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Research Article

**PRACTICE OF IN VITRO FERTILIZATION IN ARAR,
NORTHERN SAUDI ARABIA**

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Abstract:

Background: In-vitro fertilization (IVF) is a complex series of technologically driven procedures used to treat infertility or genetic problems and assist with the conception of a child.

Objectives: to show the prevalence and determinants of IVF in Arar city, Northern Saudi Arabia.

Methods: a cross sectional study was conducted among 286 of pregnant mothers attending the Maternity and children Hospital in Arar city, during the period from 1 May to 31 September 2018. The data collected using a predesigned questionnaire. The questionnaire covered the following items; Socio-demographic characteristics of the studied pregnant mothers as age, education, working status and parity. Current history of IVF, history of previous abortion, type of pregnancy (twins or single), Chronic hypertension, DM and smoking. We utilized the SPSS program (version 16) to analyze the study data. The X² test used as a test of significance, and differences considered significant at P value less than 0.05.

Results: The study includes 286 pregnant mothers, the majority of them were 25-35 years and 22% of cases more than 35 years. The study reported that 3.8% of studied pregnant women undergo In vitro fertilization. We found insignificant relations between In vitro fertilization and working status, education, age, parity and BMI (P > 0.05). While there was significant relation with previous abortion (P=0.009) which found in 72.7% of In vitro fertilization cases, smoking and type of pregnancy was single in 63.6% and twins in 36.4% of IVF cases (p=0.008). There were non-significant correlations between In vitro fertilization and DM and chronic hypertension and 81.8% of cases doing pregnancy follow up and 54.5% get nutritional education. Conclusion: The current study in Arar, KSA reported that 3.8% of the studied pregnant women undergo In vitro fertilization, which indicates considerable prevalence of IVF in the area.

Key words: In vitro Fertilization, Prevalence, Factors, Arar, Northern Saudi Arabia.

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INTRODUCTION:

In-vitro fertilization (IVF) is a complex series of technologically driven procedures used to treat infertility or genetic problems and assist with the conception of a child [1]. These procedures are known generically as assisted reproductive technology (ART). IVF and other forms of assisted reproductive technology (ART) provide opportunities for increasing proportions of couples to achieve a pregnancy.

The first pregnancy after in vitro fertilization (IVF) of a human egg and the first birth of an in vitro-fertilized baby were reported in 1976 and 1978, respectively [2, 3]. Since then, the science of IVF has taken the world by storm and this technology with its various processes are now been made available in almost every country though the developing countries still lag behind [4]. In 2018 it was estimated that eight million children had been born worldwide using IVF and other assisted reproduction techniques [5]. In the United States, approximately 1.5 percent of all births are the result of IVF [6].

The IVF process involves hormonally controlling the ovulatory process, removing ova (eggs) from the woman's ovaries and fertilization with sperm. The fertilized egg (zygote) is then transferred to the patient's uterus with the goal of establishing a successful pregnancy. A successful live-birth occurs only when all the preceding steps were successful [7]. Undoubtedly, the improved and optimized procedures, as well as the significant technological advances have contributed to increasing success with IVF [8].

In vitro fertilization (IVF) constitute major risk factor for the genesis of multiple births (twin, triplet, and higher-order births) [9]. The risk of multiple pregnancy is increased substantially in IVF cycles. In 2005, 35% of all births in the US resulting from IVF were multiples, a rate 10 times higher than 3% in general population [10]. Conception by IVF is associated with an increased incidence of several obstetric and perinatal complications. Additionally, the effects of advanced maternal age need to be considered since many women who undergo IVF are older and older women are more likely to have pregnancy complications [11] Women with IVF-conceived singletons are at increased risk of pre-eclampsia, gestational diabetes, placenta Previa, and perinatal mortality [12]. Although this technology is believed to be safe, rapid technological progress leading to treatment modifications makes it important to continually monitor the safety of ART for the rapidly growing population of users of the technology and infants conceived with its use [13].

The study aimed to show the prevalence and

determinants of IVF in Arar city, Northern Saudi Arabia.

SUBJECTS AND METHODS:

Study design and setting: a cross sectional study was conducted among 286 of pregnant mothers attending the Maternity and children Hospital in Arar city, during the period from 1 May to 31 September 2018.

Sampling: The sample size calculated using the sample size equation: $n = z^2 p(1-p)/e^2$. Provided that ($P=50\%$, $e =0.05\%$ and the total studied population >10000). The minimum sample size is 284 mothers.

Sampling technique: systematic random sampling technique was followed as we choose every 5th pregnant mother attending the hospital during the study period.

