

ORIGINAL RESEARCH ARTICLE

Evaluation of causes of female infertility using ultrasonography in Najran, Saudi Arabia

DOI: 10.29063/ajrh2022/v26i5.10

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Abstract

Descriptive cross-sectional, hospital-based study carried out at the Maternal and Childbirth Hospital, Najran, Saudi Arabia, from May 2020 to May 2021 Using Ultrasonography. This study assessed the causes of female infertility by evaluating 100 women with infertility who attended the hospital. The mean age of the women with infertility was $34.8 \pm$ years, with most between 35 -44 years 49%, 31% between 25-34 years old, 11% between 15 - 24 years old and 19% were ≥ 45 were. Of the sample, 65% had primary infertility, while 35% had secondary infertility. A statistical significant association was found between age and the type of infertility ($p < 0.05$) with polycystic ovary disease being the most common cause of infertility 56%, followed by fibroids 22%, Endometrial polyps 9%, Adenomyosis 5%, Hydrosalpinx 4%, Congenital abnormality 2% and other causes was 1%. Our findings demonstrate the usefulness of ultrasound in diagnosing and evaluating female infertility. The cause of female infertility are polycystic ovary disease, fibroids, Endometrial polyps, Adenomyosis, Hydrosalpinx and congenital anomalies. (*Afr J Reprod Health 2022; 26[5]: 90-95*).

Keywords: Infertility, causes, endovaginal, transabdominal, ultrasonography, Saudi Arabia

Résumé

Étude transversale descriptive en milieu hospitalier réalisée à l'hôpital de la mère et de l'accouchement, Najran, Arabie saoudite, de mai 2020 à mai 2021 à l'aide d'une échographie. Cette étude a évalué les causes de l'infertilité féminine en évaluant 100 femmes infertiles qui ont fréquenté l'hôpital. L'âge moyen des femmes infertiles était de $34,8 \pm$ ans, la plupart entre 35 et 44 ans 49 %, 31 % entre 25 et 34 ans, 11 % entre 15 et 24 ans et 19 % avaient ≥ 45 ans. De l'échantillon, 65% avaient une stérilité primaire, tandis que 35% avaient une stérilité secondaire. Une association statistiquement significative a été trouvée entre l'âge et le type d'infertilité ($p < 0,05$), la maladie des ovaires polykystiques étant la cause la plus fréquente d'infertilité 56 %, suivie des fibromes 22 %, des polypes endométriaux 9 %, de l'adénomyose 5 %, de l'hydrosalpinx 4 %, Anomalie congénitale 2 % et autres causes étaient de 1 %. Nos résultats démontrent l'utilité de l'échographie dans le diagnostic et l'évaluation de l'infertilité féminine. Les causes de l'infertilité féminine sont la maladie des ovaires polykystiques, les fibromes, les polypes de l'endomètre, l'adénomyose, l'hydrosalpinx et les anomalies congénitales. (*Afr J Reprod Health 2022; 26[5]: 90-95*).

Mots-clés: Infertilité, causes, endovaginal, transabdominal, échographie arabie saoudite

Introduction

Infertility is indicated if a woman has frequent sexual contact without using protection over a 12-month period and does not conceive. A woman's age has been shown to be a key factor in infertility and women who are over 35 should be assessed after 6 months¹⁻². Although as a general rule men and women should only start fertility assessment or treatment after a full year of not succeeding in conceiving a child, in certain situations, delay is

inappropriate. This is particularly true of individuals who have an anatomic or medical condition that results in amenorrhea, a drop in the number of normal sperm being produced or any form of obstruction of the reproductive tract. Females who have irregular menstrual periods of varying length and men who cannot ejaculate need to deal with these physical issues before they start attempts to conceive a child².

Ultrasonography is the main imaging tool used for examining women's pelvises for any signs

of the above-mentioned disorders among infertile females. Ultrasounds are precise, non-invasive, and cost-effective tools and provide accurate and detailed information that is used to highlight and categorize potential female infertility problems. Meticulous pelvic ultrasonography—for the most part transvaginal sonography (TVS)—can detect deformities of the uterus, ovarian syndromes, and some pathologic issues that can result in female infertility. Ultrasonography can assist patients, doctors, and gynecologists in making the best possible treatment choices by identifying the causes of infertility³⁻⁴.

