

## Effect of Maternity-Led Pro-Fertility Lifestyle Intervention on Health-Promoting Behaviors of Women undergoing Infertility Treatment

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### Abstract

**Background:** Improving infertile couples' lifestyles resulted in improved performance, higher quality of life, and lower health-care costs. **Aim of the study:** to evaluate the effects of Maternity-Led Pro-Fertility Lifestyle Intervention on Health-Promoting Behaviors of Women undergoing Infertility Treatment. **Design:** A quasi-experimental one-group (pre-test and post-test) research design was adopted which was conducted in the Gynecological outpatient clinic at the private Ajyal hospital in Sohag, Egypt. **Sample:** A purposive sample of 94 infertile women were recruited for this study. **Tools:** Two tools were used: **Tool (1)** A structured interview questionnaire included three parts. **Tool(2)** Health-Promoting Lifestyle Profile [HPLP II]. **Results :** The total mean score of the health-promoting lifestyle profile domains, including health responsibility, physical activity, nutrition, spiritual growth, personal relationships, and stress management, were significantly improved in post-intervention study participants' women compared to pre-intervention study participants' women (p. 0.001) **Conclusion:** A maternity-led pro-fertility- lifestyle intervention was found to be successful in altering lifestyle risk factors for infertility and enhancing the effectiveness of infertility therapy by boosting pregnancy rates and correcting risk factors. **Recommendations:** The maternity-led pro-fertility lifestyle intervention must be clinically applicable and integrated into routine practice for infertile patients. Prioritize a healthy lifestyle above Assisted Reproductive technique (ART) by adopting a pro-fertility health-promoting lifestyle.

**Key words:** Pro-fertility promoting lifestyle , Maternity-led intervention, infertile women.

### Introduction

Infertility is defined as the "inability to conceive after 12 months of unprotected sexual intercourse." It is further subdivided into primary and secondary infertility. Primary infertility is defined as the inability to conceive after a year of unprotected sexual activity without any prior pregnancies. Secondary infertility occurs when couples who have previously conceived children are unable to do so. (Deyhoul et al.,2017 and Benksim et al., 2018).

According to the WHO, around 20% of developed-country couples and 25% of

Un developing-country couples have experienced infertility at some point in their relationship. According to epidemiological studies, there may be up to 186 million infertile couples worldwide. It is a problem that affects between 15% and 20% of marriages, according to experts. (WHO,2020).

Being overweight or underweight (which can interfere with hormone function), hormonal imbalances causing irregular ovulation, fibroid, tubal obstructions, reduced oocyte quality, chromosomal abnormalities, age over 27, a history of pelvic inflammatory disease (PID), smoking and alcohol use, decreased frequency of coitus, congenital anomalies of the cervix

and uterus, and immune system deficiencies are all risk factors for female infertility. Infertile women also exhibit much greater levels of stress, anger, anxiety, and despair, in addition self-blame and suicidal ideation. (Ashraf et al., 2020).

A person's way of life is referred to as their lifestyle, which may include various eating and nutritional habits, sleeping patterns, smoking, physical activity, stress reduction techniques, and use of medical services. Each person's lifestyle influences their health and well-being. As a result, promoting habits and living a healthy lifestyle are two crucial ways to ensure and preserve health. (Ricci, 2020).

Health promotion is a responsibility that extends beyond the health sector and is linked to everyone in the community who leads a healthy lifestyle. It is a process of empowering individuals to raise their control power and improve their health, according to the World Health Organization (WHO, 2022).

Several studies have found a link between infertility and lifestyle. Homan et al., 2007 and Anderson et al., 2010 reported, for example, that various lifestyle and environmental factors may be connected with human health and unsuitable reproductive outcomes. Modifying fertility-related behaviors could thus be the first step in assisting infertile couples and enhancing their chances of conception. Modifiable habits in one's lifestyle can be employed as an assisted reproductive factor (Chavarro et al., 2007).

Also, participants do not engage in all health-promoting behaviors at an adequate level, particularly physical activity and health responsibility. Nonetheless, these activities are essential for improving quality of life, maintaining health, and promoting reproduction. Therefore, it is essential to offer strategies, including those that are based on indicators of behaviors that promote health, in order to improve the health of infertile couples. The nurse's role in preventing and treating infertility is critical; the nurse should analyze the existence of risk factors such as age, chronic disease, stress, and poor diet. (Mirhafourvand et al., 2014). The nurse

should also educate the couples on the symptoms, causes, diagnostic processes, treatments, and healthy lifestyle choices. The nurse can alleviate stress and worry about diagnostic tests and therapies by explaining the timing and reasoning behind them (Hatfield, 2013).

