, one out of nine questions answered scored below 50% with the remaining eight scoring above 50%. This means that a large proportion of respondents know about prevention and treatment of STIs.

Part B: Knowledge of STIs (Construct 5)

This section evaluates knowledge regarding the effects of STIs; the results are presented in Table 1.6.

Table 1.6: Effects of STIs

Questions	Correct answer	Correct (%)	Incorrect (%)
44. Can STIs cause preterm labour?	Yes	59.6	40.4
45. Can STIs cause birth abnormalities?	Yes	61.6	38.4
46. Can STIs cause foetal or neonatal death?	Yes	47.0	53.0
47. Can STIs cause cervical cancer.	Yes	55.0	45.0
48. Can some STIs cause infertility?	Yes	51.7	48.3
49. Can STIs increase risk of contracting HIV?	Yes	72.2	27.8
50. Can syphilis cause deafness and blindness in newborn?	Yes	53.0	47.0

The most correctly answered question was question 49, where 72.2% of respondents got the answer correct. The most incorrectly answered question was number 46, where slightly less than half of the respondents got the answer correct at 47.0%. In this section, six out of seven questions answered scored above 50% with the remaining one scoring below 50%. This means that the majority of the respondents are aware of the effects of STIs.

Part C: Awareness of STIs

In this part, participants were asked where they obtained information regarding STIs; the results are presented in Table 1.7.

Table 1.7: Awareness of STIs

Participant became aware through the following sources	Percentage (%)
51. Television	78.8
52. Internet	78.8
53. Newspapers	55.0
54. Educational programmes	72.84
55. Parents	55.0
56. Friends	60.26
57. Nurses at the clinic	92.71
58. School	83.44

The total score for respondents on the awareness section showed that the majority became aware of STIs via nurses at the clinic (92.71%) and from the school they were attending (83.44%). This confirms that nurses at the clinics and the school curriculum itself provide some information. The lowest source of information came from the respondents' parents and via newspapers.

Reliability

In this section, the researcher reports on reliability, which represents the consistency of the measuring tool (Jinfu 2024) using Cronbach's alpha. Cronbach's alpha values should be between the guideline values of 0.7 and at least 0.5 (Muhammad et al. 2020). See Table 1.8.

Table 1.8: Reliability of each factor to the number of answered questions

Factor	Questions	Cronbach's alpha	Mean	SD
Types	b1–b11	0.72	4.58	2.59
Mode of transmission	b12–b23	0.65	6.75	2.46
Signs and symptoms	b24–b34	0.74	6.72	2.67
Prevention and treatment	b25–b43	0.65	6.30	1.92
Effects	b45–b50	0.85	4.00	2.47

The reported Cronbach's alpha values ranged between 0.65–0.85, which are within the guideline of 0.7 or at least 0.5 in the early stages of research (Muhammad et al. 2020; Singer 2025). This indicates that the resulting factors are reliable. Factor scores were calculated by averaging the answers within each knowledge section of the questionnaire.

The section on which respondents on average scored the least correct answers was "Types of STI," with an average of 4.58 correct answers (SD = 2.59) out of 11 questions, based on the calculated factor score. The section on which respondents on average scored the most correct answers was "Prevention and treatment of STIs," where respondents had a mean score of 6.30 (SD = 1.92) from nine questions answered correctly. This reflects that respondents were more aware of prevention and treatment strategies of STIs.

Independent T-Tests

The independent T-test determines whether there are differences between two groups of data (Thukral et al. 2023). P-values are reported for completeness but are not interpreted as a convenience sample as a random sample was used. Interpretations are based on effect sizes (Thukral et al. 2023). The author states that there are three categories in which differences will be non-significant, practically visible and practically significant. An effect size of ~0.2 is considered non-significant; an effect size of ~0.5 is considered practically visible and an effect size of ~0.8 is considered practically significant (Thukral et al. 2023).

Table 1.9: Testing for differences between age groups regarding factor scores

Factor name	Age group	N	Mean	Std. Deviation	p-value	Effect size
Types	18–25	59	4.43	2.59	0.58	0.09
	26 and above	92	4.67	2.59		
Transmission	18–25	59	6.30	2.78	0.09	0.26
	26 and above	92	7.03	2.19		
Signs and symptoms	18–25	59	6.29	2.86	0.14	0.24
	26 and above	92	6.98	2.51		
Prevention treatment	18–25	59	6.06	2.18	0.26	0.17
	26 and above	92	6.45	1.73		
Effects	18–25	59	3.79	2.53	0.42	0.13
	26 and above	92	4.13	2.44		

Ages 18–25 and 26 and above were grouped to ensure enough respondents in each grouping. Based on the reported effect sizes (0.09–0.26), there are non-significant differences between two age groups about their knowledge on STIs (See Table 1.9).