The survey found that there was a fertility rate curve, which can be measured by comparing the total fertility rate (2.4 live children) with the normal live birth rate of Saudi women at the end of their child-bearing years at the age of 45 (4.9 live children). The data demonstrated a sharp fall in fertility in line with age. Thus, a Saudi woman starting her child-bearing period and entering the 45–49 years age group at the time of the survey is likely to have 4.9 live children. Women who are now entering their reproductive years and who have not reached menopause are likely to reach the fertility level of 2.4 live children. By contrast, the estimated birth rate among the Saudi population was 17.23 live children for every 1,000 people. This figure changes according to geographical locations, with Jazan reporting 10.5 live children per 1,000 people, whereas Al-Jouf reports 27.07 live children per 1,000⁵.

It is commonly believed that a number of factors can negatively impact fertility in women. These include age, obstetrical history, smoking, irregular menstrual cycles, alcohol consumption, unhealthy BMI, damaging lifestyles, and physical anomalies. Post-industrial Western culture has introduced practices and habits that can have severe and harmful effects on conceptive wellbeing. Obesity, which can be a risk factor to overall health as well as the ability to conceive, is linked to a lack of exercise and an unhealthy diet⁶⁻⁷. According to the World Health Organization (WHO), infertility is a global public health problem, which is not being accorded the attention it merits. Recent reports state that infertility in the developed world has not changed significantly between 1990 and 2010, with 1.9% of women of child-bearing age from aged 20–44, experiencing primary infertility, while 10.5% experience secondary infertility. Nevertheless,

infertility rates were highest in the developing world—particularly in the Middle East⁸. According to Alfarraj *et al.* (2015), there are several reasons for Saudi Arabian women's low fertility rates, such as the rising number of abortions, late marriages, and increases in the cost of living—all of which have a negative impact on women and, in turn, can lead to infertility. Obesity, a poor diet of fast or unhealthy food, high blood pressure, smoking, and lack of regular exercise all affect the infertility rate of Saudi women—which is slowly increasing with negative impacts on the Saudi population⁹. Alamri *et al* reported causes of female infertility in Arar KSA were included defect in ovulation in 139 (24.6%), followed by the polycystic ovary in 123 (21.8%), tubal adhesions or obstruction in 38 (6.7%), endometriosis in 18 (3.2), and uterine fibroid in 17 (3.0%). The reported type of provided management was found drugs for induction of ovulation in 83 (14.7%), herbal remedies in 44 (7.8%), IVF in 28 (5.0%), and husband treatment in 1 (0.2%)¹⁰.

The aim of fertility assessment and treatment is to allow women to produce a child. In addition, other objectives include determining why the woman is infertile, how her lifestyle has contributed to this situation, and tackling the anxiety and misery a couple might be living through as a result of being unable to conceive. Fertility interventions and evaluations must consider each couple's personal goals and prioritize them². This study was designed to assess the reasons for female infertility in Najran Province using ultrasonography.

Objectives

Using ultrasonography to evaluate the causes of female infertility in Najran, Saudi Arabia, from May 2020 to May 2021. To find a link between the age of patients, the type of female infertility and the causes of female infertility.

Methods

This is a descriptive, cross-sectional, hospital-based study focusing on Najran, Saudi Arabia, from May 2020 to May 2021, and designed to determine the causes of infertility in Najran using ultrasonography. The study population consisted of infertile females of childbearing age who presented with primary or secondary infertility at MC

Hospital.100 female were selected randomly. Female whom age between 15-45 years old with secondary or primary infertility, were inclusion in the study. However, female under 15 or over 45 years' old and infertile male patients were excluded from the study. A data collection sheet and questionnaire were used to gather data, and this was supplemented by demographic information on the patient's age, the type of ultrasound examination they had, and findings from the uterine and ovarian ultrasound, including the type of infertility and its causes. Statistical analysis was conducted using SPSS (version 25 for social sciences). Distributions of female age, weight height and infertility causes detected by Ultrasound was analysis using frequency, correlation between age and infertility type using person's moment correlation and cross tab was use to analysis the correlation between type and patients age with causes of female infertility.