### **Significance of the study**

Infertility prevalence has a significant psychological, economic, demographic, and medical implications. It affects 12% of Egyptian couples, according to a study by the Egyptian Fertility Care Society. Primary infertility affects 4.3% of these women (never been pregnant), and secondary infertility affects 7.7%. more than 25 million women between the ages of 15-49 are present in Egypt, indicating that at least 3 million are infertile (CDC, 2020 and El-Sherif et al., 2021).

Egyptian women are still adhering to their ancient and traditional way of life, particularly the inherited rudimentary prescriptions for infertility therapy. In the 19<sup>th</sup> and early 20<sup>th</sup> centuries, illiterate and jobless women's first options for reproductive treatment were faith and traditional healers. (Hassan, 2016).

The prevalence of primary and secondary infertility in Egypt was 9 and 16%, respectively. Furthermore, Infertility has been linked to overweight and obesity, a sedentary lifestyle, irregular menstruation, a history of pelvic inflammatory disease, and passive smoking. However, there is a paucity of nursing research in Egypt defining risk factors for infertility in women, thus the current study examined risk factors and encouraged lifestyle intervention on modifiable infertility risk factors in infertile women. (Sanad et al., 2019).

### **Operational definition:**

**Pro-fertility promoting lifestyle:** lifestyle behaviors that enhance and promote fertility and promote successful conception rate

**Maternity-led intervention:** is a program developed under the framework of a

health-promoting lifestyle model provided to infertile women who are educated and trained by community health nurses regarding pro-fertility health promotion to modify their lifestyle behaviors.

#### Research hypothesis:

To achieve the study's aim, the following research hypothesis is proposed:

**H (1):** Infertile women who receive the intervention will have better health-promoting lifestyle implementation as well as a higher health-promoting lifestyle model score.

**H (2):** Infertile women who receive the intervention and better implement the pro-fertility lifestyle instructions will exhibit high success rates of treatment by the occurrence of pregnancy and correcting lifestyle health behaviors.

#### The study's aims are as follows:

- To evaluate the effects of Maternity-Led Pro-Fertility Lifestyle Intervention on Health-Promoting Behaviors of Women undergoing Infertility Treatment.

- Determine the effect of the intervention-related improvement on the clinical pregnancy outcome of infertility treatment.

#### Subjects and Methods

**Research Design:** A quasi-experimental one-group (pre-test and post-test) research design was adopted in this study. This design, like a true experiment, tries to establish a cause-and-effect link between an independent and dependent variable. However, unlike a true experiment, a quasi-experiment does not rely on random assignment. Instead, participants are selected based on non-random characteristics.

#### Setting:

The research was carried out at the Gynecological outpatient clinic at the private Ajyal hospital in Sohag, Egypt (for delaying pregnancy and infertility treatment).

#### Sample Size:

The current study will have conducted on a purposive sample of 94 women. The sample was calculated according to the following equation:

$$n = \frac{[DEFF * N * p(1-p)]}{[(d^2/Z^2)1 - \alpha/2 * (N-1) + p*(1-p)]}$$

DEFF = 1 (Design impact)

N = 287 (population).

10% +/- p (Hypothesized%)

d = 0.05 (tolerated margin of error)

Z (confidence level) = 1.96

$\alpha$  (Alpha) = 0.05

n =

$$\frac{[1 * 287 * 10\% + / - 5 (1 - 10\% + / - 5)]}{[(0.05)^2 / (1.96)^2 - 0.05 / 2 * (287 - 1) + 10\% + / - 5 (1 - 10\% + / - 5)]}$$

n = 94 women

**Subjects:** A purposive sample of 94 infertile women were recruited for this study.

**inclusion criteria as:** Women with infertility (primary or secondary) who have at least one of the modifiable risk factors that have been shown to negatively affect fertility (smoking, body mass index less than 18.5 kg/m<sup>2</sup> and greater than 25 kg/m<sup>2</sup>, over-exercising or not exercising at all, caffeine consumption of more than 300mg/day, and high levels of stress) agreed to participate in the study, attending all intervention sessions and completing follow-up. Women who had no modified risk factors and declined to participate in the trial, women with male factor infertility and those who were older than 40 years, as well as those who did not complete the program sessions and follow-up, were omitted.

