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Impact of lifestyle related factors on infertile women in Baghdad

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Abstract

Background: Many lifestyle variables have been shown to impact women's fertility throughout the last few decades.

Objectives: To compare effect of lifestyle factors on infertile and fertile women and find out if there is any association between demographic variables and life style status of the studied sample.

Methodology: A case-control study design was conducted where 400 women were involved. Two hundred infertile women were recruited as the study group, and another 200 fertile women were taken as the control group. Data were collected by a self-structured questionnaire that was established by researchers, based on data from relevant international studies.

Results: Patients were more avoidance to drugs, smoking, and alcohol than control group (P value = 0.04). There was significant negative correlation between socio-demographic variables and physical activity and exercise in patients group ($r=-0.199$, $p<0.05$). The odds of physical health were significantly decreased in females with free business (OR =0.278, 95% CI 0.103–1.39), and females with primary education (OR =0.430, 95% CI 0.165–1.121). The odds of environmental pollutants/harmful substance factor avoidance were significantly increased in persons with Primary education (OR =2.1, 95% CI 0.491–3.401; 2.33, 95% CI 0.13–2.33).

Conclusion: Lifestyle factors significantly affected female fertility, SES may play an important role in human fertility. The infertile women significantly had more avoidance of Drugs, smoking and alcohol than the fertile group.

Keywords: Lifestyle factors, infertile women, fertile women

Introduction

An inability to conceive had a negative impact on the couple's mental health, social life, and financial stability [1]. Lack of a healthy lifestyle might negatively impact fertility. After cancer and heart disease, the World Health Organization predicts that infertility will be the third leading cause of death globally in this century [2]. Failure to conceive after a year or more of regular, unprotected sexual activity is considered infertility [3]. Infertility may affect either the male or female reproductive system. Primary and secondary infertility both exist. When a person has never obtained a pregnancy, they are said to have primary infertility, whereas those who have once had a baby are considered to have secondary infertility [4]. Overall, the infertility prevalence is 9%, with a range of 3.5–16.70% in industrialized nations and 69.0–9.33% in underdeveloped countries. In the United States, infertility affects between 12-18% of couples [5]. According to the Public Survey of Family Growth, 6% of married American women aged 15–44 are sterile. Conversely, 25% of Chinese couples of childbearing age struggle with infertility [6]. Prevalence of infertility in Nigeria is between 20% to 30%, whereas in northeastern Ethiopia it is 21.2% and in the Gambia it is 9%. There is a dearth of information from Asia to Latin America. The World Health Organization estimates that between eight and twelve percent of couples of childbearing age suffer from infertility in these areas [7]. In Iran, 7.88% of couples experience infertility every year [8]. There were an estimated 3.588 live births per woman in Iraq in 2020, a decrease of 1.29% from 2019. Infertility affected (25% of) women of childbearing age in Tikrit City in 2010 [9]. A person's, communities, or culture's way of life may be defined as their beliefs, values, habits, and priorities in daily life. Overweight, smoking, other drug usage, and alcohol use all have negative effects on fertility in both men and women. Caffeine use, diet, and physical activity are just a few examples of lifestyle variables that may have a direct or indirect impact on a person's conceivability. Maintaining a healthy weight and way of life are two examples of non-medical measures that may help infertile people conceive [10].

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Aims of the study**The aims of the present work are:**

- Compare the effect of the lifestyle factors between infertile and fertile women
- Find out if there is any association between demographic variables and life style status of the studied sample.

Patients and Methods

Study design: a case control study design was used to conduct this study.

Setting: the study was conducted at infertility clinic of: *Kamal Al Samarrai Fertility Center, Al-Kadhimiya Hospital, Bagdad Teaching Hospital*. The study lasts 6 months duration from first of January till June 30th 2021.

Sample

The research included 400 female participants. Two hundred women with infertility diagnoses (hundred with primary infertility and one hundred with secondary infertility) were recruited as the study group (patients), while two hundred fertile women who sought contraceptive services at the same clinics served as the control group.

