Original Research Article

PREDICTIVE FACTORS FOR THE SEVERITY OF PROCEDURE-ASSOCIATED PAIN IN INFERTILE WOMEN UNDERGOING HYSTEROSALPINGOGRAPHY IN BAYELSA STATE, SOUTH-SOUTH NIGERIA

ABSTRACT

Background: Hysterosalpingography is the most commonly used investigative modality for the evaluation of tubal patency. It is cheap, readily available and reliable. However, its main drawback is associated pain.

Objective: To determine the predictive factors for the severity of procedure-associated pain in infertile women undergoing hysterosalpingography.

Materials and Methods: This prospective, descriptive, cross-sectional study was conducted at the infertility clinics and radiology departments of the Federal Medical Centre, Yenagoa and Niger Delta University Teaching Hospital, Okolobiri, both in Bayelsa State, Nigeria, between July, 2021 and February,

2022. Hysterosalpingography was done after written informed consent by the patient. The Visual Analogue Scale and Numerical Rating Scale were used to grade pain levels during and after the procedure, respectively. Data were analysed using Statistical Product and Service Solutions for Windows®, version 25. Results were presented in frequencies and percentages for categorical variables, and mean and standard deviation for continuous variables. Student's t-test was used to compare sample means, and Chi-square, for testing associations.

Results: The odds of experiencing pain increased with increasing age (Crude OR = 3.48 – 5.34; p = < 0.05). Women with tertiary level of education were three times more likely to report pain (Crude OR = 3.58; p = 0.029) than those with primary level of education. Parity (χ^2 = 19.85; p – 0.001), type of infertility (χ^2 = 5.93; p = 0.015) and duration of infertility (χ^2 = 11.08; p = 0.004) had significant relationships with the severity of pain perception. Dysmenorrhoea (Crude OR = 1.99; p = 0.001) was also significantly associated with pain perception. Pain was two times more likely to be experienced by women with abnormal hysterosalpingography findings.

Conclusion: Our study established that the predictors of pain perception in hysterosalpingography were age, level of education, duration of marriage, duration of infertility, parity, number of children, type of infertility, dysmenorrhoea and abnormal findings on hysterosalpingography.

Keywords: Hysterosalpingography, Infertility, Pain, Predictive, Perception.

INTRODUCTION

Infertility was described in 2018 by the World Health Organisation as a disease of the male or female reproductive system, defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse.[1] Infertility causes a lot of anxiety and stress for the couples involved. Globally, about 6% – 15.7% of couples have issues with fertility.[2–5] The prevalence of infertility varies broadly in the Sub-Saharan region of Africa. It is 10.4% in Sudan[3] 14.3% in The Gambia[2] and 32% in the South-South region of Nigeria.[6 It is estimated that infertility affects 6% and 10% of couples in the United Kingdom and the United States of America, respectively.[5] The commonest cause of infertility is tubal factor infertility.[7–9]

Hysterosalpingography is a crucial investigative modality in gynaecological practice used for the evaluation of infertile women. Hysterosalpingography is reliable, cheap and readily available. It has been recommended by the National Institute for Health and Care Excellence (NICE) for evaluation of tubal patency, and is the most commonly used investigative modality for tubal patency testing.[10] However, its major pitfall is procedure-associated pain. Nyengidiki et al., reported that 93.1% of women expressed hysterosalpingography-associated pain.[11] Various pain relief methods have been used for the control of hysterosalpingography-associated pain, with different outcomes. There is presently no consensus among clinicians on the most effective pain relief method to use during hysterosalpingography. There is

paucity of published data on the predictive factors for hysterosalpingography-associated pain. Therefore, the objective of this study was to determine the predictive factors for the severity of procedure-associated pain in infertile women undergoing hysterosalpingography in Bayelsa State, South-South Nigeria.

MATERIALS AND METHODS

This prospective, descriptive, cross-sectional study was conducted at the radiology departments and infertility clinics of the Federal Medical Centre, Yenagoa and Niger Delta University Teaching Hospital, Okolobiri, both in Bayelsa State, Nigeria. It was conducted over an eight-month period, from July, 2021 – February, 2022. These two tertiary health institutions in Bayelsa State, provide specialised gynaecological services to women in the State, and serve as referral centres for other hospitals in Bayelsa State and surrounding Rivers and Delta States. Ethical approval was obtained from the Hospitals' Research and Ethics Committees.