**Time enrollment:** women were invited to participate in the study after their first clinic visit, during the period from the first of January 2022 to the end of July 2022.

#### Data collecting tool:

The following tools were used to acquire data: **Tool 1:** A structured interview questionnaire: It was established by researchers using a variety of relevant national and

international literature (Youness EM., 2018 & Sanad Z., 2019 ), and was divided into three parts:

**Part 1: Included demographic data** such as age, educational status, and work status, residence, monthly income, and marriage duration.

**Part 2: Included data about women's medical and assisted reproductive technique (ART) histories**, such as the type of infertility, the duration of seeking infertility therapy, the history of ART trials, and the number of trials.

**Part 3: Assessment of women's lifestyle risk factors:** The researchers developed this part based on current, national, and international literature. It aimed to assess the exact women used for lifestyle risk evaluation of females that have been indicated to affect fertility negatively, which included: an assessment of obesity by calculation of BMI (kg/m<sup>2</sup>); it comprised:

(a) **BMI assessment scale:** This was used to assess obesity. It was done by calculating BMI as an indicator of the degree of obesity by kg/m<sup>2</sup> for both groups. In this study, the researcher determined obesity by a measure, that is, BMI, based on calculating the height and weight of the women and determine the following:

- Normal having BMI index 18.5 – 24.9 kg/m<sup>2</sup>
- Overweight having BMI of 25.0-29.9 kg/m<sup>2</sup>
- Underweight having BMI<18.5 kg/m<sup>2</sup>
- Obese having BMI 30.0 kg/m<sup>2</sup> or greater

(b) **Assessment of physical exercise** if little, moderate, or vigorous

(c) **History of passive smoking**

(d) **Drinking caffeinated drinks** such as tea and coffee for more than 300 mg/day

(e) **Hours of sleep/day** ( if >6 hrs. or 6-8 hrs.).

(f) **Suffering from stress** ( if no, average, Intense)

(g) **Exposure to environmental pollutants/ chemicals**

**Tool 2: Health-Promoting Lifestyle Profile [HPLP II] (Adult version) (walker et al., 1995)**

Model for Promoting Health - Tools for Measuring Health Promoting Lifestyle 52 item measuring health responsibility, physical activity, food, spiritual development, stress reduction, and interpersonal relationships looks at how frequently people engage in these behaviors. There are four selections for each item: never (1), occasionally (2), frequently (3), and always. The total score range is 52 and the scores for each dimension are determined independently.

#### Scoring system

The average of the respondent's responses to each of the 52 items gets a score for an overall health-promoting lifestyle; similarly, the average of the responses to the six subscale items yields scores for each of the six subscales. To preserve the 1 to 4 metric of item responses and to enable meaningful comparisons of scores across subscales, means should be used rather than sums of scale items.

**The following items are included on each scale:**

#### 1 to 52 Health-Promoting Lifestyle

Health Duty 3, 9, 15, 21, 27, 33, 39, 45, 51  
 Physical Activity 4, 10, 16, 22, 28, 34, 40, 46  
 Nutrition 2, 8, 14, 20, 26, 32, 38, 44, 50  
 Spiritual Development 6, 12, 18, 24, 30, 36, 42, 48, 52  
 Interpersonal Relations 1, 7, 13, 19, 25, 31, 37, 43, 49  
 Stress Reduction 5, 11, 17, 23, 29, 35, 41, 47

#### Pilot study:

Before beginning data collection, a

pilot study was conducted on 10% of the study subjects to evaluate the provisionally constructed tools for clarity and application, as well as to estimate the time required to gather data. The necessary changes were then made before to the actual investigation. The pilot research data were not included in the study.

#### **Validity:**

The tools were examined for face and content validity by five experts:(1) from Obstetrics and Gynecology medicine, (2) Obstetrics and Gynecology nursing, and (2) from community health nursing. They were also asked to provide feedback on the tool's content, correctness, relevancy, and relevance to the research purpose. Finally, only minor changes were made to accommodate the judge's ruling.

#### **Reliability**

Cronbach's alpha test and correlation coefficient between the two tests were assessed for determining the reliability, which was 0.854 respectively for study's tools.