Data collection: Tools of data collection included anthropometric profile and lifestyle habits. Data were collected by a self-structured questionnaire that was established by the researchers, based upon data from relevant international studies [12, 13-16] and was validated by panel of experts, and through direct interview the researcher filled the questionnaire. The questionnaire consist of two parts:

Sociodemographic data such as:

Age /year, Type of infertility: Primary /Secondary, Education level, Occupation, House ownership, Car ownership, BMI to assess obesity.

- i. Underweight (having BMI < 18.5 kg/m²).
- ii. Normal by a BMI index $\geq 18.5 - 24.9$ (kg/m²)
- iii. Overweight by a BMI of 25 to 29.9(kg/m²)
- iv. Obese ≥ 30 (kg/m²)

Life style Factors questionnaire: which is composed of 50 questions distributed as follows:

Factor 1: Physical health: which consist of 9 questions.

Factor 2: Physical activity and exercise: which consist of 4 questions.

Factor 3: Mental health: which constitute of 9 questions.

Factor 4: Drug and alcohol avoidance: which consist of 7

questions.

Factor 5: Balanced consumption of food: which consist of 11 questions

Factor 6: Weight control and nutrition: which consist of 10 questions.

Scoring

Each question was given a number, agree =2, don't know =1 and don't agree=0

Then each factor was scored to good, Fair and poor according to the median:

Below the median (50% from total answer); poor

Above the median (50%-75% from total answers); fair

Above the median (75%-100% from total answers); good

Pilot study: done on 10% of participated women (40 women), 20 from each group, who were excluded from the study to test the clarity of the questions and to detect any further problems or difficulties that would help in making the necessary modifications requiring reconstructing the questionnaire.

Ethical consideration: Oral consent was obtained from all women who participated in study, and they were informed that the collected data were used for the study only and confidentiality was kept. An official permission with the number 564 at 11/4/2021 was obtained from the ethical committee of the Ministry of health, Kamal Al Samarrai Fertility Center, and Al-Kadhimiya Hospital to conduct this study.

Statistical Analysis: Numbers and percentages were used to define the categorical variables, while mean and standard deviation were used to characterize the continuous ones. When comparing two category variables, the 2-Test was utilized. The Student t-test was used to examine the significance of the differences between the continuous variables. The degree of connection between variables was determined using the Spearman correlation. To demonstrate the impact of demographics on lifestyle factors, researchers used logistic regression models. For statistical significance, a two-tailed P value of less than 0.05 was used. The statistical work was performed in SPSS 23.0.

Results: The participants aged between 19 to 40 years old. (Table 1) shows the sociodemographic characteristics of studied groups. There were insignificant differences between patients and control group regarding age, BMI, education, occupation and socioeconomic status ($p > 0.05$).

Table 1: The sociodemographic characteristics of studied groups.

Sociodemographic Characteristics		Control	Patients	P Value
Age groups (years)	≤ 20	14	9	0.27
	21-30	105	96	
	31-40	81	95	
Age (years), (Mean ±SD)		29.29±6.53	30.37±6.21	0.091
BMI groups (Kg/m ²)	Normal	65	57	0.79
	Over-weight	84	89	
	Obese	51	54	
BMI (Kg/m ²), (Mean ±SD)		27.70 ±5.25	27.53±5.07	0.745
Education	Primary	18	14	0.35
	Secondary	64	52	
	Collage	14	20	
	Postgraduate	104	114	
occupation	House wife	129	109	0.6
	Free business	12	33	
	Employer	59	58	
Socioeconomic status (SES) Groups	High	60	71	0.43
	Intermediate	78	78	
	Low	62	51	
Socioeconomic status (SES) score		8.60±2.73	8.17±2.78	0.12

*P Value < 0.05 was significant

The Association between both study groups(patients, control)and the life style factors levels is shown in table (2) were insignificant differences between patients and control group regarding physical health, physical activity and exercise, mental health, Balanced consumption of food and

exposed to Environmental pollutants/harmful substance ($p>0.05$), while There was significant differences between patients and control group regarding drugs, smoking, alcohol avoidance, patients more avoidance to drugs, smoking, alcohol than control group (P Value=0.04*).