The sample size for this study was calculated using the formula:

$n = z^2pq/d^2$ [12]

Where:

n = minimum sample size

z = normal standard deviation set at 95% confidence limit = 1.96

p = prevalence of infertility which was 32% (0.32) from a previous study.[13]

q = 1 – p (complementary probability).

d = margin of error = 5% = 0.05

Calculation:

$n = (1.96)^2 \times 0.32 \times 0.68 / (0.05)^2$

$n = 3.8416 \times 0.32 \times 0.68 / 0.0025$

$n = 0.8359 / 0.0025$

$n = 334.37$

After giving room for attrition of 15%, 'n' was adjusted to 380

Therefore, 380 women being evaluated for infertility were randomly selected for this study from the gynaecological clinic. These women were recruited consecutively until the sample size was complete. Hysterosalpingography was performed for these women in both tertiary health institutions.

Infertile women referred for hysterosalpingography, and women that gave consent and completely filled the consent/questionnaire forms were included in the study. Exclusion criteria included abnormal uterine/vaginal bleeding before the procedure, on-going menstruation, pregnancy, discharge on inspection of the cervix, cervical stenosis/cervical pathology, evidence of pelvic inflammatory disease,

previous history of contrast hypersensitivity, and all patients that declined consent or incompletely filled the consent form and questionnaire.

The nature of the study, the procedure and the likely benefits to the patients were explained to them. Written informed consent was obtained from the women that met the inclusion criteria. Their age, level of education, occupation, parity, body mass index and other relevant patients' information were obtained and documented. Afterwards, they were referred to the Radiology Department for hysterosalpingography.

PROCEDURE

All the hysterosalpingography investigative modalities were performed at the Radiology Unit of both hospitals on outpatient basis. The procedure was performed during the proliferative phase of the menstrual cycle, between days 7 – 10. Lead apron for body protection and eye shield were worn by the radiologist before the procedure. Prior to the procedure, the patient was asked to abstain from unprotected sexual intercourse from the beginning of her menses until after the procedure, to exclude the risk of pregnancy, which is an absolute contraindication to the procedure. Allergy to contrast media was also excluded. The Visual Analogue Scale[14] was used to document the level of pain expressed by the patients at different stages of the investigation, by an assistant (Figure 1).

Figure 1: Visual Analogue Scale

The patient was placed in lithotomy position on the x-ray table, and a warmed bivalve speculum was introduced to visualize the cervix. The vagina and cervix were cleaned with chlorhexidine solution, following which the cervix was grasped at 12 o'clock position with a tenaculum, and gentle traction applied. A self-retaining cannula was then introduced into the cervical canal, and about 10 – 20 ml of Urographin, a radio-opaque, water-soluble radiologic contrast media was introduced through the cannula into the uterus, after removing the speculum. Before introducing the contrast, a scout x-ray film was obtained. The patient was placed supine after contrast media administration, and filling of the uterine cavity and fallopian tubes, and spillage of the dye into the peritoneal cavity was observed under fluoroscopy, and documented, with serial x-ray images taken during filling of the uterine cavity, filling of the fallopian tubes, as well as during contrast spillage into the peritoneal cavity. On completion of the

procedure, the instruments were removed in turns, the patient was cleaned and repositioned, and asked to put her clothes on.

The hysterosalpingography films were reported by Consultant Radiologists, and the study findings were explained to the women. Thirty minutes after the procedure, the level of pain that the women felt were recorded with the use of the Numerical Rating Scale (Figure 2).[15] This is the commonest scale used in the grading of pain. The patient rates the level of pain on a scale of 0 – 10. A score of 0 indicates no pain, 1 – 3 suggests mild pain, 4 – 6 suggests moderate pain, 7 – 10 suggests severe pain.[15]

