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Impact of Lifestyle Factors on Hormonal Levels and their Influence on Reproductive Health

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ABSTRACT: The present study investigates the intricate relationship between lifestyle factors, hormonal balance and reproductive health among women of reproductive age. Lifestyle choices—are increasingly recognized as critical determinants of endocrine function. This research aims to assess how these lifestyle variables influence key reproductive hormones and, in turn, affect menstrual regularity, fertility, and pregnancy-related outcomes.

KEYWORDS: Hormone, Balance, Reproductive, Health.

I. INTRODUCTION

Fertility refers to an individual's ability to reproduce, whereas a woman's fertility is her biological potential to conceive based on the likelihood of conception. Infertility is the condition where a couple is unable to conceive a pregnancy after engaging in unprotected sexual intercourse. Approximately 15% of the global population experiences infertility, with male and female factors contributing approximately equally. The prevalence of infertility is increasing, leading researchers to focus on environmental variables as genetic causes prove insufficient in explaining the phenomenon. In recent times, lifestyle factors have garnered significant attention, as evidenced by several studies indicating that detrimental lifestyle choices, such as dietary habits, stress, alcohol consumption, tobacco use, and obesity, have the capacity to impact the long-term physiological well-being of women. These lifestyle choices can impact both the overall health and reproductive ability of an individual, and studies have shown that they can considerably reduce the likelihood of women conceiving. The human body assimilates dietary, hormonal, and environmental stimuli in order to sustain the essential state of homeostasis. Obesity is a prevalent risk factor associated with lifestyle choices. This is because a diet high in calories disrupts the body's energy balance, hence affecting metabolic processes. Unlike obesity, nutritional insufficiency caused by improper dietary choices, overly intense activity, and low body weight can also have adverse effects on female fertility. Women experience sleep disruptions due to premenstrual dysphoria, menopause transition, and other pregnancy complications. Recreational drug use and the presence of psychoactive chemicals in these drugs might indirectly affect the neural system, leading to a decrease in GnRH levels. This demonstrates that lifestyle factors have a crucial impact on proper neuroendocrine functioning and how their adjustments might affect physiological balance and fertility. Hormone is another factor which directly or indirectly affects the fertility in both men and women. Also, different factors affect the type and level of infertility differently. Hence, it becomes important to look at these effects more deeply.

II. RESEARCH METHODOLOGY

The study hypothesized that:

- H1: There is an impact of Life Style on Hormonal Level.
- H2: There is an effect of hormonal Levels on reproductive ability.

Area of the Study: Ajmer is a district of the state of Rajasthan, situated in the western part of India, as seen in the figure. Figure 1 shows the map of the study area. Female respondents from both rural and urban area were selected.

Fig 1: Map of Study Area



Data Collection: The research was based on primary and secondary data. The primary data was obtained from the study. The study enrolled women (n-150) in Ajmer city. A questionnaire was developed in dialogue with the visiting patients along with experienced medical practitioners. The study-specific questionnaire designed for women included questions both about their lifestyles and their menses to establish a connection between both of them. The questionnaire covered questions on lifestyle factors such as fat-rich diets, caffeine intake, anxiety/depression caused due to hormonal imbalance and correlate them to delayed child bearing, sexual behavior. The secondary data was obtained from journals, newspapers and magazines.

Data Analysis: In the present study, which aims to examine the impact of lifestyle factors on hormonal levels and reproductive health in women, a range of statistical techniques were employed following the development of conceptual models corresponding to each hypothesis. The data collected through a structured questionnaire was entered and analyzed using SPSS software. The data analysis process involved both descriptive and inferential statistical techniques. These methods were applied based on the nature of variables and the objectives of each hypothesis. By using a combination of descriptive and inferential methods—mean, standard deviation, logistic regression and MANOVA—this study ensured a comprehensive and robust analysis of the data. These analytical techniques were aligned with the conceptual models and research hypotheses, enabling the researcher to draw data-driven conclusions about the relationship between lifestyle factors and women's hormonal and reproductive health.

Conceptual Model Design: Prior to analysis, conceptual models were developed to frame the relationships between lifestyle factors (such as physical activity, sleep, diet, stress, substance use) and dependent variables like hormonal balance and reproductive health. These models helped guide the selection of statistical methods best suited to test each hypothesis.