Table 2: The Association between both study groups (patients, control) and the life style factors levels

Studied Factors Control	Groups	Good	Fair	Poor	P Value
Physical health	Control	34	82	84	0.159
	Patients	43	91	66	
Physical activity and exercise	Control	22	35	143	0.354
	Patients	28	26	146	
Mental health	Control	104	79	17	0.27
	Patients	100	73	27	
Drugs, smoking, alcohol avoidance	Control	159	25	16	0.04*
	Patients	172	23	5	
Balanced consumption of food	Control	53	78	69	0.28
	Patients	67	74	59	
Environmental pollutants/harmful substance	Control	3	28	169	0.18
	Patients	3	42	155	

*P Value < 0.05 was significant

Association between socioeconomic status (SES) for both groups and studied life style factors was shown in (table 3). There were significant negative correlation between (SES)

and Physical activity and exercise in patients group ($r=-0.199, p<0.05$).

Table 3: Association between socioeconomic status and studied lifestyle factors in studied group (patients, control)

Studied Factors	Correlation	Control	Patients
		SES	SES
Physical health	R	0.053	-0.031
	P	0.459	0.668
	Odds ratio	1.057	0.96
Physical activity and exercise	R	0.049	-0.199*
	P	0.486	0.005
	Odds ratio	1.013	0.81
Mental health	R	-0.027	-0.039
	P	0.702	0.584
	Odds ratio	0.99	0.96
Drugs, smoking, alcohol avoidance	R	0.030	0.054
	P	0.672	0.448
	Odds ratio	1.05	1.05
Balanced consumption of food	R	0.001	-0.036
	P	0.998	0.612
	Odds ratio	1.016	0.96
Environmental pollutants/harmful substance	R	0.083	-0.079
	P	0.243	0.267
	Odds ratio	1.042	1.17

R correlation Coefficient *P Value < 0.05 was significant

While logistic regression analyses were conducted to assess the association between socio-demographic characteristics and physical health in both groups (Table 4). The logistic regression models illustrated that the odds of physical health

was significantly decreased in females with free business (OR =0.278, 95% CI 0.103–1.39). Occupation may be having a significant predictor of physical health in studied group

Table 4: The association between socio-demographic characteristics and physical health in both groups (patients, control)

Socio-demographic Characteristics		Physical health	P value	Odds ratio	Lower limit	Upper limit
Age (years)		Fair	0.624	0.992	0.962	1.024
		Poor	0.681	1.002	0.993	1.011
BMI (Kg/m ²)		Fair	0.291	1.030	0.975	1.088
		Poor	0.135	1.044	0.987	1.104
Education	Primary	Fair	0.651	1.283	0.435	3.785
	Secondary	Fair	0.729	.897	0.484	1.661
	Collage	Fair	0.351	1.650	0.576	4.730
	Postgraduate	Fair	-	-	-	-
	Primary	Poor	0.493	1.467	0.490	4.387
	Secondary	Poor	0.606	1.177	0.634	2.187
	Collage	Poor	0.705	1.241	0.405	3.803
	Postgraduate	Poor	-	-	-	-
occupation score	House wife	Fair	0.223	0.669	0.350	1.278
	Free business	Fair	0.172	0.543	0.226	1.304
	Employer	-	-	-	-	-
	House wife	Poor	0.318	0.716	0.371	1.40
	Free business	Poor	0.012*	0.278	0.103	1.39
	Employer	-	-	-	-	-
SES		Fair	0.461	1.037	0.941	1.143
		Poor	0.555	1.030	0.933	1.138

The reference category is: good
The odds of Physical activity and exercise was significantly

decreased in females with primary education (OR =0.430, 95% CI 0.165–1.121), as shown in (table 5).

Table 5: The association between socio-demographic characteristics with Physical activity and exercise.

Socio-demographic Characteristics		Physical activity and exercise	P value	Odds ratio	95% Confidence Interval for odds ratio	
					Lower limit	Upper limit
Age (years)		Fair	0.446	0.977	0.920	1.037
		Poor	0.127	1.038	0.989	1.089
BMI (Kg/m ²)		Fair	0.500	0.976	0.908	1.048
		Poor	0.549	0.983	0.929	1.040
Education	Primary	Fair	0.523	0.661	0.186	2.355
	Secondary	Fair	0.574	1.273	0.548	2.958
	Collage	Fair	0.166	3.241	0.614	7.095
	Postgraduate	Fair	-	-	-	-
	Primary	Poor	0.044*	0.430	0.165	1.121
	Secondary	Poor	0.375	0.734	0.371	1.453
	Collage	Poor	0.409	1.883	0.420	8.440
	Postgraduate	Poor	-	-	-	-
occupation score	House wife	Fair	0.831	0.905	0.362	2.264
	Free business	Fair	0.804	1.179	0.321	4.326
	Employer	-	-	-	-	-
	House wife	Poor	0.176	0.605	0.292	1.253
	Free business	Poor	0.349	0.598	0.204	1.755
	Employer	-	-	-	-	-
SES		Fair	0.772	1.021	0.889	1.172
		Poor	0.064	1.111	0.994	1.242