#### **Ethical consideration:**

Official permission clarifying the goal of the study was obtained to get the approval of the ethical committee of the Faculty of Nursing, Sohag University, as well as the director of administrative clinic at private Ajyal Hospital; all gave their official permission and approval before the study's conduct. Furthermore, the researchers received verbal agreement for participation from all female participants, describing the goal of the study and promising confidentiality would be maintained during the investigation. All participants were advised that their information would be kept private and used exclusively for research reasons, that their participation in the study was fully voluntary, and that they could opt out at any time.

#### **Fieldwork:**

This study took place from the beginning of January 2022 to the end of July 2022. Implemented throughout five successive

stages were used to conduct the current study: preparatory, interview, assessment, intervention, and evaluation.

#### **• Preparatory phase:**

It was enacted after obtaining permission from the director and head of the previously stated sittings to gather data. The study's objectives and the main procedure were explained in the letter. After a thorough, meticulous, crucial analysis and review of the relevant literature, the tools for data collection, as well as the content of the program, were developed, a colored guide booklet was designed based on intensive related literature and up-to-date clinical guidelines. Specialized professors evaluated this guide booklet at the faculty of Obstetrics& gynecological Medicine and maternity & Community health nursing, Sohag University, and it follows the framework of the health promotion model. It included colored illustrated pictures of fertility-promoting health behavior, focused on;

#### **➤ Nutritional guidelines :**

-Drinking plenty of water not less than 3-5 liter /day, eating more vegetables and a variety of balanced health types, eating healthy monounsaturated fats instead of saturated and trans fats, making at least half of grains whole, and getting enough calcium-rich foods including dairy,

-Avoiding plants that contain toxic inflammatory chemicals

Avoiding high sugar and carbohydrates diet (bread, rice, potatoes, and sugary sweets like candy)

-Avoiding soy and other phytoestrogen-rich foods, Caffeinated drinks

-Filling the nutrient gap of the fertility diet with supplements, obtain 400 micrograms per day of folic acid from supplements and include foods such as dark leafy green vegetables and fortified grains, fish oil(Omega3s), multivitamins (Vitamin E, C, Zinc, Folic acid, and Selenium), and antioxidants that will help in meeting nutrient needs and promote a healthy weight human cell production.

#### **➤ Physical exercise guidelines:**

- Generally recommends low to moderate intensity/impact exercise like the following: Yoga, Walking, Gentle bike rides,

Swimming, Tai Chi, Even standing (like using a standing desk rather than sitting), and Fertility Yoga

- Avoiding high-intensity, high-impact exercises such as sprinting, leaping, cross-fit, heavy lifting, and any contact activity, such as basketball, soccer, and volleyball, which have a detrimental effect on infertile fertility.

- Walking at least 1-2 hours per day.

➤ **Stress management measures,**

-Prayer

-Reading Quran and or a book in a bark

Practice relaxation techniques: such as progressive muscle relaxation, deep breathing, meditation, and imagery.

-Eat a healthy balanced diet, exercise regularly, get adequate sleep and allow time for recreation.

- Take warm baths

- Keep communicating with family and friends to avoid isolation.

-Consume natural, calming herbs and supplements

-Avoid caffeinated drinks such as tea and coffee for greater than 300 mg/day.

➤ **General instructions:**

-Avoiding smoking (either active or passive (first, second, or third-hand smoking)

-Avoid exposure to chemicals or polluted environments. Such as pesticides, detergents, cosmetics, perfumes containing phthalates, scrubs, soaps, and creams with parapets

-Chemical found in plastics that can leach into food

- Avoid non-prescription health medications.

• **Interviewing phase:** in which the researchers greet each lady who comes to the previously stated sitting for the first time or for a follow-up visit, and then begin to explain the purpose of the study and its significance to her. After confirming that they met the inclusion criteria and gaining her approval, researchers invited each of them to participate in the study.

• **Assessment phase:** in which each woman was interviewed individually in a private room in the center, then the researchers starting to collect the baseline data related to demographic data and medical history, lifestyle

infertility risk factors were assessed by asking the woman questions regarding physical exercise if little, moderate, or vigorous, history of passive smoking, drinking caffeinated drinks such as tea and coffee for more than 300 mg/day, Hours of sleep/day, suffering from stress, and if exposed to environmental pollutants/ chemicals.

- **For the obesity risk factor assessment,** the researcher used the clinic scale, an electronic scale representing weight and length. Then the researcher calculated the BMI according to the equation of height (cm) to weight (kg)

- The time needed for completing the questionnaire ranged from 20 – 30 minutes for each woman

- **In terms of the Health Promoting Life Style assessment (tool 2)** pre-test was administered to each woman individually, as each domain of the health-promoting lifestyle tool was evaluated separately, and the overall score was determined.