- **Binary Logistic Regression Analysis (For Hypothesis 1)** - For Hypothesis 1, which focused on analyzing the impact of lifestyle factors on hormonal levels, binary logistic regression was employed. This technique is suitable for predicting the probability of a binary outcome (e.g., presence or absence of hormonal imbalance) based on multiple independent variables. The logistic regression model assessed how factors like exercise frequency, sleep duration, diet quality, stress levels and substance use influenced the likelihood of experiencing hormonal imbalance.

Fig 2: Conceptual Model for Binary Logistic Regression Analysis

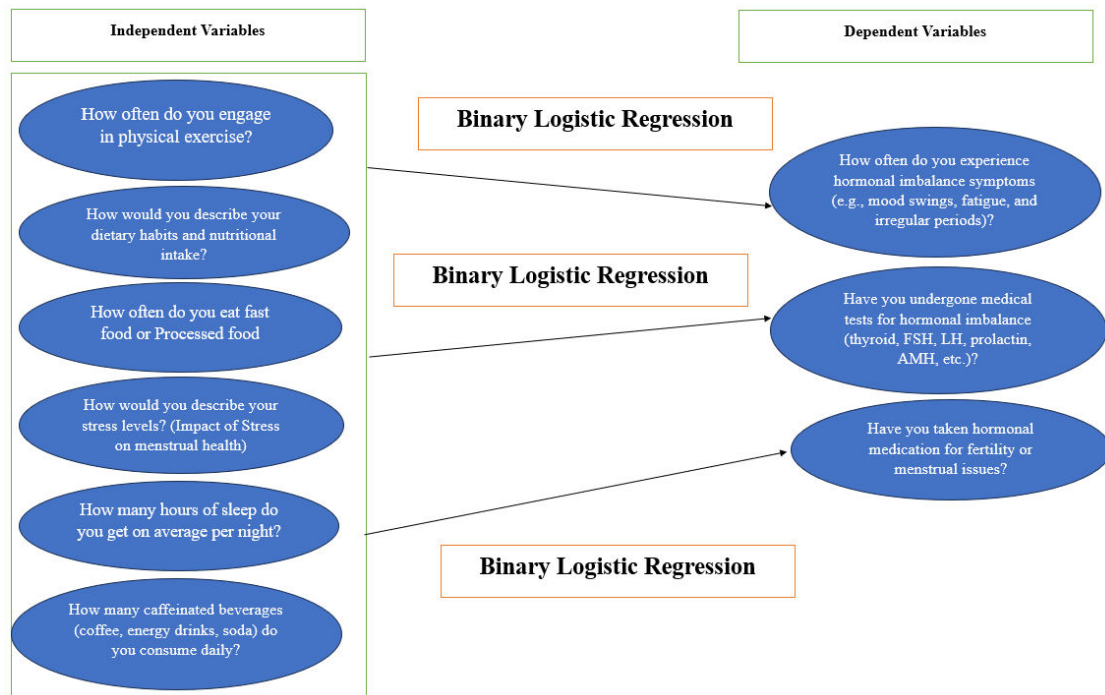
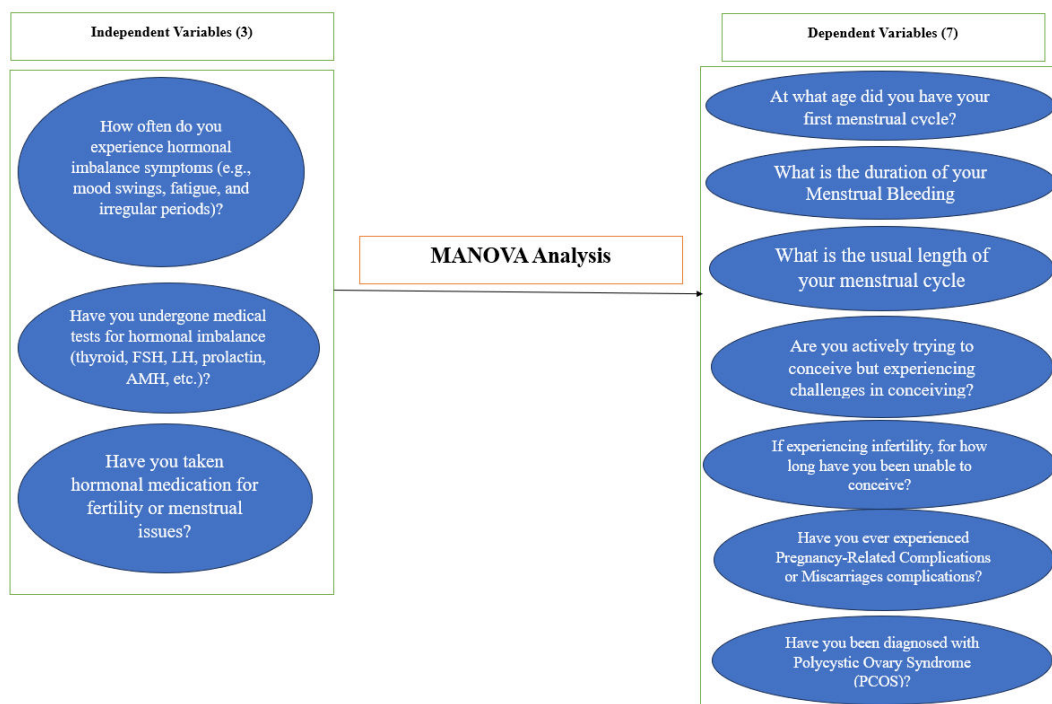