The reference category is: good

The odds of Mental health factor was insignificantly decreased with occupation and nearly no association, with

age, BMI as shown in table 6.

Table 6: The association between socio-demographic characteristics with mental health factor in both studied groups (patient, control)

Socio-Demographic Characteristics		Mental health	P value	Odds ratio	95% Confidence Interval for odds ratio	
					Lower limit	Upper limit
Age (years)		Fair	0.099	1.026	0.995	1.059
		Poor	0.153	1.024	0.991	1.058
BMI (Kg/m ²)		Fair	0.577	1.012	0.971	1.054
		Poor	0.806	1.008	0.946	1.074
Education	Primary	Fair	0.597	0.802	0.354	1.817
	Secondary	Fair	0.327	0.784	0.482	1.275
	Collage	Fair	0.120	0.530	0.239	1.179
	Postgraduate	Fair	.	.	.	.
	Primary	Poor	0.527	1.427	0.474	4.290
	Secondary	Poor	0.901	1.048	0.502	2.186
	Collage	Poor	0.256	0.415	0.091	1.890
	Postgraduate	Poor	.	.	.	.
occupation score	House wife	Fair	0.620	0.887	0.553	1.423
	Free business	Fair	0.470	0.758	0.357	1.608
	Employer	-	.	.	.	.
	House wife	Poor	0.760	0.891	0.425	1.868
	Free business	Poor	0.867	1.096	0.373	3.223
	Employer	-	.	.	.	.
SES		Fair	0.393	1.033	0.958	1.115
		Poor	0.953	1.004	0.892	1.129

The reference category is good

Table 7 showed that there was nearly no association between drugs, smoking, alcohol avoidance with SDC with, age, BMI, education and occupation ($p > 0.05$).

Table 7: The association between socio-demographic characteristics with Drugs, smoking, alcohol avoidance. In both studied groups (patients, control)

Socio-Demographic Characteristics		Drugs, smoking, alcohol avoidance	P value	Odds ratio	95% Confidence Interval for odds ratio	
					Lower limit	Upper limit
Age (years)		Fair	0.819	0.999	0.993	1.006
		Poor	0.567	0.980	0.915	1.050
BMI (Kg/m ²)		Fair	0.428	1.026	0.964	1.092
		Poor	0.589	1.023	0.943	1.109
Education	Primary	Fair	0.923	.939	0.263	3.352
	Secondary	Fair	0.377	0.683	0.293	1.591
	Collage	Fair	0.836	1.127	0.363	3.500
	Postgraduate	Fair	.	.	.	.
	Primary	Poor	0.689	1.378	0.286	6.629
	Secondary	Poor	0.270	1.691	0.665	4.298
	Collage	Poor	0.99	1.00	0.11	1.033
	Postgraduate	Poor	.	.	.	.
occupation score	House wife	Fair	0.642	0.842	0.407	1.741
	Free business	Fair	0.210	0.375	0.081	1.737
	Employer	-	.	.	.	.
	House wife	Poor	0.279	1.866	0.603	5.768
	Free business	Poor	0.823	1.220	0.215	6.919
	Employer	-	.	.	.	.
SES		Fair	0.759	1.019	0.902	1.151
		Poor	0.147	0.884	0.748	1.044

The reference category is good

The current study showed that there was nearly no association between Balanced consumption of food with

certain SDC, age, BMI, Education and occupation (table 8) were P Value (> 0.05).

Table 8: The association between socio-demographic characteristics with balanced consumption of food factor among both groups (patients, control).