The data collected using a predesigned questionnaire. The questionnaire covered the following items:

- Socio-demographic characteristics of the studied pregnant mothers as age, education, working status and parity
- Current history of IVF, history of previous abortion, type of pregnancy (twins or single), chronic hypertension, DM and smoking.

Ethical consecrations:

Data collector gave a brief introduction to the patients by explaining the aims and significance of the study to the mothers. Written consent was obtained from all of the studied mothers. Confidentiality of data was maintained throughout the study.

Statistical analysis:

We utilized the statistical package for social sciences, version 16 (SPSS Inc., Chicago, Illinois, USA) to analyze the study data. The results displayed as counts and percentages. The X^2 test used as a test of significance, and differences considered significant at P value less than 0.05.

RESULTS:

Table 1: Shows sociodemographic characteristics of the studied pregnant mothers. The study includes 286 cases, the majority of them were 25-35 years' age group and 22% of cases more than 35 years. 82.5% were university or higher education and more than half were housewife (52.8%). Only 1% of mothers were smokers, 8.7% had asthma, 2.1% had chronic hypertension and abortion reported in 35.7%. The majority of mothers were overweight (46.5%) and

84.6% represent caffeine addiction. As regards type of pregnancy, single was the most common by 94.8% followed by twin 5.2%.

Figure 1: illustrates the prevalence of IVF pregnancy among the studied pregnant mothers. It is clear that, 3.8% were IVF and 96.2% were normal pregnancy

Table 2: shows Association between sociodemographic variables, type of pregnancy, BMI and Smoking with In vitro Fertilization in the studied pregnant women. The study reported; 3.8% of studied pregnant women undergo In vitro fertilization. We found on significant correlations between In vitro fertilization and working status, education, age group,

parity, BMI groups and caffeine addiction ($p > 0.05$). However, there were significant correlation with previous abortion ($p=0.009$) which found in 72.7% of In vitro fertilization cases, smoking and type of pregnancy was single in 63.6% and twins in 36.4% of IVF cases ($p=0.008$).

Table 3: shows association between presence some of chronic diseases and pregnancy follow up with In vitro Fertilization in the studied pregnant women. We found there were non-significant correlations between In vitro fertilization and DM, chronic hypertension and Pre- eclampsia but, it was found with bronchial asthma ($p= 0.02$). 81.8% of cases doing pregnancy follow up and 54.5% had nutritional education.

Table (1): Sociodemographic characteristics of the studied pregnant mothers. (N=286)

	Frequency (N=286)	Percent
Age Group		
• <20	12	4.2
• 20-25	48	16.8
• 25-35	163	57.0
• >35	63	22.0
Education		
• Primary	3	1.0
• Secondary	47	16.4
• University or higher	236	82.5
Working status		
• Working	135	47.2
• Housewife	151	52.8
Parity		
• 1 st pregnancy	27	9.4
• 1-3	133	46.5
• 3-5	74	25.9
• >5	52	18.2
Smoking		
• No	283	99.0
• Yes	3	1.0
Abortion		
• No	184	64.3
• Yes	102	35.7
BMI Group		
• Underweight	6	2.1
• Normal	78	27.3
• Overweight	133	46.5
• Obese	69	24.1
IVF		
• Yes	11	3.8
• No	275	96.2
Chronic hypertension		

• No	280	97.9
• Yes	6	2.1
DM		
• Yes	15	5.2
• No	271	94.8
Type of pregnancy		
• Twins	15	5.2
• Single	271	94.8

