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Finding out the Relationship Generated between Atherosclerosis in Infertile Women by Conducting a Study in Iraq

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Abstract: Background: The greatest cause of mortality for women in the world is atherosclerotic cardiovascular disease (ASCVD). **Aim**: interested in Finding out the relationship generated between atherosclerosis in infertile women by conducting a study in Iraq. **Patients and methods:** This paper was presented as a cross-sectional study to find out the relationship generated between atherosclerosis in infertile women by conducting a study in Iraq where it contained into 66 patients which collect from different hospitals in Iraq from 17th June 2021 to 27th August 2022. To follow up of the methodology, this study was had into two groups which are the patients' group have, 36 patients who present as women have infertile, while the second group represents women don't have infertile with 30 cases. This study was designed and simulated of data outcomes by the SPSS program. **Results and Discussion**: our results complement a small study that used data which found that women with a history of infertility had a 7.58% higher risk of dying from cardiovascular disease (5 of 36 cases; median age, 38 years); they also compare with a Swedish study of a cohort of 80,000 women (median age, 50 years), in which infertility was linked to a 20% higher risk of incident cardiovascular disease compared with women without a history of infertility. **Conclusion**: In conclusion, we demonstrate that infertility overall was marginally linked with the risk of ASCVD among a varied cohort of women tracked for over two decades. Nevertheless, more severe phenotypes with infertility among women give substantial insight into a woman's cardiovascular health. Women with infertility who did not give birth to a live child or who experienced a miscarriage had a noticeably greater risk of ASCVD than women without infertility. Our results indicate that the reproductive years of a woman may offer a special opportunity for the early identification and management of ASCVD risk factors because infertility, as well as pregnancy loss, happens during this time.

Keywords: atherosclerotic cardiovascular disease; infertile; BMI; Clinical Phenotypes.

INTRODUCTION

The greatest cause of mortality for women in the world is atherosclerotic cardiovascular disease (ASCVD) [Heron, M, 2017]. Women often exhibit distinct ASCVD symptoms from males, are more likely to have a wrong diagnosis, and experience worse consequences, such as a greater chance of passing away following a significant cardiovascular event. To increase ASCVD prevention and treatment within women, novel approaches are required. In the United States, 15% of women of reproductive age have infertility, which is defined by the inability to get pregnant after trying for more than a year. [McSweeney, J.C. *et al*., 2003- Murugappan, G. *et al*., 2021]

When a woman is diagnosed with infertility, her chances for serious maternal morbidity, cancer, chronic illness, and mortality rise in addition to her desire to start a family. Uncertainty exists over the underlying causes of the link between infertility and morbidity [Murugappan, G. *et al*., 2019; Murugappan, G. *et al*., 2020], including whether the higher risk of morbidity is caused by infertility itself or by underlying disorders. Infertility and ASCVD have been linked in several studies, mostly in premenopausal women in reproductive age. The risk of ASCVD in infertile women in later life must be studied. [Murugappan, G. *et al*., 2009- Senapati, S, 2018]

While there is substantial diversity in the etiology and duration of infertility, as well as different biochemical pathways leading to ASCVD, current research still treats infertility as a single homogenous exposure. Extreme forms of infertility can be shown by the failure to give birth to a living child, which can take the form of pregnancy loss or nulliparity. Women with a history for infertility are more likely to be nulliparous, which is the condition of having not given birth to a child. Additionally, infertile women who never give birth to a living child may have a more severe version of the underlying

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illness process that causes infertility. [Parikh, N.I. *et al*., 2010- Hakim, R.B. *et al*., 1995]

Infertile women who conceive had a 2.6-fold greater chance of pregnancy loss compared to fertile women, even though pregnancy loss is separate from infertility. The most important risk factor for both infertility and miscarriage are age, and both are frequent manifestations of reproductive failure [Agenor, A. *et al*., 2015- Arnett, D.K. *et al*., 2019]. This paper is interested in Finding out the relationship generated between atherosclerosis in infertile women by conducting a study in Iraq.

PATIENTS AND METHODS

This paper was presented as a cross-sectional study to find out the relationship generated between atherosclerosis in infertile women by conducting a study in Iraq where it contained into 66 patients which collect from different hospitals in Iraq from 17th June 2021 to 27th August 2022. To follow up of the methodology, this study was had into two groups which are the patients' group have, 36 patients who present as women have infertile, while the second group represents women don't have infertile with 30 cases. This study was designed and simulated of data outcomes by the SPSS program.

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Furthermore, this study was started with a Distribution of infertile women patients based on ages who contain with ages between (24-45) years which can be seen in Table 1. In addition, this study determined with Prevalence of infertile women patients' symptoms that, which include Chest pain, dizziness, extreme tiredness, nausea, and shortness of breath; where these factors can be determined in Table 2.