- **Intervention phase:** during which the content of a health promotion intervention was designed based on learning objectives and an analysis of results obtained from tools completed during the assessment phase; a content was designed and developed with the objects of dimensions of health-promoting behaviors and nutrition, physical activity, responsibility for health, spiritual growth, interpersonal relationships, and stress management **as following :**

- An intervention program was given to each participant woman, it was executed in 3 sessions:

○ One session on infertility knowledge, lasting 30 minutes/day.

○ The second session for pro-fertility promoting lifestyle guidelines and instructions that enhance fertility and the success rates of infertility treatment supplied with a booklet was distributed among study group patients for reinforcement, using an interactive and audiovisual aids methods to encourage active participation and interaction of participants women such as, group discussion, role play, power point, figures, models, and videos .

○ This session lasted nearly 45 minutes accordingly. Moreover, any further explanations or questions were provided to the women either

face to face interviews or through telephone calls.

• **The evaluation phase:** This phase began 10 weeks after implementation estimating the effect of the health-promoting intervention program on women's lifestyle and degree of compliance with program instructions using tool 2 (post-test), in addition to asking if the pregnancy test was positive, that indicating the occurrence of pregnancy.

#### **Statistical design:**

The data was organized, categorized, coded, tabulated, figure and analyzed using the Statistical Package for Social Sciences (SPSS) V.26. In tables, figure data was represented using numbers, percentages, averages, and standard deviations. To evaluate statistical significance, the Pearson correlation between variables was used, and the mcnemar test was used. To compare the means of variables, a T-test was performed. A statistically significant P-value of 0.05 was declared.

#### **Results**

**Table 1:** shows that the mean SD age of the women studied was  $31.2 \pm 3.8$ , and nearly half (52.9%) of them were between the ages of 30-<40, with more than one-third having a secondary education. Furthermore, the vast majority (88.3%) were housewives, and 74.4% lived in rural areas. Furthermore, more than half of the participants had a sufficient income, and 39.4% had been married for 5-8 years.

**Table 2:** reveals that more than half of the women participants had a history of primary infertility, more than one-third had been seeking infertility treatment for 1-2 years, and 45.7% had a history of ART trial for 1-2 times (53.5%).

**Table 3:** reveals the Lifestyle profile of studied participant women, as more than half of participant women (57.4%) had a high BMI (<25Kg), nearly three-quarters of them were exposed to passive smoking, they also drank caffeinated beverages for more than 300 mg/day. Regards physical exercises, the great majority of them had a little pattern of exercises, and a minority were playing vigorous exercises. Additionally, more than half of the participant's women had sleeping patterns from 6-8 hrs. /day, as well as; 43.6 % of them were suffering from intense stress, and 95.7% of them were exposed to environmental pollutants.

**Table 4:** demonstrates that the total mean score of the health-promoting lifestyle profile domains, including health responsibility, physical activity, nutrition, spiritual growth, personal relationships, and stress management, were significantly improved in post-intervention study participants' women compared to pre-intervention study participants' women (p . 0.001)

**Table 5:** shows a positive correlation between the participant's level of education and the total score of health-promoting lifestyle in pre and post-intervention (p.678 & 640), but a significant negative correlation between the total score of health-promoting lifestyle and the participants' pre and post-intervention residence, and a significant negative correlation between the participants' income and their total score of health-promoting lifestyle in pre and post-intervention.

**Figure (1):** illustrates that the intervention program had an augmented and enhanced effects, as shown by the incidence of clinical pregnancy among more than one-third 36% (34) of the studied women who were receiving and adhering to the program guidelines.