Results

One hundred infertile females took part in the study. Table 1 shows that the mean age of the group was 34.8 ± 7 . Forty-nine percent of the women were aged 35–44, 31% were aged 25–34, 11% were aged 15–24, and 9% were ≥ 45 . The majority of the cases of infertility were diagnosed using endovaginal sonography (71%), while the remaining 29% of the women were diagnosed using transabdominal sonography. Table 2 illustrates that 65% of the cases presented with primary infertility and 35% with secondary infertility. Table 3 shows the correlation between age and the type of infertility p-value (<0.05), while Table 4 lists the main causes of infertility, namely polycystic ovary disease (56%), of which 35% correlated with primary infertility and 21% with secondary infertility. Furthermore, fibroids were responsible for 22% of the infertility cases, 14% of which correlated with primary infertility and 8% with secondary infertility. Endometrial polyps accounted for 9% of the cases, 7% of which correlated with primary infertility, and 2% with secondary infertility, while adenomyosis accounted for 5%, with 4% correlating with primary infertility, and 1% with secondary infertility, and hydrosalpinx accounted for 4%, 2% correlating with congenital abnormality and 2% with primary infertility. Finally, congenital abnormality (2%) only correlated with primary infertility, and “other abnormality” was present in 1% of the causes of primary infertility. Tables 5 and

6 show that polycystic ovary disease was most common in the 35–44 age group (28%), followed by the 25–34 age group (18%), the ≥ 45 age group (6%), and the 15–24 year olds (4%). The majority of cases where fibroids caused infertility were found in the 35–44 age group, with 7% correlating with 23–34 years old individuals, and 3% with the 15–25 and the ≥ 45 groups. Six percent of the 35–44 years old age group exhibited endometrial polyps, with 3% and 1% correlating with the 25–34 years old and 15–24 years old participants, respectively. Three percent of the adenomyosis correlated with the 35–44 years old group and 2% with the 25–34 years old patients. Moreover, 3% of hydrosalpinx cases correlated with the 35–44 years old group, while 1% correlated with the 15–24 years old group. The 2% of congenital abnormalities correlated with 15–24 years old participants, and the other 1% of cases of infertility correlated with 25–34 years old individuals.

Discussion

Fertility, which refers to the ability to produce a child, has declined in the majority of Western societies in terms of births per 1,000 women aged 15–44 and over for the last few decades¹¹.

This cross-sectional, hospital-based descriptive study was carried out in a maternal and childbirth hospital in Najran, Saudi Arabia, and included 100 infertile women with both primary and secondary infertility. Data was gathered using a data sheet and a questionnaire, which covered age, the type of infertility, the causes of infertility and the ultrasound modalities used to determine the causes of the infertility. Frequency, cross tab, and personal correlation were combined to assess the causes of female infertility and to find links between age, type of infertility, and the causes of infertility.

The current study used endovaginal sonography to diagnose the causes of female infertility in 71% of the cases, while the remaining 29% of the women were diagnosed using transabdominal sonography—which is trustworthy and accurate when evaluating the size and number of follicles. When it comes to predicting periovulatory events, transvaginal scanning is the better option, since it offers higher resolution. Evaluating the ovary, which is found at the pelvic brim, is best suited to transabdominal scanning, particularly at a 5 MHz frequency and is often necessary¹².

Table 1: Distributions of patient age n = 100

Age in years	NO	%
15–24	11	11%
25–34	31	31%
35–44	49	49%
≥45	9	9%
	100	100%
Mean age =34.8 ±7		

Most of infertile women their age between (35-44) years old

Table 2: Type of ultrasound modality

Ultrasound modality	NO	Percentage
EVS	71	71%
TAS	29	29%

Most Causes of female infertile was diagnosis's Using endovaginal Sonography

Table 3: Distributions of type of infertility

Type of infertility	No	Percentage
Primary	65	65%
Secondary	35	35%

Most of infertility type is primary infertility (65%)

Table 4: Correlation between age and infertility type

Correlations		Patients age	Type of infertility
patients age	Pearson Correlation	1	.599**
	Sig. (2-tailed)		.000
type of infertility	N	100	100
	Pearson Correlation	.599**	1
	Sig. (2-tailed)	.000	
	N	100	100

**Correlation is significant at the 0.01 level (2-tailed).

There is a significant correlation between patient age and infertility type (p = 0.000)

Table 5: Distributions of infertility causes detected by ultrasonography in the study (n = 100)

Infertility causes	NO	%
Polycystic ovary disease	56	56%
Fibroids	22	22%
Endometrial polyps	9	9%
Adenomyosis	5	5%
Hydrosalpinx	4	4%
Congenital abnormality	2	2%
Other	1	1%
	100	100%

Most infertility was due to polycystic ovary disease (56%)

The current study found that most of the infertile female have primary infertility 65% and rest have Second infertility 35% Al-turki reported that the 78.99% have primary infertility in eastern Saudi

Arabia¹³. However Alamri *et al* reported the primary of female infertility in Arar northern Saudi Arabia was 19.8% and Secondary infertility was 80.2%¹⁰.