Fig 3: Conceptual Model for MANOVA Analysis



- **MANOVA (Multivariate Analysis of Variance) for Hypothesis 2** - To test Hypothesis 2, which examined the impact of lifestyle on reproductive health, MANOVA was used. This technique allows for the simultaneous comparison of mean differences in multiple dependent variables across groups defined by lifestyle categories. In this study, reproductive health indicators such as menstrual cycle length, fertility challenges and PCOS diagnosis were compared across different levels of lifestyle practices. MANOVA helped determine whether lifestyle factors had a statistically significant multivariate effect on these health outcomes. Figure 3 shows the Conceptual Model for MANOVA Analysis.

III. RESULT AND DISCUSSION

Descriptive Statistics -

Profile of the Respondents: The mean value for physical exercise is 1.82, which indicates that most respondents engage in low levels of physical activity, falling between "rarely or never" and "1–2 times per week". This suggests a generally sedentary to lightly active lifestyle among the majority of participants. The mean for dietary habits is 3.26, which lies between "Vegetarian/Vegan with balanced nutrient intake" and "Balanced diet with essential nutrients". This reflects that most women report having a fair to good quality diet, with a tendency towards balanced and nutritious eating habits. The mean score for fast food consumption is 3.04, falling close to "Occasionally", which suggests that most respondents consume fast or processed food occasionally, rather than on a daily or weekly basis. This is relatively positive in terms of dietary health. The mean stress level is 3.12, which lies just above "Moderate" and leans towards "Low", indicating that stress levels among participants are moderate to low, though some may still experience notable stress, potentially impacting hormonal and menstrual health. For sleep, the mean value is 2.10, indicating that most respondents sleep between 5–7 hours per night, which is below the ideal range of 7–9 hours. This points to inadequate sleep duration for many, which can affect hormonal balance and reproductive health. The mean caffeine consumption is 2.74, suggesting that most participants consume 0–1 cup or 2–3 cups of caffeinated beverages daily, with a tendency towards moderate caffeine intake.

Table 1: Statistical Analysis of Lifestyle Factors

		Physical exercise?	Dietary habits and nutritional intake?	Fast food or Processed food	Stress levels?	Average sleep per night?	Caffeinated beverages - Consumption (coffee, energy drinks, soda)
N	Valid	150	150	150	150	150	150
	Missing	0	0	0	0	0	0
Mean		1.82	3.26	3.04	3.12	2.10	2.74
Std. Deviation		.935	.979	.566	.768	.576	.847