Socio-Demographic Characteristics		Balanced consumption of food	P Value	Odds ratio	95% Confidence Interval for odds ratio	
					Lower limit	Upper limit
Age (years)		Fair	0.318	1.019	0.982	1.058
		Poor	0.919	0.998	0.960	1.038
BMI (Kg/m ²)		Fair	0.783	0.993	0.947	1.042
		Poor	0.320	1.025	0.976	1.076
Education	Primary	Fair	0.832	0.909	0.376	2.196
	Secondary	Fair	0.544	1.187	0.682	2.065
	Collage	Fair	0.767	1.136	0.488	2.645
	Postgraduate	Fair	.	.	.	.
	Primary	Poor	0.474	0.709	0.277	1.818
	Secondary	Poor	0.849	0.945	0.531	1.684
	Collage	Poor	0.351	0.630	0.239	1.662
	Postgraduate	Poor	.	.	.	.
occupation score	House wife	Fair	0.553	1.179	0.684	2.032
	Free business	Fair	0.881	1.066	0.462	2.463
	Employer	-	.	.	.	.
	House wife	Poor	0.861	0.951	0.545	1.660
	Free business	Poor	0.812	0.900	0.378	2.142
	Employer	-	.	.	.	.
SES		Fair	0.993	1.000	0.917	1.090
		Poor	0.603	1.024	0.936	1.120

The reference category is good

The odds of with Environmental pollutants/harmful substance factor avoidance was significantly increased in

persons with Primary education (OR =2.1, 95% CI 0.491–3.401; 2.33, 95% CI 0.13–2.33). As shown in table 9.

Table 9: The association between socio-demographic characteristics with Environmental pollutants/harmful substance factor in both studied groups (patients, control).

Socio-Demographic Characteristics		Environmental pollutants /harmful substance	P value	Odds ratio	95% Confidence Interval for odds ratio	
					Lower limit	Upper limit
Age (years)		Fair	0.314	1.069	0.939	1.217
		Poor	0.310	1.070	0.939	1.218
BMI (Kg/m ²)		Fair	0.487	1.059	0.902	1.243
		Poor	0.345	1.078	0.923	1.259
Education	Primary	Fair	0.001	2.1	0.491	3.401
	Secondary	Fair	0.254	0.372	0.068	2.037
	Collage	Fair	0.1	1.6	0.712	4.839
	Postgraduate	Fair	.	.	.	.
	Primary	Poor	0.02	2.33	0.13	2.33
	Secondary	Poor	0.488	.564	0.112	2.848
	Collage	Poor	0.01	2.1	0.23	2.44
	Postgraduate	Poor	.	.	.	.
occupation score	House-wife	Fair	0.695	0.690	0.107	4.433
	Free business	Fair	0.828	0.759	0.062	9.231
	Employer	-	.	.	.	.
	House-wife	Poor	0.615	1.589	0.261	9.680
	Free business	Poor	0.831	0.767	0.067	8.750
	Employer	-	.	.	.	.
SES		Fair	0.686	1.064	0.788	1.435
		Poor	0.710	0.946	0.708	1.265

The reference category is good

Discussion

This examination researched the sociodemographic factors that may possibly impact fertility. In total, sample of 400 women were involved in this study. Two hundred infertile women (Patients) and two hundred fertile women as the control group.

Sociodemographic characteristics of studied groups

There were insignificant differences between patients and control group regarding age, BMI, education, occupation and socioeconomic status of these factors, it has been noted that improved education, which stimulates higher interest in

financial life, is the most influential on lowering fertility rates. It’s possible that the higher rates of educated women shown in this research may be partially explained by the fact that individuals in higher SES areas have more access to health care and better control over their reproductive health than those in lower SES communities. One possible explanation is that persons of higher socioeconomic status marry at an older age and pay more attention to family planning overall [16].

Our findings were consistent with those of Amal and Yehia [17], who reported that there was no statistically significant difference in BMI between infertile and fertile females,

despite the fact that over half of both groups were overweight (defined as a BMI of 18.5-24.9) [20].

The Association between both study groups (patients, control) and the life style factors levels

The current study showed a significant differences between patients and control group regarding drugs, smoking, alcohol avoidance, and patients group were more avoidance to drugs, smoking, and alcohol than control group. Smoking has a wide range of negative effects on female reproductive organs such the ovary, oviduct, and uterus [18].