Table 1.10: Testing for differences between pregnancy duration groups about factor scores

Factor name	Months Pregnant grouped	N	Mean	Std. Deviation	p-value	Effect size
Types	0–6	64	4.44	2.66	0.58	0.09
	7–9	87	4.68	2.55		
Transmission	0–6	64	6.36	2.61	0.10	0.26
	7–9	87	7.04	2.31		
Signs and symptoms	0–6	64	6.69	2.89	0.91	0.02
	7–9	87	6.74	2.50		
Prevention treatment	0–6	64	6.02	2.09	0.13	0.23
	7–9	87	6.51	1.76		
Effect	0–6	64	3.72	2.59	0.24	0.19
	7–9	87	4.21	2.37		

Respondents in the 0–3 and 4–6 months pregnant groups were combined to ensure enough respondents in each grouping. Based on the reported effect sizes (0.09–0.26), there are also non-significant differences between the two different pregnancy duration (in months) groups about their knowledge on STIs (Table 1.10).

Table 1.11: Differences between number of previous pregnancy and factor scores

Factor name	Number of pregnancies grouped	N	Mean	Std. Deviation	P-value	Effect size
Types of STI	1–3	136	4.58	2.59	0.98	0.01
	More than 3	15	4.60	2.67		
Transmission of STIs	1–3	136	6.81	2.46	0.38	0.25
	More than 3	15	6.20	2.48		
Signs and symptoms of STIs	1–3	136	6.70	2.66	0.83	0.06
	More than 3	15	6.87	2.88		
Prevention and treatment of STIs	1–3	136	6.41	1.82	0.11	0.45
	More than 3	15	5.27	2.52		
Effects of STIs	1–3	136	4.02	2.51	0.71	0.09
	More than 3	15	3.80	2.11		

The difference between respondents who have been pregnant one–three times (Table 1.11) compared to those who had more than three pregnancies leans towards being practically visible (effect size = 0.45) in terms of their mean knowledge of prevention and treatment of STIs. The group that had one–three pregnancies (mean = 6.41, SD = 1.82) had slightly more knowledge than the group that had more than three pregnancies (mean = 5.27, SD = 2.52).

ANOVA

ANOVA assists to characterise the difference between two measures of effect size; it therefore tests whether there are differences between data groups (Wilcox, 2022). P-values in this study are reported for the sake of completeness, but are not interpreted, since a convenience sample instead of a random sample was used. Interpretations are based on effect sizes with guideline values whereby 0.48 is a medium or practical visible difference since it is close to 0.5. An effect size of ~0.20 is considered non-significant while an effect size of ~0.5 is considered practically visible and an effect size of ~0.8 is considered practically significant (Wilcox, 2022).

Table 1.12: Comparison between the employment status and questions answered

	N	Mean	Std Deviation	ANOVA p-value	Wench p-value	Effect size	
						Full-time with…	Unemployed with
Types of STI							
Full time	37	5.2432	2.66047	0.077	0.087	–	–
Unemployed	79	4.1430	2.51884			0.41	–
Part-time, Student, Contract, Other	35	4.8657	2.56251			0.14	0.28
Transmission of STIs							
	N	**Mean**	**Std. Deviation**	**ANOVA p-value**	**Welch p-value**	**Effect size**	
						Full-time with…	**Unemployed with…**
Full time	37	7.4865	2.29276	0.050	0.044	–	–
Unemployed	79	6.3190	2.37886			0.49	–
Part-time, Student, Contract, Other	35	6.9429	2.65621			0.20	0.23
Signs and symptoms of STIs							
	N	**Mean**	**Std. Deviation**	**ANOVA p-value**	**Welch p-value**	**Effect size**	
						Full-time with…	**Unemployed with…**
Full-time	37	7.2162	2.45102	0.124	0.125	–	–
Unemployed	79	6.2937	2.74073			0.34	–
Part-time, Student, Contract, Other	35	7.1429	2.63621			0.03	0.31
Prevention and treatment of STIs							
	N	**Mean**	**Std. Deviation**	**ANOVA p-value**	**Welch p-value**	**Effect size**	
						Full-time with…	**Unemployed with…**
Full-time	37	6.6757	1.54657	0.370	0.296	–	–
Unemployed	79	6.2152	1.88565			0.24	–
Part-time, Student, Contract, Other	35	6.0857	2.31836			0.25	0.06

Effects of STIs							
	N	Mean	Std. Deviation	ANOVA p-value	Welch p-value	Effect size	
						Full-time with…	Unemployed with…
Full-time	37	4.6757	2.14805	0.149	0.115	–	–
Unemployed	79	3.7215	2.63087			0.36	–
Part-time, Student, Contract, Other	35	3.9143	2.34359			0.32	0.07