Reproductive Ability of Respondents: The descriptive statistical analysis of reproductive health factors among 150 respondents reveals several key insights. The mean age at first menstrual cycle was 3.26 (SD = 1.000), indicating that the majority of participants reported menarche between 12–14 years of age, which falls within the normal biological range. The average duration of menstrual bleeding was 3.28 (SD = 1.081), suggesting that most women experience a normal menstrual bleeding span of 3–7 days, reflecting regular uterine function. Regarding the length of the menstrual cycle, the mean was 3.56 (SD = 0.966), pointing toward a predominant cycle range of 21–35 days, which is considered optimal for reproductive health. When asked about difficulties in conceiving, the mean score was 3.16 (SD = 0.949), which falls between, trying to conceive for less than a year without success and no difficulty in conceiving. This indicates that while some women face minor challenges, most have not experienced significant conception issues. Similarly, for infertility duration, the mean was 3.45 (SD = 0.945), suggesting that in cases of infertility, it has typically been limited to around 1 year, implying early-stage or short-term difficulties rather than long-standing infertility. In terms of pregnancy-related complications or miscarriage history, the mean score was 3.10 (SD = 1.379), suggesting variability, but skewed toward no complications or miscarriages and some pregnancy complications. This implies that a majority of the women either had healthy pregnancies or experienced occasional issues. Lastly, the mean score for PCOS diagnosis was 3.58 (SD = 0.943), indicating that most respondents selected not diagnosed and have regular cycles. This supports the interpretation that PCOS prevalence in this sample is relatively low and the majority of women report regular hormonal function. Overall, these results suggest that the reproductive health status of the

surveyed women is largely positive, with regular menstrual characteristics and minimal long-term reproductive challenges.

Table 2: Statistical Analysis of Reproductive Health Factors

		Age - first menstrual cycle?	Duration of Menstrual Bleeding	Length of menstrual cycle	Challenges in conceiving?	Unable to conceive for how long?	Pregnancy-Related Complications	PCOS - Diagnosis?
N	Valid	150	150	150	150	150	150	150
	Missing	0	0	0	0	0	0	0
Mean		3.26	3.28	3.56	3.16	3.45	3.10	3.58
Std. Deviation		1.000	1.081	.966	.949	.945	1.379	.943

Hormonal Levels of the Respondents: Hormonal balance is essential for the proper functioning of the reproductive system and overall health in women. This section focuses on the respondents' experiences related to hormonal health, including symptoms of hormonal imbalance (such as mood swings, fatigue and irregular periods), medical testing for hormonal levels (like thyroid, FSH, LH, prolactin, AMH) and the use of hormonal medications. Assessing these factors provides important insights into the prevalence and management of hormonal issues among the participants.

Fig 4: How often do you experience hormonal imbalance symptoms (e.g., mood swings, fatigue and irregular periods)?

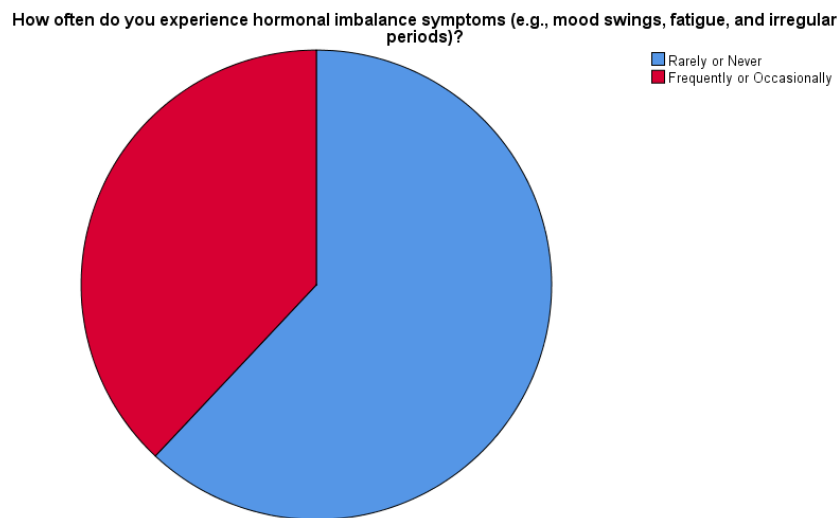


Table 3: How often do you experience hormonal imbalance symptoms (e.g., mood swings, fatigue and irregular periods)?

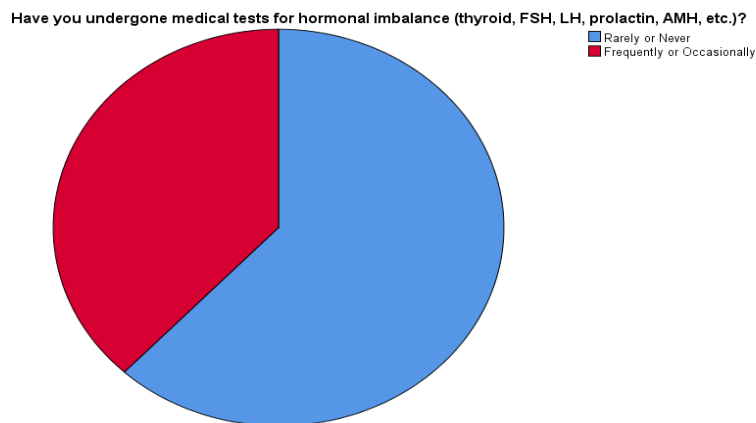
		Frequency	Percent	Valid Percent
Valid	Rarely or Never	93	62.0	62.0
	Frequently or Occasionally	57	38.0	38.0
	Total	150	100.0	100.0