Many studies on women with infertility due to ovulatory dysfunction and tubal infertility demonstrated that cocaine and other addiction drugs significantly augmented the hazard of primary tubal infertility, the impacts for smoking on eggs and sperm quality are changeable. Quitting of male or the female partner (or both) who smokes, will increase the chance of conceiving and having a healthy baby. So the physician always advice patients who want to conceived for quitting these bad habits [19].

Association between socioeconomic status (SES) for both groups and studied life style factors

In this study there were significant negative correlation between (SES) and Physical activity and exercise in patients group. This result agree with Guessous *et al.* how found negative correlation between (SES) and physical activity and exercise [20], high socio economic status may lead to decrease physical activity by relying on modern technology in accomplishing daily required activities driving cars, instead of walking.

The association between socio-demographic characteristics and physical health in both groups (patients, control)

This study illustrated that the odds of physical health was significantly decreased in females with free business. Occupation may be having a significant predictor of physical health in studied groups. There has been incongruity amongst the studies that have looked at the connection between health and a person's work. Higher educational attainment was proven to be an independent predictor of improved health in the United States by Fujishiro *et al.* [21].

Occupation somewhat affects both income and education, lending credence to the complicated interplay between these and other SES determinants.

The association between socio-demographic characteristics with Physical activity and exercise

Primary-school educated women had a far lower likelihood of engaging in physical activity and exercise. As previous research has shown, that those with lower levels of education were more likely to report feeling unwell on their own. Because people at the greatest levels of education have larger health potentials, it's possible that those at the lowest levels of education have inferior physical health or functional status [22], which might be explained in part by the fact that more educated people have more options for generating revenue.

The association between socio-Demographic characteristics with mental health factor in both studied groups (patient, control)

Psychological wellness which is considered as a significant

factor in patients with infertility, in addition to infertility, treatment of infertility present arrangement of stressors, including extensive and costly treatment, emotional distresses and physically difficult protocols [23].

The current study showed that the mental health factor was insignificantly decreased with occupation. Poor emotional wellness was observed to be both an outcome of and hazard factor for joblessness in equivalent qualities, far beyond the affiliation saw between these two factors. Our finding that is type of occupation reliably connected with psychological well-being [24].

The association between socio-demographic characteristics with Drugs, smoking, alcohol avoidance. In both studied groups (patients, control)

There was no association between drugs, smoking, and alcohol avoidance with, age, BMI, education and occupation in this study. This may be due to cultural background as an eastern community, the prevalence of consumption of these products is limited, on the other hand infertile women tend to avoid unhealthy behavior that may affect her fertility chance.

The association between socio-Demographic characteristics with Environmental pollutants/harmful substance factor in both studied groups (patients, control)

The current study showed that there was insignificant association between environmental factors and SDC, however outside air contamination has been related with an expanded danger of different disease and mortality related with different illnesses including conceptive issue [25]. Expose to air contamination is excessively higher in lower SES communities, so a reproductive and environmental system is valuable when investigate the connection between air poisons and sociodemographic factors on conceptive issue [26].

As indicated by the Endocrine Society, considers have shown that a few toxins and harmful substance act as endocrine disruptors disturbed germ cell function and effect on follicles in ovarian tissue led to disturbed follicle development, and disturb steroid hormone levels, these synthetic substances are additionally connected with abnormal puberty, unpredictable menstrual cycle, decreased fertility, PCOS and endometriosis [27].

In a planned report, Messerlian *et al.* assessed the relationship between some substance toxins and antral follicle development in an investigation that included 215 infertile ladies. The more elevated levels of urinary compound toxin adversely corresponded with antral follicle count showing that they are related with lower ovarian reserve in infertile women [28].

Conclusions

Lifestyle factors significantly affected female fertility, the present study shows that the SES may be played an important role in human fertility:

- The infertile women significantly had more avoidance to Drugs, smoking and alcohol than. Fertile group. However, no significant difference was observed between groups regarding the physical, mental health, balanced consumption of food and Environmental pollutants/harmful substance.
- It demonstrates that a sizeable fraction of infertile

women has many negative lifestyle-related variables that may affect not just their fertility but also the success of their infertility therapy.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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