Table (1): distribution of studied women according to their demographic data (N.94):

demographic data	N	%
<b>Age</b>		
20-<30 years	45	47.9
30-<40	49	52.1
<b>Mean <math>\pm</math>SD</b>	<b>31.2<math>\pm</math>3.8</b>	
<b>Education Level</b>		
Do not read & write	7	7.4
Primary	20	21.3
Preparatory	26	27.7
Secondary	32	34.0
University	9	9.6
<b>Employment status</b>		
Employee	11	11.7
Housewives	83	88.3
<b>Residence:</b>		
Rural	69	73.4
Urban	25	26.6
<b>Monthly income :</b>		
Enough	55	58.5
Not enough	39	41.5
<b>Marriage's duration</b>		
2-<5 years	27	28.7
5- 8 years	37	39.4
>8 years	30	31.9

Table (2): distribution of studied women based on medical and ART history (94):

Item	N	%
<b>Type of infertility</b>		
Primary	56	59.6
Secondary	38	40.4
<b>The duration of seeking infertility treatment</b>		
> 1 year	6	6.4
Several months	12	12.7
A year - two years	30	31.9
>2 to 5 years	29	30.9
>5-10 years	17	18.1
<b>History of ART trial</b>		
Yes	43	45.7
No	51	54.3
<b>If yes, the number of trials ( n. 43)</b>		
1-2 times	23	53.5
3-4 times	17	39.5
>4 times	3	7.0



Table (3): Lifestyle profile of studied participant women (94).

Item		N	%
Body mass index (BMI)	> 18.5 kg/m <sup>2</sup>	40	42.6
	< 25 kg/m <sup>2</sup>	54	57.4
Passive smoking	Yes	65	69.1
	No	29	30.9
Drinking caffeinated drinks such as tea and coffee for more than 300 mg/day	Yes	76	19.1
	No	18	80.9
Physical exercises	Little/moderate	91	96.8
	Vigorous	3	3.2
Sleeping hours per day	>6 hrs.	38	40.4
	6-8 hrs.	56	59.6
Suffering from stress	No	23	24.5
	Average	30	31.9
	Intense	41	43.6
Exposed to environmental pollutants	Yes	90	95.7
	No	4	4.3

Table (4): distribution of women investigated based on mean SD of total score to health-promoting lifestyle model (94).

Items	Mean ±SD		P-value
	Pre-intervention	Post- intervention	
Health Responsibility	14.79±4.29	26.50±5.62	<b>0.001</b> **
Physical activity	10.98±3.60	22.09±5.30	<b>0.001</b> **
Nutrition	16.05±3.94	25.59±4.08	<b>0.001</b> **
Spiritual growth	12.22±3.97	22.54±7.26	<b>0.001</b> **
Personal Relationships	16.23±3.71	25.72±4.78	<b>0.001</b> **
Stress management	11.73±3.37	22.48±4.96	<b>0.001</b> **
Total	102.24±17.61	144.93±28.12	<b>0.001</b> **

t-test

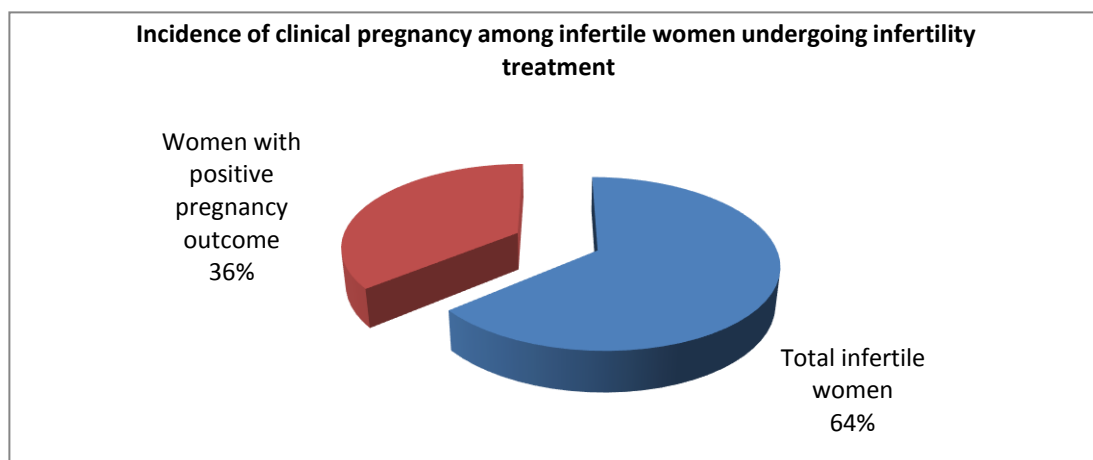
(\*\*) a highly statistically significant difference

**Table (5): Correlation between total score and health-promoting lifestyle profile, demographic data, and women's medical profile (94):**