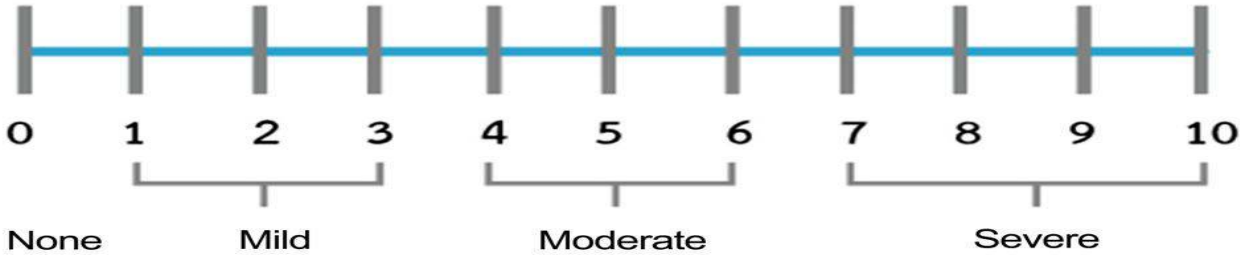

Figure 2: Numerical Rating Scale.[15**]**

DATA ANALYSIS

Data from the study were checked daily for completeness and correctness. Thereafter the data were entered into Statistical Product and Service Solutions for Windows®, version 25 (SPSS Inc.; Chicago, USA) for analysis. Categorical variables like age group, level of education, occupation, parity, type of infertility and other patients' information were analysed and presented in frequencies and percentages. The continuous variables were summarized using mean and standard deviation. Pain scores were summarized using median and range. Pain was categorized as no/mild when pain scores were 0 – 3, and moderate/severe when pain scores were ≥ 4. The relationship between study variables (independent variables like age, parity and so on) and severity of pain (dependent variable) was investigated using the Chi-square test of proportion and a bivariate logistic regression analysis. Factors with *p-value* < 0.05 in the bivariate analysis, were thereafter included in a multivariate regression analysis to identify the predictors of severe pain in these women who had hysterosalpingography. Level of significance was set at *p-value* < 0.05.

RESULTS

Sociodemographic characteristics

A total of 380 women participated in the study, with a mean age of 35.8 ± 4.5 years. The modal (39.7%) age group was 30 – 34 years. Two hundred and seventy-two (71.6%) women had tertiary education and 168 (44.2%) of them were civil servants. Almost one-half (49.7%) of the participants were overweight,

while about a quarter (24.2%) were obese. A little over one-half (54.5%) had been married for ≤ 5 years and a third (69.5%), married for 6 – 10 years. Seven in ten of the women had no living child (Table 1).

Gynaecological features and hysterosalpingography findings

Table 2 shows that 154 (40.5%) women were nulliparous while 108 (28.4%) were multiparous. Majority (77.1%) of the women had secondary infertility and 269 (70.8%) women have had infertility for ≤ 5 years (Table 2). Two hundred and thirty-one women (60.8%) had had a previous induced abortion, 190 (50%) and 105 (27.6%) women had dysmenorrhoea and chronic pelvic pain, respectively (Table 2). Tubal blockage was the most common (273, 71.8%) tubal finding, while uterine fibroid was the most common (83, 21.8%) uterine finding.

Pain following hysterosalpingography

Pain scores in this study ranged between 0 – 9, with median value of 4. For the purpose of this study, pain perception scores were graded into no/mild pain and moderate/severe pain. One hundred and thirty-eight (36.3%) women had no/mild pain, while 242 (63.7%) of the women had moderate/severe pain (Figure 2).

Table 1: Sociodemographic characteristics

Characteristics	Frequency N = 380	Percentage (%)
Age group (years)		
< 30	13	3.4
30 – 34	151	39.7
35 – 39	135	35.5
≥ 40	81	21.3
Mean age ± SD in years	35.8 ± 4.5	
Level of education		
Primary	13	3.4
Secondary	95	25.0
Tertiary	272	71.6
Occupation		
Civil servant	168	44.2
Professional	40	10.5
Trader	135	35.5
Unemployed	37	9.8
Weight		
Normal	86	22.6
Overweight	189	49.7
Obesity class I	92	24.2
Obesity class II	13	3.4
Obesity class III	0	0
Mean BMI ± SD in kg/m^2	27.4 ± 4.9	
Duration of marriage (years)		
≤ 5	207	54.5