This study was presented the Comorbidities of infertile women patients in comparison with control, which have on Diabetes, Hyperlipidaemia, Hypertension, and Smoking. That the result has shown in Table 3, this paper was extended with infertile women patients based on BMI where contain (>32.68), (30.58), (28.46), and (26.74), which have been found these outcomes in Table 4. To further of results, this study was determined of live births cases with infertile women patients that include >3, 0, 1, and 2. This outcome have been determined in Table 5. Also, this paper was determined into pregnancy loss cases with infertile women patients which get with >3, 0, 1, and 2, that can be express in Table 6. This paper was Compared between infertile women patients' group and the women control group based on clinical Phenotypes, which include Atherosclerotic cardiovascular disease, Clinical myocardial infarction, Cardiac procedure, Ischemic stroke, Peripheral arterial disease, Carotid artery disease, and Death due to cardiovascular disease that can be shown in Figure 1.

RESULTS

Table 1: Distribution of infertile women patients based on ages

N	**V**	66
	Mi	0
M		35.4091
StE		.78772
Me		35.5000
Mo		45.00
SD		6.39946
V		40.953
Sk		-.077
SES		.295
Ra		21.00
Min		24.00
Max		45.00
S		2337.00

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Table 2: Prevalence of infertile women patients' symptoms

		F, 66	P (%)	VP (%)	CP (%)
V	**Chest pain**	**12**	**18.2**	**18.2**	**18.2**
	dizziness	12	18.2	18.2	36.4
	extreme tiredness	9	13.6	13.6	50.0
	nausea	19	28.8	28.8	78.8
	shortness of breath	14	21.2	21.2	100.0
	T	66	100.0	100.0	

Table 3: Comorbidities of infertile women patients in comparison with control

		F,66	P (%)	VP (%)	CP (%)
V	Diabetes	13	19.7	19.7	19.7
	Hyperlipidaemia	30	45.5	45.5	65.2
	Hypertension	16	24.2	24.2	89.4
	Smoking	7	10.6	10.6	100.0
	T	66	100.0	100.0	

Table 4: Distribution of infertile women patients based on BMI

		F,66	P (%)	VP (%)	CP (%)
V	>32.68	23	34.8	34.8	34.8
	26.74	10	15.2	15.2	50.0
	28.46	16	24.2	24.2	74.2
	30.58	17	25.8	25.8	100.0
	T	66	100.0	100.0	

Table 5: Determination of live births cases with infertile women patients

		F,66	P (%)	VP (%)	CP (%)
V	**>3**	30	45.5	45.5	45.5
	0	8	12.1	12.1	57.6
	1	16	24.2	24.2	81.8
	2	12	18.2	18.2	100.0
	T	66	100.0	100.0	

Table 6: Determination of pregnancy loss cases with infertile women patients

		F,66	P (%)	VP (%)	CP (%)
V	**>3**	21	31.8	31.8	31.8
	0	19	28.8	28.8	60.6
	1	12	18.2	18.2	78.8
	2	14	21.2	21.2	100.0
	T	66	100.0	100.0	

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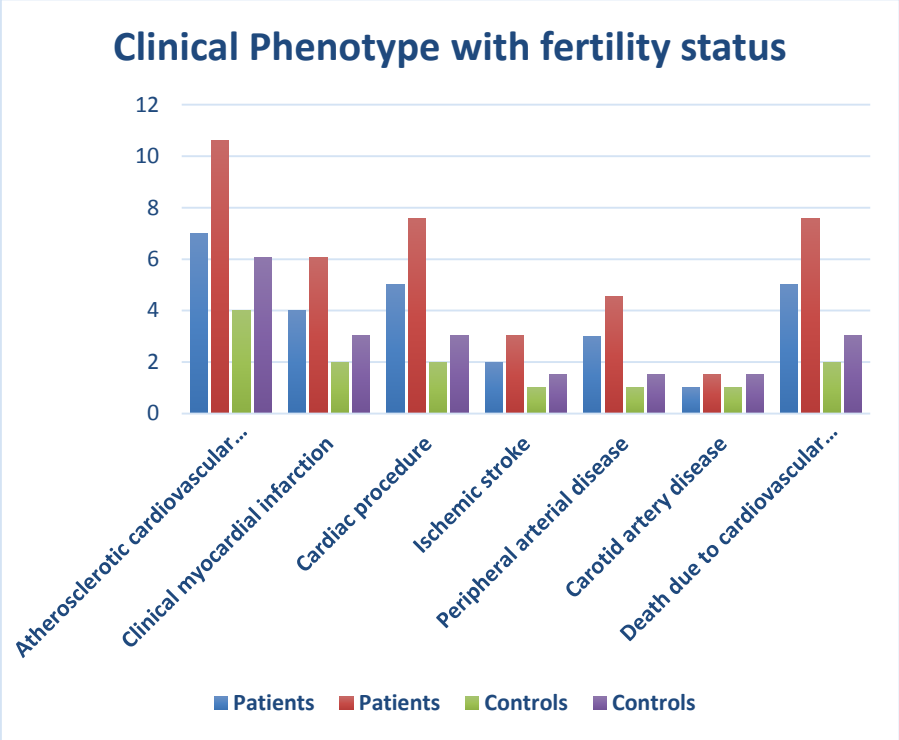