Items		Pre-intervention	Post-intervention
<b>Age</b>	Pearson Correlation	-.098-	-.120-
	Sig. (2-tailed)	0.348	.251
<b>Education Level</b>	Pearson Correlation	.678**	.640**
	Sig. (2-tailed)	.000	.000
<b>Employment status</b>	Pearson Correlation	-.479-**	-.318-**
	Sig. (2-tailed)	.000	.002
<b>Residence:</b>	Pearson Correlation	.566**	.333**
	Sig. (2-tailed)	.000	.001
<b>Monthly income</b>	Pearson Correlation	-.449-**	-.276-**
	Sig. (2-tailed)	.000	.007
<b>Marriage's duration</b>	Pearson Correlation	-.194-	-.133-
	Sig. (2-tailed)	0.061	.200
<b>How long have you been looking for a pregnancy chance?</b>	Pearson Coefficient of Correlation	-.181-	-.217-*
	Sig. (2-tailed)	.081	.036

\* At the 0.05 level, the correlation is significant (2-tailed).

\*\* At the 0.01 level, correlation is significant (2-tailed).



**Figure (1) :Incidence of clinical pregnancy among infertile women undergoing infertility treatment.**

## Discussion

Numerous lifestyle factors have been shown to affect women's fertility throughout the past few decades. Despite this proof, a lot of infertile women still fail to recognize the influence a healthy lifestyle has on their ability to conceive. So this study conducted to evaluates the impact of a maternity-led pro-fertility promoting lifestyle intervention on health-promoting behaviors among infertile

women. It also reveals the benefits of a health-promoting lifestyle on women with infertility who have at least one of the risk factors that have been shown to negatively affect fertility.

Regarding the medical and ART history of the studied women, According to the current study, more than half of the participants had a history of primary infertility. These findings are supported by **Al-Mahmood and Al-Ajeely in Tikrit City: with 600 participants** who

discovered that approximately of cases involved primary infertility. On the contrary, a study by **Sanad et al.** in Menoufia with 80 participants reported that primary infertility was less than quarter. From the investigator's point of view due to the disparities in the assessment technique, prevalence of risk factors, and diagnostic criteria.

According to the Lifestyle profile of the studied participants' women, more than half of the participant's women had a high BMI ( $<25 \text{ kg/m}^2$ ). These findings were verified by **Ramadan and Said in Egypt**, who reported that about half of infertile women had a body mass index of overweight or obese. This finding is consistent with **Talmor and Dunphy's** findings that women with a high body mass index (BMI) are more likely to be infertile than women of normal weight. Obesity affects 70% of infertile women, according to statistics. Obesity not only has an impact on one's physical appearance, but it also disrupts the body's hormone and enzyme balance.

According to passive smoking, nearly three-quarters of participants were exposed to passive smoking. This result agrees with **Sanad et al.**, who reported that passive smoking was reported by greater than two thirds of the infertile group. In addition, **Amirkhani et al., in Tehran**, with 178 participants, discovered that passive smoking increased infertility risk.

Concerning caffeine consumption, three quarters of participants drank caffeinated beverages for greater than 300 mg/day. from the investigator's point of view, due to 73.4% of studied women live in rural areas with a difference in the traditions and beliefs of the studied women. Women that live in rural areas are more vulnerable to risk factors of infertility due to a lack of knowledge and practice about infertility.

Regarding physical exercises, the majority had a little pattern of exercise, and the minority played vigorous exercises. This result is similar to **Eraky and Seif El-Nasrin Egypt, with (200)** women who claimed that most women didn't exercise regularly and that this had a significant relationship with infertility.

( $p=0.02$ ). **Ferreira et al.** stated that in a study of 26,955 women, Ovulatory infertility was less likely in people who engaged in vigorous activity. In addition, moderate, consistent exercise positively impacts the outcomes of assisted reproductive technology and fertility.

Regarding stress in the same table, 43.6 % of studied participants suffered from intense stress. This finding result, supported by **Anderson et al.**, reported that infertility is stressful because of societal pressures, tests, diagnoses, failed treatments, unfulfilled desires, and even financial costs.

The health-promoting lifestyle profile total mean score, shows that the total mean score of the health-promoting lifestyle profile domains, such as health responsibility, physical activity, nutrition, spiritual growth, personal relationships, and stress management, were significantly improved among studied participants' women in post-intervention compared to pre-intervention ( $p. 0.001$ ) from the investigator point of view. This outcome validated the current research hypothesis's success. As a result, the major goal of health promotion is to encourage healthy behavior. Furthermore, these findings may be explained by healthy behavior as a result of a multifaceted approach (good eating, physical activity, social and psychological support). (**Leischik et al.**).