6 – 10	132	34.7
11 – 15	24	6.3
≥ 16	17	4.5
Mean duration of marriage ± SD in years	6.2 ± 4.6	
Number of children		
None	264	69.5
1 – 2	96	25.3
≥ 3	20	5.2
Median number of children (Range)	0 (0 – 5)	

Table 2: Gynaecological features and hysterosalpingography findings

Characteristics	Frequency N = 380	Percentage (%)
Parity		
Nulliparity	154	40.5
Primiparous	90	23.7
Multiparous	108	28.4
Grand-multiparous	28	7.4
Type of infertility		
Primary	87	22.9
Secondary	293	77.1
Duration of infertility (years)		
≤ 5	269	70.8
6 – 10	95	25.0
11 – 15	16	4.2
Mean duration of infertility ± SD in years	4.5 ± 3.0	
Gynaecological history*		
Dysmenorrhoea	190	50.0
Chronic pelvic pain	105	27.6
Previous pelvic inflammatory disease	92	24.2
Spontaneous abortion	38	10.0
Induced abortion	231	60.8
Hysterosalpingography findings*		
Abnormal tubal findings	286	75.3
Abnormal uterine findings	104	27.4

*More than one characteristic applies in a participant.

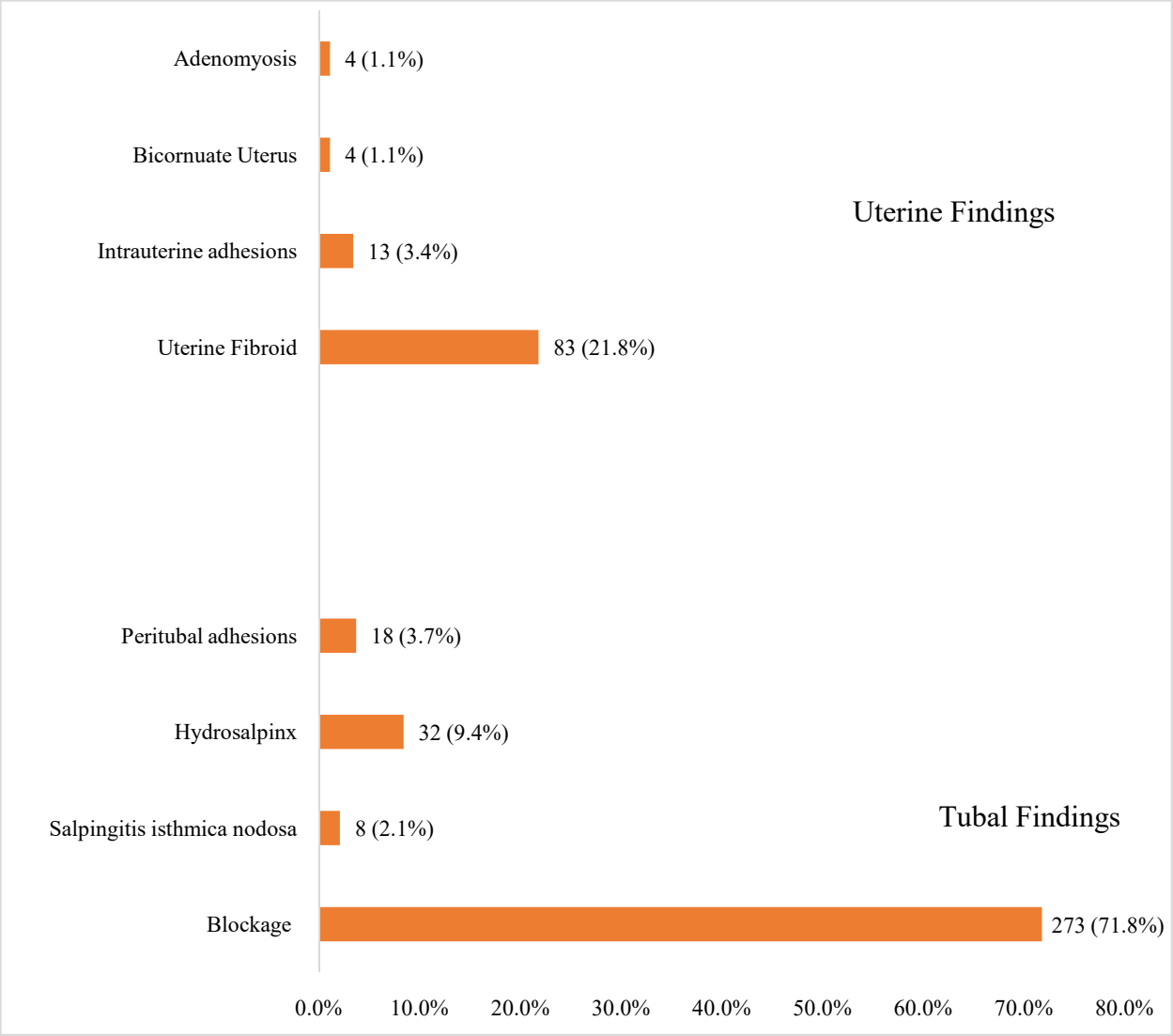