Based on the reported effect sizes in Table 1.12, the difference between the full-time employed and the unemployed leans towards a practically visible effect (effect size = 0.41) when considering the respective respondents' knowledge regarding the types of STI. The respondents who were full-time employed (mean = 5.2432, SD = 2.66) had slightly more knowledge than the respondents who were unemployed (mean = 4.1430, SD = 2.52); on the results regarding knowledge on the transmission of STIs, the results lean towards a practically visible effect size (effect size = 0.49). The respondents who were full-time employed (mean = 7.49, SD = 2.29) had slightly more knowledge than the respondents who were unemployed (mean = 6.32, SD = 2.38). Furthermore, results between the employment status and knowledge regarding signs and symptoms, prevention and treatment and effects of STIs had non-significant effect sizes less than 0.34, 0.25 and 0.36 respectively.

Table 1.13: Comparison between the relationship status and questions answered

	N	Mean	Std. Deviation	ANOVA p-value	Welch p-value	Effective size	
						Single with…	Committed relationship with…
Types of STI							
Single	59	4.4915	2.42382	0.185	0.212	–	–
Committed Relationship	61	4.2885	2.67364			0.08	–
Married	31	5.3226	2.67566			0.31	0.39
Transmission of STIs							
	N	**Mean**	**Std. Deviation**	**ANOVA p-value**	**Welch p-value**	**Effective size**	
						Single with…	**Committed relationship with…**
Single	59	6.5966	2.52723	0.525	0.532	–	–
Committed Relationship	61	6.6721	2.39945			0.03	–
Married	31	7.1935	2.46873			0.24	0.21
Total	151	6.7497	2.45842			–	–
Signs and symptoms of STIs							
	N	**Mean**	**Std. Deviation**	**ANOVA p-value**	**Welch p-value**	**Effective size**	
						Single with…	**Committed relationship with…**
Single	59	6.8576	2.71955	0.343	0.327	–	–
Committed Relationship	61	6.3541	2.75594			0.18	–
Married	31	7.1613	2.36779			0.11	0.29
Prevention and treatment of STIs							
	N	**Mean**	**Std. Deviation**	**ANOVA p-value**	**Welch p-value**	**Effective size**	
						Single with…	**Committed relationship with…**
Single	59	6.3051	2.30632	0.796	0.731	–	–
Committed Relationship	61	6.1967	1.65146			0.05	–
Married	31	6.4839	1.63036			008	0.17

Effects of STIs							
	N	Mean	Std. Deviation	ANOVA p-value	Welch p-value	Effective size	
						Single with…	Committed relationship with…
Single	59	4.1525	2.57182	0.169	0.157	–	–
Committed Relationship	61	3.5738	2.39067			0.23	–
Married	31	4.5484	2.36416			0.15	0.41

Based on the results of reported effect size regarding the difference between the relationship status (Table 1.13) and the knowledge regarding the type, transmission, signs and symptoms, and prevention and treatment of STIs, there was a non-significant effect size of less than 0.39, 0.24, 0.29 and 0.17, respectively.

The difference between respondents who are in a committed relationship versus those who are married leans towards a visible effect (effect size = 0.41) when considering the respective respondent knowledge about the effects of STIs. The respondents who are married (mean = 4.55, SD = 2.36) had slightly more knowledge than the respondents who are in committed relationships (mean = 3.57, SD = 2.39).

Discussion of Results

According to the researcher's knowledge, this study, which used a 58-item questionnaire, was the first to assess the knowledge and awareness of STIs within the DKK District in the NWP. From a sample of 151 respondents, the data reveal that the majority was aged between 26 and 36 years (51.7%). A similar study conducted by Cegolon et al. (2022), found that the majority of respondents was younger than 30 years. In this current study 86% of respondents were of Black ethnicity owing to the location of each health facility. Of the respondents, 90.1% had one–three pregnancies before and 52.3% of them were unemployed. No previous study within South Africa was located relating to the employment status and knowledge of STIs. About 40.4% of respondents were found to be in committed relationships; in another study, specific status of relationship was not identified – only married or unmarried status (Mansor et al. 2020). Socio-demographic data affected the awareness and knowledge regarding STIs (Semwogerere et al. 2021).

Feedback indicated total knowledge scores between 41.64% and 69.98% across sections. Taken together, these results reflect an overall average level of STI knowledge in the community. One should take in account that within the reliability section, 4.58 questions out of 11 (41.64%) were answered correctly on types of STI and 6.75 out of 12 questions (56.25%) were answered correctly in the mode of transmission section, emphasising the need for awareness in these two categories. In similar studies, such as

those conducted by Mansor et al. (2020), respondents presented with better knowledge regarding signs and symptoms and the recognition thereof; the results concluded with an awareness of 61.06%, which is considered good knowledge. This current study further supports the findings of previous studies by Mansor et al. (2020) and Cegolon et al. (2022), indicating that the majority of respondents with 73.5% and about 97% respectively, knew that HIV is an STI respectively.