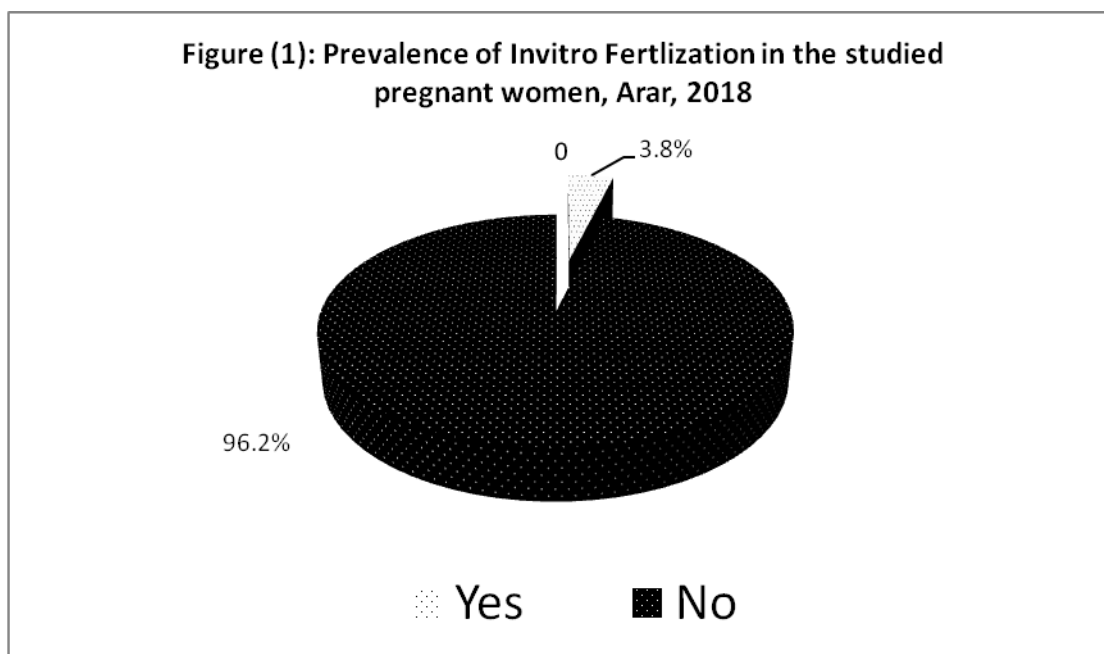


Table (2): Association between sociodemographic variables, type of pregnancy, BMI Caffeine addiction and Smoking with Invitro Fertilization in the studied pregnant women

Variable	Response	IVF		Total (N=286)	P value
		Yes (n=11)	No (n=275)		
Working status	Working	5	130	135	0.906
		45.5%	47.3%	47.2%	
	Housewife	6	145	151	
		54.5%	52.7%	52.8%	
Education	Primary	0	3	3	0.743
		.0%	1.1%	1.0%	
		1	46	47	
	Secondary	9.1%	16.7%	16.4%	
		10	226	236	
	University or more	90.9%	82.2%	82.5%	
		0	12	12	
Age group	<20	.0%	4.4%	4.2%	0.134
		0	48	48	
	20-25	.0%	17.5%	16.8%	
	25-35	10	153	163	
	>35	90.9%	55.6%	57.0%	
		1	62	63	
		9.1%	22.5%	22.0%	
Parity	1 st pregnancy	1	26	27	0.681

	1-3	9.1%	9.5%	9.4%	
		7	126	133	
	3-5	63.6%	45.8%	46.5%	
		2	72	74	
Previous abortion	No	18.2%	26.2%	25.9%	0.009
		3	181	184	
	Yes	27.3%	65.8%	64.3%	
		8	94	102	
Type of pregnancy	Twins	72.7%	34.2%	35.7%	0.000
		4	11	15	
	Single	36.4%	4.0%	5.2%	
		7	264	271	
BMI group	Underweight	63.6%	96.0%	94.8%	0.476
		0	6	6	
	Normal	.0%	2.2%	2.1%	
		1	77	78	
	Overweight	9.1%	28.0%	27.3%	
		6	127	133	
Obese	54.5%	46.2%	46.5%		
	4	65	69		
Smoking	No	36.4%	23.6%	24.1%	0.008
		10	273	283	
	Yes	90.9%	99.3%	99.0%	
		1	2	3	
		9.1%	.7%	1.0%	

Table (2): association between presence some of chronic diseases and pregnancy follow up with Invitro Fertilization in the studied pregnant women

Variable	Response	IVF		Total (N=286)	P value
		Yes (n=11)	No (n=275)		
DM	No	11	260	271	0.426
		100.0%	94.5%	94.8%	
	Yes	0	15	15	0.621
		.0%	5.5%	5.2%	
Chronic hypertension	No	11	269	280	0.026
		100.0%	97.8%	97.9%	
	Yes	0	6	6	0.646
		.0%	2.2%	2.1%	
Bronchial Asthma	No	8	253	261	0.793
		72.7%	92.0%	91.3%	
	Yes	3	22	25	0.627
		27.3%	8.0%	8.7%	
Pre eclampsia	Yes	3	59	62	0.793
		27.3%	21.5%	21.7%	
	No	8	216	224	0.793
		72.7%	78.5%	78.3%	
Pregnancy follow up	No	2	42	44	0.793
		18.2%	15.3%	15.4%	
	Yes	9	233	242	0.627
		81.8%	84.7%	84.6%	
Nutritional education	No	5	105	110	0.627
		45.5%	38.2%	38.5%	
	Yes	6	170	176	

		54.5%	61.8%	61.5%	
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DISCUSSION:

Infertility affects 10–15% of couples of reproductive ages, and in the United States approximately 100,000 cases are treated each year via assisted reproductive technology [14]. IVF and other forms of assisted reproductive technology (ART) provide opportunities for increasing proportions of couples to achieve a pregnancy. In Vitro Fertilization (IVF) has become an established treatment for many forms of infertility. The main goal of IVF is to allow a patient the opportunity to become pregnant using her own eggs or donor eggs and sperm from her partner or from a donor. This is an elective procedure designed to result in the patient's pregnancy when other treatments have failed or are not appropriate. In general, the ovaries are stimulated by a combination of fertility medications and then one or more oocyte(s) are aspirated from ovarian follicles. These are fertilized in the laboratory ("in vitro"), after which, one or more embryo(s) are transferred into the uterine cavity. These steps occur over approximately a two-week interval of time, which is called an IVF cycle [15]. This is across sectional study was conducted among 286 of the studied pregnant mothers. The study aimed to show the prevalence and determinants of IVF in Arar city, Northern Saudi Arabia.

Among 289 studied pregnant mother there were 11 (3.8%) undergo in vitro fertilization. in Finland nowadays circa 3.6% of all infants, including those from multiple pregnancies, are conceived by in Vitro Fertilization (IVF) and assisted reproductive technology ART, while ART accounts for 1.4% of all infants in the USA [16]. Children conceived through ART comprise such as in vitro fertilization (IVF) as many as 3.3% of total births in Australia [17], 1.5% in Japan [18], 1.6% in USA [19], 5.9% in Denmark [20], and 1.7–2.2% in the largest European countries (Germany, France, United Kingdom, and Italy) [21]. A prospective cohort study was composed of 1161 pregnant women from them 223 women (19.2%) recruited following IVF [22]. According to Association between age group with in vitro Fertilization in the studied pregnant women, our study found that it was more prevalent in 25-35 age group by 90.9% without significant correlations ($p=0.13400$). However, another study found that there were significant correlations between age and in vitro fertilization ($p=0.0005$) and it was more prevalent among women 31- 35 years by 40.4% [22]. In Sweden, another study found that the majority of IVF women (44%) were 30-34 years' age group [23].

We found that 72.7% of women undergo in vitro fertilization had previous abortion which was higher than non in vitro fertilization group, this was

statically significant ($p=0.009$). This was higher than result of another study which reported previous abortion by 36.3% and it was not statistically significant [22].

As regards relation between in vitro fertilization and BMI group, we found that the majority were overweight 54.5% followed by obese 36.4% without significant correlations ($p=0.476$). similar to our result another study reported non- significant correlations between BMI and invitro fertilization but, the majority were normal weight 58.1% [22].

Our study reported twin's pregnancy in 36.4% of invitro fertilization cases and dingle 63.6%. However, in non invitro fertilization group twins reported by 5.2% and single 94.8%. In Sudan another study confirmed that IVF babies had higher incidence of multiple births, (45.8%) were twins, (18.8%) were triplets the remainder (35.4%) were singletons. However, in the control group (8.3%) were twins, (3.1%) were triplets and (88.5%) were singletons [24]. There was a statistically significant high incidence of multiple births in Ericson study, in which 27% of IVF pregnancies were multiple births in comparison with 1% in the control group [25].

Regarding to association between presence some of chronic diseases and pregnancy follow up with Invitro Fertilization in the studied pregnant women, we found no significant correlations with diabetes mellitus, chronic hypertension and pre -eclampsia but, there was significant correlation with bronchial asthma ($p=0.026$). Similar to our results another study found non-significant correlations between diabetes, hypertension and invitro fertilization but, in contrast to our result non statically significant found with asthma [22]. However, another study found that there was a statistically significant between invitro fertilization and Pre-eclampsia [26].

REFERENCES:

1. Ajayi, A., et al. "Awareness, Knowledge and Perception of in Vitro Fertilization among Final-Year Medical Students in South-West Nigeria." *International Journal of Pregnancy & Child Birth* 2 (2017).
2. Steptoe PC, Edwards RG. Reimplantation of a human embryo with subsequent tubal pregnancy. *Lancet* 1976; 1:880.
3. Steptoe PC, Edwards RG. Birth after the reimplantation of a human embryo. *Lancet* 1978; 2:366.
4. BBC. The birth of the world's first 'test-tube baby' has been announced in Manchester (England). Louise Brown was