Figure 3: Hysterosalpingography findings

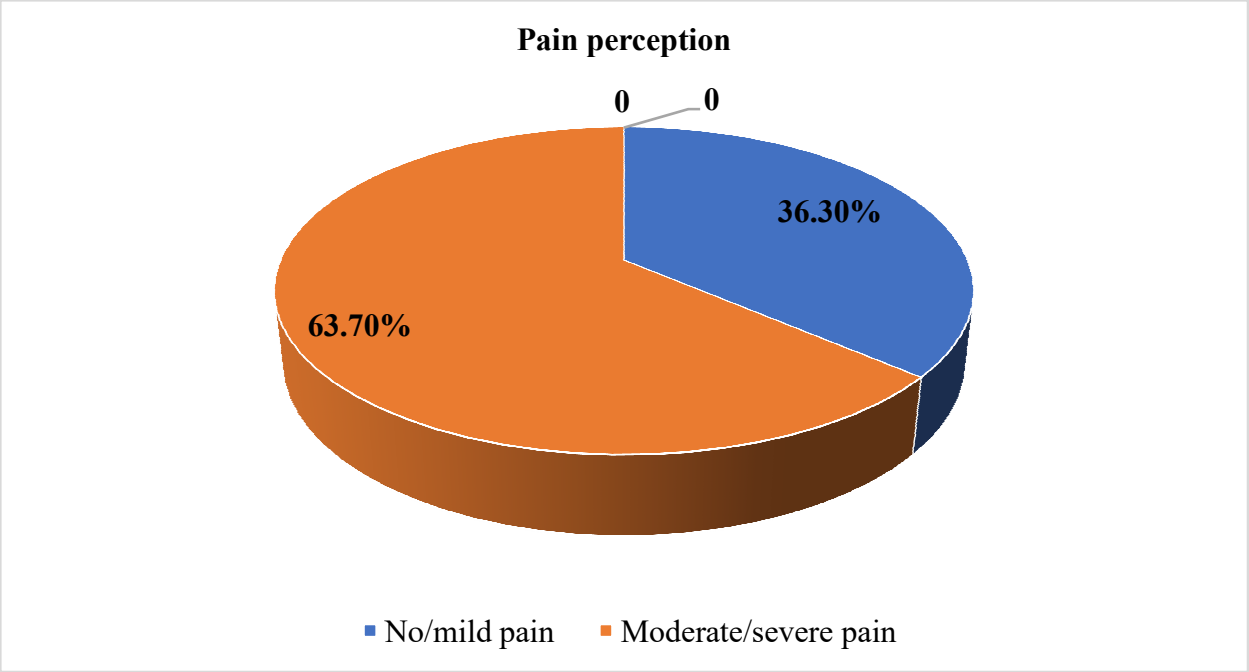

Figure 4: Pie chart showing pain perception

Relationship between sociodemographic characteristics and severity of pain

Age (χ^2 = 8.39; p = 0.039), level of education (χ^2 = 13.07; p = 0.001), duration of marriage (χ^2 = 28.10; p = 0.001) and number of children (χ^2 = 18.16; p = 0.001) showed statistically significant relationship with moderate/severe pain perception among the women (Table 3).

The odds of experiencing moderate/severe pain increased with increasing age (Crude OR = 3.48 – 5.34; p =< 0.05). Participants with tertiary level of education were three times more likely to report moderate/severe pain (Crude OR = 3.58; p=0.029) than those with primary level of education (Table 3). The odd of moderate/severe pain perception was eight times more in women without living children (Crude OR = 8.28; p = 0.001) when compared to women with ≥ 3 children (Table 3).