There was a correlation between the participant's level of education, residence, income, and overall score of health-promoting lifestyle in the pre- and post-intervention periods. This might be because when the studied sample's educational level increased, this had a good effect on changing lifestyle. This finding confirms that of **Mirghafourvand et al.** in Egypt, 322 participants indicated that one of the determinants of a healthy lifestyle is education. Therefore, the overall score of leading a healthy lifestyle and the score across all aspects were raised by raising the educational level.

As there was a correlation between the participant's residence and the total score of health-promoting lifestyle in pre- or post, it is

possible that this is due to urban women having a high level of knowledge and the opportunity to share information on healthy lifestyles for infertility.

There was a correlation between the participant's income and the total score of health-promoting lifestyle in pre & post-intervention. In line with **Baheiraei et al., Mirghafourv et al.** found that participants who stated that their income was "totally" enough to cover their living expenses had higher overall health-promoting lifestyle scores than participants who stated that their income was "slightly." This may be because couples' overall health can be improved when they have enough money to cover their living expenses.

As regard as the current study reported that highlighted the augmented effect of the intervention program as evidenced by the occurrence of clinical pregnancy among more than one-third of 34 (36. %) of studied women who received and followed the program guidelines.

The current study agrees with **Kaya et al. (2016)** discovered that health-promoting lifestyle education was beneficial in reducing lifestyle risk factors for infertility and increasing the success rates of assisted reproduction treatment by rectifying these risk factors.

Also agree with **Kim and Nho, 2022** when they say that is a link between infertility and lifestyle. Changes in lifestyle, such as a healthier diet and more physical activity, enhance overall and reproductive health and boost conception rates. As a result, healthcare providers should educate infertile men, women, and couples about the need of making lifestyle changes.

**Zhang et al., 2017 and Wekker et al., 2018** found that food and lifestyle advice at three months enhanced ova count, mature ova count, embryo count, embryo quality, fertility, and pregnancy rate in infertile women. Furthermore, a six-month lifestyle intervention improved reproductive endocrine and lipid

metabolism and decreased the volume of the left and right ovaries, resulting in greater menstruation recovery, ovulation, and conception rates in obese and infertile women.

This could be attributed to the following factors: First, physical activity to enhance health status may induce changes in energy balance, which is closely associated to the reproductive system [**Redman,2006**]. Second, physical exercise may improve assisted reproductive outcomes by restoring ovarian function and sensitising the ovary to clomiphene citrate during simple ovulation induction [**Yusuf et al., 2011**]. Furthermore, regular physical exercise might help decrease stress and worry, both of which are substantial risk factors for the result of assisted reproduction [**Frederiksen et al., 2015**].

The current study educated infertile women on the effects of prayer on fertility treatment. Prayer, according to **Kwang et al., 2001**, can double the success percentage of in vitro fertilization procedures. This may be due to the connection between prayer practices and improvements in spiritual, physical, and mental health outcome, as well as increased immune function, wellbeing, higher levels of life satisfaction, hope, and optimism, and decreased rates of anxiety and depression.

Finally the current study reported that the intervention program had an augmented and enhanced effects for the infertility treatment, as shown by the incidence of clinical pregnancy among more than one-third of the studied women who were receiving and adhering to the program guidelines, so these findings support and indicates that the second research hypothesis was accepted.

## Conclusion

A maternity-led pro-fertility-promoting lifestyle intervention was found to be successful in altering lifestyle risk factors for infertility and enhancing the effectiveness of infertility therapy by boosting pregnancy rates and correcting risk factors.

**Limitations:**

The findings of this study have to be seen in light of some limitations, the first one is the a sampling techniques and sample size that limit the generalizability of the data also, the second limitation concerns the study design that lack for control group. These limitation can be overcome in a future further true experimental investigations. In addition, a large number of individuals were excluded because they didn't keep up with the center.

**Recommendations:**

- The maternity-led pro-fertility lifestyle intervention must be clinically applicable and integrated into routine practice for infertile patients.

- Prioritize a healthy lifestyle above ART by adopting a pro-fertility health-promoting lifestyle.

- Make use of fertility nurses in this area by widening their scope of practice, including further training and skill recognition.

**Further study :**

Replication of this study among infertile male.

Replication of this study with two groups(study &control ).

**Potential conflict of interest**

This study contains no conflicts of interest.

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