Furthermore, regarding knowledge of STIs, 21.2% of respondents in the current study know that trichomoniasis is an STI while 27.2% know that hepatitis B is an STI. This is a contrary finding to the study by Mansor et al. (2020), where the knowledge regarding trichomoniasis and hepatitis B was 12.5% and 24.8% respectively. According to the researcher's knowledge, this study was the first to assess whether respondents knew that STIs could be transmitted through sharing food; 88% of the respondents answered correctly. Only 19.9% of respondents in this study know that STIs can be transmitted to the baby through breastfeeding, while a study by Mansor et al. (2020) concluded that 60.8% of respondents knew that STIs could be vertically transmitted. A total of 29.3% of respondents answered that STIs could be transmitted through mosquito bites, which is similar to the study by Patel et al. (2023) showing a slightly higher result of 35.6%. Only 21.9% of respondents know that there could be no signs or symptoms of an STI, which is similar to a study by Mansor et al. (2020) indicating that 90% of respondents did not know that STIs can have no signs or symptoms thereby delaying treatment for specific STIs.

Regarding the signs and symptoms, 30.5% responded that coughing could be a sign of an STI; a similar study by Mansor et al. (2020) found that tuberculosis is closely associated with HIV, and it can therefore be understood why respondents associate coughing as a sign of an STI (Mansor et al. 2020). Similarly, this current study concludes that respondents have good knowledge regarding prevention and treatment of STIs. This could be due to the provincial implementation programme launched in 2017, with Goal 2 being to accelerate the prevention and treatment of HIV, TB and STIs in the NWP (2017–2022) (North West Department of Health 2017). Only 37.7% respondents know that there are vaccinations for some STIs. In a study by Patel et al. (2023), 60.3% of respondents believed that it is important to get their partner screened if they presented with symptoms. Only 47.0% of respondents know that STIs could cause foetal and neonatal death; no previous study exists to compare data within the region. Mansor et al. (2020) found that most respondents became aware of STIs via knowledge transfer conducted by the nurses at the clinic and by healthcare professionals (92.71%). In Mansor et al. (2020), the second source of awareness was by means of the internet, which ranks third in this study. The lowest source of information came from the respondents' parents and via newspapers. Patel et al. (2023) had similar results; 64.9% of respondents became aware through reading the newspaper as opposed to the current study's results, where 55.0% of respondents became aware of STIs by means of a newspaper.

Within the reliability section, it is emphasised that attention should be given to knowledge transfer regarding the types of STI as the respondents presented with poor knowledge in that section. This should be the focus by healthcare professionals in rendering antenatal care services. The participants answered only 4.58 questions correctly out of 11 questions.

The respondents who had one to three pregnancies had more knowledge regarding prevention and treatment of STIs than the group that had more than three pregnancies. This cross-sectional study was the first within the province to investigate the knowledge between the different groups of gestational ages. Furthermore, this study determines whether socio-demographic aspects have a role in the knowledge and awareness of STIs. To the knowledge of researcher, no other study could be identified that determined the socio-demographic aspects. Comparisons by employment status reveals that full-time employed participants have more knowledge about the types of STI and transmission of STIs than those who are unemployed , thus emphasising the need for awareness within this group. There was no other significant effect between the groups regarding the signs and symptoms, the prevention and treatment and the effects of STIs.

Relationship status showed no effect on respondents' knowledge regarding the types, transmission, signs and symptoms, and prevention and treatment of STIs. The only variance observed on the effects of STIs are the results that show that those participants who are married have more knowledge than those in committed relationships. This emphasises the need for more efforts by health facilities to increase awareness and knowledge of STIs within this population group.

The study has some limitations. As a convenience sampling approach was taken, some respondents were recruited when they were attending their antenatal follow-up visits and others were there for an initial visit. Respondents could therefore have prior knowledge of STIs. Lastly, the geographical location of facilities and the fact that only five facilities were used within this study could have had an effect on results.

Conclusion

This study proves that more knowledge and awareness are needed regarding STIs. The main finding suggests that there is poor knowledge regarding the types of STI among pregnant women, necessitating that more attention is given to this topic. Socio-demographic aspects have an impact on the knowledge of the respondents. The current study further showed that there was positive feedback regarding the prevention and treatment of STIs and that emphasis should be directed towards the types of STI, rather than HIV alone, but to also focus on other endemic STIs. Feedback on the transmission of STIs indicates that more awareness is required as most respondents did not know that STIs could be transmitted to an infant during breastfeeding. Strengthened health education and awareness are required to communicate that some STIs present no initial signs and symptoms and that certain infections can be prevented through vaccinations.

Conflict of Interest Statement

The authors declare that no competing interest exists; the preparation of this manuscript does not include the use of AI.

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