Relationship between gynaecological features, hysterosalpingography findings and severity of pain

The parity of the women (χ^2 = 19.85; p = 0.001), type of infertility (χ^2 = 5.93; p = 0.015) and duration of infertility (χ^2 = 11.08; p = 0.004) had a significant relationship with the severity of pain perception (Table 4). Nulliparous and primiparous women were three times more likely to experience pain when compared to grand-multiparous women, and there was a 94% increased odd of moderate/severe pain perception among women with primary infertility (Table 4).

While women with dysmenorrhoea (Crude OR = 1.99; p = 0.001) were more likely to express moderate/severe pain, those who had a history of spontaneous abortion were less likely to express

moderate/severe pain. Pain perception was two times more likely to be reported by women with abnormal uterine findings (Table 4).

Table 3: Relationship between sociodemographic characteristics and pain perception

Characteristics	Severity of pain		χ^2 (p-Value)	Crude OR (95%CI)	p-Value
	No/mild	Moderate/severe			
Age group (years)					
< 30	9 (69.2)	4 (30.8)	8.39	1	
30 – 34	52 (34.4)	99 (65.6)	(0.039)	4.28 (1.26 – 14.59)	0.020
35 – 39	53 (39.3)	82 (60.7)		3.48 (1.02 – 11.88)	0.046
≥ 40	24 (29.6)	57 (70.4)		5.34 (1.50 – 19.04)	0.010
Level of education					
Primary	8 (61.5)	5 (38.5)	13.07	1	
Secondary	46 (48.4)	49 (51.6)	(0.001)	1.71 (0.52 – 5.59)	0.379
Tertiary	84 (30.9)	188 (69.1)		3.58 (1.14 – 11.27)	0.029
Occupation					
Civil servant	53 (31.50	115 (68.5)	18.32	4.52 (2.11 – 9.68)	0.001
Self-employed	18 (40.0)	24 (60.0)	(0.001)	3.13 (1.23 – 7.96)	0.017
Professional					
Trader	44 (32.6)	91 (67.4)		4.31 (1.98 – 9.37)	0.001
Unemployed	25 (67.6)	12 (32.4)		1	
Weight					
None	26 (30.2)	60 (69.8)	5.30	3.69 (1.10 – 12.36)	0.034
Overweight	72 (38.1)	117 (61.9)	(0.160)	2.60 (0.82 – 8.25)	0.105
Obesity class I	32 (34.8)	62 (65.2)		3.00 (0.91 – 9.93)	0.072
Obesity class II	8 (61.5)	5 (38.5)		1	
Duration of marriage (years)					
≤ 5	52 (25.1)	155 (74.9)	28.10	1	
6 – 10	62 (47.0)	70 (53.0)	(0.001)	0.38 (0.23 – 0.60)	0.001
11 – 15	16 (66.7)	8 (33.3)		0.17 (0.07 – 0.42)	0.001
≥ 16	8 (47.1)	9 (52.9)		0.38 (0.14 – 1.03)	0.057
Number of children					
None	86 (32.6)	178 (67.4)	18.16	8.28 (2.69 – 25.51)	0.001
1 – 2	36 (37.5)	60 (62.5)	(0.001)	6.67 (2.07 – 21.50)	0.001
≥ 3	16 (11.6)	4 (20.0)		1	

Table 4: Relationship between gynaecological features, hysterosalpingography findings and pain perception