Figure 1: Compare between infertile women patients' group and women control group based on clinical Phenotypes

Table 7: Analysis logistic of pregnancy-related exposures into infertile women patients

Variables	ASCVD, N (%)	Crude HR (95% CI)	Adjusted HR (95% CI)
Comorbidities			
Patients group Controls Group	25 (37.88%) 11 (16.67%)	2.47 (0.88-4.28)	2.65 (0.74-5.66)
BMI			
Patients group Controls Group	34 (51.52%) 24 (36.36%)	3.582 (2.11-7.62)	4.21 (1.56-6.42)
Symptoms			
Patients group Controls Group	23 (34.85%) 16 (24.24%)	3.81 (1.045-8.262)	3.44 (1.35-7.22)
Clinical Phenotypes			
Patients group Controls Group	31 (46.97%) 10 (15.15%)	3.16 (1.57-5.44)	2.66 (0.77-4.68)
live births			
Patients group Controls Group	8 (12.12%) 24 (36.36%)	1.82 (0.55-3.25)	2.31 (0.40-4.21)
Pregnancy losses			
Patients group Controls Group	28 (42.42%) 6 (9.09%)	2.43 (2.40-5.11	3.15 (2.97-5.20)

DISCUSSION

Those with infertility exhibited a slightly increased risk of ASCVD compared to those without infertility within this large, multiracial group of postmenopausal women. The risk of ASCVD linked to infertility was significantly greater in nulliparous women, especially those who had experienced pregnancy loss. These results imply that infertility may be related to ASCVD risk in these more severe phenotypes. Our findings held up well after taking sociodemographic traits and ASCVD risk variables into account. [Curb, J.D. *et al*., 2003]

A new component of our study is the investigation into nulliparity along with pregnancy loss as more severe infertility phenotypes along with their relationship to ASCVD risk for infertile women. In a study conducted in Spain [Hughes, R.A. *et al*., 2019; Cairncross, Z.F. *et al*., 2021] between 2003

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and 2016, 56,000 infertile women (median age, 34 years) were shown to have a 14% greater risk of cardiovascular disease than fertile women.

Our results complement a small study that used data, which found that women with a history of infertility had a 7.58% higher risk of dying from cardiovascular disease (5 of 36 cases; median age, 38 years); they also compare with a Swedish study of a cohort of 80,000 women (median age, 50 years), in which infertility was linked to a 20% higher risk of incident cardiovascular disease compared with women without a history of infertility.

In our study, nulliparous women having a history for infertility who also had a miscarriage were the group at greatest risk for ASCVD. Women in infertility experience pregnancy loss more frequently, and it may be a more severe phenotype of infertility, with age being a prevalent risk factor. Loss of pregnancy is also independently linked to an 8% increased risk of ASCVD in women later in life. In a subgroup study of infertile nulliparous women, we discovered a non-significant but greater ASCVD risk among those who had lost three or more pregnancies but not among those who had only one. [Parikh, N.I. *et al*., 2016]

Our findings imply that both infertilities, therefore, miscarriage, may be linked to the chance of developing ASCVD, and further research into these exposures in additional cohorts is necessary. Evidence is mounting that pregnancy outcomes might be utilized to enhance cardiovascular disease risk assessment in women who conceive and give birth to live children. Pregnancy is thought of as a maternal stress test that can reveal future risk of cardiovascular disease because of the way the physiologic demands of pregnancy enhance subclinical metabolic as well as vascular susceptibilities. [Lane-Cordova, A.D. *et al*., 2020]

CONCLUSION

In conclusion, we demonstrate that infertility overall was marginally linked with the risk of ASCVD among a varied cohort of women tracked for over two decades. Nevertheless, more severe phenotypes with infertility among women give substantial insight into a woman's cardiovascular health. Women with infertility who did not give birth to a live child or who experienced a miscarriage had a noticeably greater risk of ASCVD than women without infertility. Our results indicate that the reproductive years of a woman may offer a special opportunity for the early identification and management of ASCVD risk factors because infertility, as well as pregnancy loss, happens during this time.

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