The predominant cause of female infertility found in this study was polycystic ovary disease, which affects 56% of infertile women. Polycystic ovary syndrome (PCOS) affects up to 10% of women of child-bearing age and is the object of much scientific research¹⁴. Assisted reproduction in women with PCOS has not been very successful, since impaired folliculogenesis and lower quality oocytes have presented obstacles to conception, as has the high risk of miscarriage. To date, there is no definitive information on the clinical outcomes of women with PCOS, and the results remain conflicting across fields. Overall, however, there is general agreement that ultrasound is useful in predicting fertility outcomes for women with PCOS¹⁵. Alamri *et al* reported that Most cases attending the outpatient and/or inpatient department in Maternity and Children Hospital of Arar, KSA, were due to infertility, the common cause of infertility was found a defect in ovulation in, followed by the polycystic ovary¹⁰.

This study also found a strong link between female fertility and age, with higher age groups being more vulnerable to other disorders, such as fibroids and endometriosis, which also impact negatively on the chances of conception¹⁶. The majority of the infertile women in this study were 35–44 years old, and Cruzz and Gindoff (1999) emphasized the importance of the age of the woman when assessing a couple's fertility problems. Female fertility begins to decline at the age of 30, a trend which accelerates at 40, with 40-year-old women being 50% less likely to fall pregnant than their younger peers¹⁷. See Tables 1 and 4.

There are certain congenital anomalies of the female reproductive tract or Müllerian anomalies (MA), which can affect the uterus, cervix, Fallopian tubes, or vagina. Nevertheless, the number of women with such anomalies in the general population has been estimated at 0.5%¹⁸⁻¹⁹. This study identified two cases of congenital anomalies, 2% of the sample, namely bicorniate uterus and septate uterus, which are closely connected to primary infertility and most often present in patients aged 15–24.

In addition, this study found that 1% of participants, aged between 25 and 34 years old, had

Table 6: Correlation between type of infertility and cause of female infertility

Causes of infertility * type of infertility Count		type of infertility		Total
		Primary	Secondary	
causes of infertility	Polycystic ovary disease	35	21	56
	Fibroids	14	8	22
	Endometrial polyps	7	3	10
	Adenomyosis	4	1	5
	Hydrosalpinx	2	2	4
	Congenital abnormality	2	0	2
	other	1	0	1
Total		65	35	100

Table 7: Correlation between patients age and causes of female infertility

causes of infertility * patients age Count		Patients age				Total
		15-24	25-34	35-44	≥45	
causes of infertility	Polycystic ovary disease	4	18	28	6	56
	Fibroids	3	7	9	3	22
	Endometrial polyps	1	3	6	0	10
	Adenomyosis	0	2	3	0	5
	Hydrosalpinx	1	0	3	0	4
	Congenital abnormality	2	0	0	0	2
	other	0	1	0	0	1
Total		11	31	49	9	100

another form of female infertility—uterine adhesion. The limitation of this study were the small sample size and it focus on specific area in Saudi Arabia (Najran).

Conclusion and Recommendations

Infertility is the term used to describe the inability to fall pregnant after a year of regular sexual intercourse, and ultrasound is a helpful diagnostic tool when assessing female infertility. Most Causes of female infertile was diagnosis's Using endovaginal Sonography. However there is a significant correlation between patient age and infertility type. Female infertility is closely linked to age, and in Najran Province, Saudi Arabia, the prime cause of female infertility were The cause of female infertility are polycystic ovary disease, fibroids, Endometrial polyps, Adenomyosis, Hydrosalpinx and congenital anomalies The study recommends that every female patient with suspected infertility issues should be given an ultrasound examination. Further research with large population include all province of Saudi arabi should be conducted to evaluate the causes of female infertility.

Acknowledgements

The author would like to express their Gratitude's to ministry of education and the Deanship of scientific research- Najran University Kingdoms of Saudi Arabia for their Financial and technical support under code number (NU/MRC/10/351).

Conflict of interest

There is no conflict of interest.

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