Characteristics	Severity of Pain		χ^2 (p-Value)	Crude OR (95%CI)	p-Value
	No/mild	Moderate/severe			
Parity					
Nulliparity	42 (27.3)	112 (72.7)	19.85 (0.001)	3.55 (1.55 – 8.14)	0.003
Primiparous	27 (30.0)	63 (70.0)		3.11 (1.29 – 7.45)	0.011
Multiparous	53 (49.1)	55 (50.9)		1.38 (0.59 – 3.19)	0.448
Grand-multiparous	16 (57.1)	12 (42.9)		1	
Type of infertility					
Primary	22 (25.3)	65 (74.7)	5.93 (0.015)	1.94 (1.13 – 3.31)	0.016
Secondary	116 (39.6)	177 (60.4)		1	
Duration of infertility (years)					
≤ 5	91 (33.8)	178 (66.2)	11.08 (0.004)	5.87 (1.84 – 18.71)	0.003
6 – 10	35 (36.8)	60 (63.2)		5.14 (1.54 – 17.18)	0.008
11 – 15	12 (75.0)	4 (25.0)		1	
Gynaecological history					
Dysmenorrhoea					
Yes	54 (28.4)	136 (71.6)	10.24 (0.001)	1.99 (1.30 – 3.06)	0.001
No	84 (44.2)	106 (55.8)		1	
Chronic pelvic pain					
Yes	38 (36.2)	67 (63.8)	0.01 (0.975)	1.01 (0.63 – 1.61)	0.975
No	100 (36.4)	175 (275)		1	
Pelvic inflammatory disease					
Yes	27 (29.3)	65 (70.7)	2.55 (0.110)	1.51 (0.91 – 2.51)	0.112
No	111 (38.5)	177 (61.5)		1	
Spontaneous abortion					
Yes	21 (55.3)	17 (44.7)	6.55 (0.010)	0.42 (0.21 – 0.83)	0.012
No	117 (34.2)	225 (65.8)		1	
Induced abortion					
Yes	75 (32.5)	156 (67.5)	3.77 (0.063	1.52 (0.99 – 2.33)	0.053
No	63 (42.3)	86 (57.7)			
Hysterosalpingography findings					
Abnormal tubal findings					
Yes	107 (37.4)	179 (62.6)	0.60 (0.438)	0.82 (0.50 – 1.35)	0.438
No	31 (33.0)	63 (67.0)		1	
Abnormal uterine findings					
Yes	21 (20.2)	83 (79.8)	16.10 (0.001)	2.91 (1.70 – 4.97)	0.001
No	117 (42.4)	159 (57.6)		1	

In the multivariate analysis that showed the predictors of moderate/severe pain perception, age, level of education, parity, number of children and duration of infertility remained statistically significant (p= < 0.05) for the perception of moderate/severe pain (Table 5). The chance of moderate/severe pain was five times

higher in women with dysmenorrhoea (aOR – 5.32; p -0.001) and 12 times greater in women who had abnormal uterine findings.

Table 5: Predictors of perception of pain

Characteristics (Reference group)	aOR	95%CI for OR		p-Value
		Min	Max	
Age group (< 30 years)				
30 – 34	7.93	0.77	9.41	0.081
35 – 39	3.25	2.75	13.90	0.006
≥ 40	6.48	2.35	17.85	0.001
Level of education (Primary)				
Secondary	4.09	2.54	7.78	0.001
Tertiary	7.64	4.32	13.48	0.001
Occupation (Unemployed)				
Civil servant	0.77	0.21	7.78	0.695
Professional	0.03	0.00	0.68	0.027
Trader	3.46	1.44	13.12	0.001
Parity (Grand-multiparity)				
Nulliparity	2.93	1.05	21.98	0.001
Primiparous	2.62	1.54	15.16	0.001
Multiparous	4.21	0.60	29.49	0.148
Number of children (≥ 3)				
None	1.45	1.13	11.85	0.019
1 – 2	2.71	0.30	24.85	0.378
Type of infertility (Secondary)				
Primary	0.37	0.06	2.44	0.299
Duration of marriage (≤ 5)				
6 – 10	0.27	0.06	1.23	0.091
11 – 15	0.99	0.11	9.21	0.990
≥ 16	1.32	0.09	19.43	0.841
Duration of infertility (11 – 15 years)				
≤ 5	4.36	1.04	18.38	0.048
6 – 10	5.51	1.31	23.24	0.036
Dysmenorrhoea (No)				
Yes	5.32	2.05	13.83	0.001
Spontaneous abortion (No)				
Yes	0.73	0.22	2.42	0.611
Uterine factors (No)				
Yes	12.71	2.28	70.80	0.004

DISCUSSION

Hysterosalpingography is a crucial investigative modality used in women being evaluated for infertility. Many women experience mild to severe pain during and after the procedure. This study looked out for the predictive factors for hysterosalpingography-associated pain. Due to the subjective nature of pain, it is not easy to consistently record pain perception reliably and reproducibly. Therefore, we used the Visual Analogue Scale and the Numerical Rating Scale in this study. They are the most widely used scales for recording pain perception.