- born shortly before midnight in Oldham and District General Hospital. 1978.
5. European Society of Human Reproduction and Embryology (3 Jul 2018).
 6. Ory SJ. The national epidemic of multiple pregnancy and the contribution of assisted reproductive technology. *Fertil Steril* 2013; 100:929.
 7. Maity A, Williams PL, Ryan L, Missmer SA, Coull BA, Hauser R. Analysis of in vitro fertilization data with multiple outcomes using discrete time-to-event analysis. *Stat Med*. 2013;33(10):1738-49.
 8. Geary, S. and Moon, Y. S. (2006) The human embryo in vitro – recent progress. *J. Reprod. Med.* 51, 293–302.
 9. Assisted reproductive technology surveillance -- United States, 2006. *MMWR Surveill Summ* 2009;58:1-25.
 10. Schieve L.A., Peterson H.B., Meikle S.F. Live birth rates and multiple birth risk using in vitro fertilization. *JAMA*. 2007;282:1832–1837.
 11. American College of Obstetricians and Gynecologists' Committee on Obstetric Practice, Committee on Genetics, U.S. Food and Drug Administration. Committee Opinion No 671: Perinatal Risks Associated With Assisted Reproductive Technology. *Obstet Gynecol* 2016; 128:e61. Reaffirmed 2018.
 12. Kathpalia SK, Kapoor K, Sharma A. Complications in pregnancies after in vitro fertilization and embryo transfer. *Med J Armed Forces India*. 2016;72(3):211-4.
 13. Kissin DM, Jamieson DJ, Barfield WD (2014) Monitoring health outcomes of assisted reproductive technology. *N Engl J Med* 371:91–93
 14. Centers for Disease Control and Prevention 2002 Assisted Reproductive Technology Success Rates, National Summary and Fertility Clinic Reports. Department of Health and Human Services.
 15. Paulson, Richard, R. L. Barbieri, and V. A. Barss. "In vitro fertilization." *UpToDate*, Waltham, MA (2016).
 16. Sunderam S, Kissin DM, Flowers L, Anderson JE, Folger SG, Jamieson DJ, Barfield WD. and Centers for Disease Control and Prevention (CDC) Assisted reproductive technology surveillance—United States, 2009, *MMWR Surveill Summ*, 2012, vol. 61 (pg. 1-23)
 17. Hansen M, Kurinczuk JJ, de Klerk N, Burton P, Bower C (2012) Assisted reproductive technology and major birth defects in Western Australia. *Obstet Gynecol* 120:852–863
 18. Fujii M, Matsuoka R, Bergel E, van der Poel S, Okai T (2010) Perinatal risk in singleton pregnancies after in vitro fertilization. *Fertil Steril* 94:2113–2117
 19. Centers for Disease Control and Prevention (2013) Assisted Reproductive Technology Fertility Clinic Success Rates Report. <http://www.cdc.gov/art/reports/2013/fertility-clinic.html>.
 20. Malchau SS, Loft A, Larsen EC, Aaris Henningsen AK, Rasmussen S, Andersen AN et al (2013) Perinatal outcomes in 375 children born after oocyte donation: a Danish national cohort study. *Fertil Steril* 99:1637–1643
 21. European IVF-Monitoring Consortium (EIM) for the European Society of Human Reproduction and Embryology (ESHRE), Calhaz-Jorge C, de Geyter C, Kupka MS, de Mouzon J, Erb K et al (2016) Assisted reproductive technology in Europe, 2012: results generated from European registers by ESHRE. *Hum Reprod* 31:1638–1652
 22. Farhi A, Reichman B, Boyko V, Hourvitz A, Ron-El R, Lerner-Geva L (2013) Maternal and neonatal health outcomes following assisted reproduction. *Reprod Biomed Online* 26:454–461
 23. Källén, Bengt, et al. "In vitro fertilisation in Sweden: obstetric characteristics, maternal morbidity and mortality." *BJOG: An International Journal of Obstetrics & Gynaecology* 112.11 (2005): 1529-1535.
 24. Gaily, Zeinab Mohammed, Eisir Abu Elhassan Elhussein, and Zein EIAbdeen AlRahim Karar. "Short-term Outcome of In-vitro Fertilization Babies (IVF) In Sudan." *NNJ* 10: 10-40.
 25. Ericson A, Hillensjo T, Nygren KG, Wennerholm UB. Deliveries and children born after in vitro fertilization in Sweden. *Lancet*. 1999; 354:1583.
 26. Sari Räisänen, Kaisa Randell, Henriette Svarre Nielsen, Mika Gissler, Michael R. Kramer, Reija Klemetti, Seppo Heinonen; Socioeconomic status affects the prevalence, but not the perinatal outcomes, of in vitro fertilization pregnancies, *Human Reproduction*, Volume 28, Issue 11, 1 November 2013, Pages 3118–3125, <https://doi.org/10.1093/humrep/det307>.