The predictors of pain perception observed in this study were age, level of education, duration of marriage, duration of infertility, parity, number of children, type of infertility, dysmenorrhoea and abnormal findings on hysterosalpingography. In this study, the older the women were, the more pain they perceived. The plausible reason for this observation may be due to the fact that as women age, the risk of morbidities which will cause increase in pain perception increases. Our finding contrasts the findings of Park et al.,[16] and Szymusik et al.,[17] who did not observe any relationship between pain perception and age. In our study, women with tertiary level of education had more pain perception compared to patients with lower level of education. This finding is in tandem with the report of Nyengidiki et al.,[11] where moderate/severe pain perception was more in women with secondary level of education and above. The reason for this finding is not readily understood, because what is generally known is that the higher the level of education, the lesser the pain perception, and vice versa.[18] The more educated a woman is, the less anxious and more confident she is. However, infertility in itself, irrespective of level of education, causes a lot of anxiety and stress, which predispose to increased perception of hysterosalpingography-associated pain.[19]

Our study revealed that the longer the duration of marriage, the more the pain perception. The duration of marriage often times correlates with duration of infertility. The key issue here is the fact that infertility causes a lot of anxiety and stress,[19] especially with increasing age, duration of marriage and duration of infertility. Nulliparous and primiparous women were three times more likely to experience moderate/severe pain when compared to grand-multiparous women. This observation in our study was congruent to the finding of Park et al.[16] This finding, again is related to the fact that infertility causes anxiety and stress, which predispose to increased hysterosalpingography-associated pain, as observed in a previous study in the study centres.[19] It may also be related to the fact that nulliparous and primiparous women may have smaller uterine cavities compared to multiparous and grand-multiparous women, and hence, more pain from uterine distension during instillation of the contrast medium in hysterosalpingography.

Women without living children were eight times more likely to report moderate/severe pain when compared to women with living children. The plausible reason for this is that women without living

children are more anxious, with consequent increase in pain perception during investigative modalities like hysterosalpingography. In this study, women with primary infertility had increased moderate/severe pain perception when compared to women with secondary infertility. The anxiety was more in women who had never been pregnant before compared to women who have had a previous pregnancy, irrespective of the outcome. This observation in our study contrasts the report of Szymusik et al.[17]

Our study observed that dysmenorrhea significantly correlated with hysterosalpingography-associated pain. This observation is in consonance with the findings of Park et al.,[16] but contrasts the observation of Szymusik et al.,[17] where the relationship of dysmenorrhoea and pain perception was not statistically significant. A plausible reason for our finding may be that women with dysmenorrhea may be more markedly sensitive to prostaglandin release during hysterosalpingography. This study observed that abnormal findings on hysterosalpingography were predictive of moderate/severe pain during and after the procedure. This is in agreement with the observation of Park et al.,[16] Szymusik et al.,[17] and Atalabi and Osinaike.[20] The increased perception of pain in patients with abnormal hysterosalpingography findings may be related to an increased intrauterine and intrafallopian tube pressure owing to obstruction and limited/no peritoneal spillage of contrast media in this category of patients .

A strength of this study is its two-centre prospective, descriptive, cross-sectional study design. Only two Consultant Radiologists performed the hysterosalpingography in this study, thereby reducing the risk of performance bias, and increasing the validity of the study findings. No form of premedication was given to the study participants, further increasing the validity of the reported findings. A limitation of this study is that it is hospital-based, with a relatively small sample size. Larger scale, multi-centre, high-powered studies are recommended.

CONCLUSION

Our study established that the predictors of pain perception were age, level of education, duration of marriage, duration of infertility, parity, number of children, type of infertility, dysmenorrhoea and abnormal findings on hysterosalpingography. Modifying these factors will help reduce the severity of hysterosalpingography-associated pain. Adequate analgesics and pre-procedure counselling also play an important role in reduction of pain perception during and after hysterosalpingography.

ETHICAL APPROVAL

This prospective, descriptive, cross-sectional study was examined and approved by the Research and Ethics Committees of the hospitals.

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COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.