The data indicates that a significant majority of the respondents, 62%, reported experiencing such symptoms rarely or never. In contrast, 38% of the respondents stated that they experience these symptoms frequently or occasionally. These percentages suggest that while a substantial portion of the population does not frequently suffer from hormonal imbalance symptoms, more than one-third still experiences them at varying levels, which highlights the relevance of addressing hormonal health concerns among women.

Table 4: Have you undergone medical tests for hormonal imbalance (thyroid, FSH, LH, prolactin, AMH, etc.)?

		Frequency	Percent	Valid Percent
Valid	Rarely or Never	93	62.0	62.0
	Frequently or Occasionally	57	38.0	38.0
	Total	150	100.0	100.0

Fig 5: Have you undergone medical tests for hormonal imbalance (thyroid, FSH, LH, prolactin, AMH, etc.)?



The descriptive statistics reveal that a significant proportion of women—62.0%—reported that they have rarely or never undergone medical tests for hormonal imbalances such as thyroid, FSH, LH, prolactin, or AMH. In contrast, only 38.0% of the respondents stated that they have undergone such tests frequently or occasionally. These percentages indicate a noticeable gap in hormonal health monitoring among the surveyed women. The findings suggest that awareness, access, or motivation for hormonal testing may be lacking for a majority of women, which could potentially delay the diagnosis and treatment of underlying reproductive or hormonal issues.

Fig 6: Have you taken hormonal medication for fertility or menstrual issues?

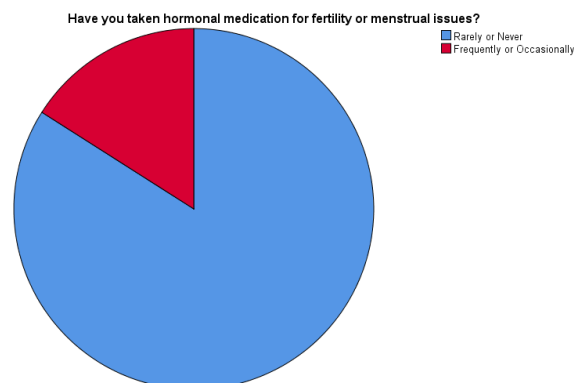


Table 5: Have you taken hormonal medication for fertility or menstrual issues?

		Frequency	Percent	Valid Percent
Valid	Rarely or Never	126	84.0	84.0
	Frequently or Occasionally	24	16.0	16.0
	Total	150	100.0	100.0

The descriptive statistics reveal that a significant majority of the respondents — 84.0% — reported that they have rarely or never taken hormonal medication for fertility or menstrual issues. In contrast, only 16.0% of the participants indicated that they take such medication frequently or occasionally. This suggests that while hormonal medication is used by a portion of the population, its usage remains relatively limited among the respondents. The high percentage of women who do not regularly rely on hormonal treatment may reflect factors such as lack of medical consultation, unawareness, limited access to healthcare, or reliance on alternative remedies.

IV. HYPOTHESIS TESTING

Hypothesis 1: Impact of lifestyle on hormonal level

This hypothesis examines the relationship between lifestyle factors and the hormonal levels of women. Lifestyle encompasses various components such as diet, physical activity, stress, sleep patterns and overall health behavior. These elements can significantly influence the endocrine system, which regulates hormone production and balance. The hypothesis assumes that an unhealthy or imbalanced lifestyle may lead to hormonal disruptions, manifesting in symptoms such as irregular menstruation, fatigue, mood swings and fertility issues. To test this hypothesis, data were collected on different lifestyle indicators and correlated with self-reported symptoms of hormonal imbalance, medical test results and use of hormonal medications. The analysis aims to identify whether women with healthier lifestyle patterns experience fewer hormonal issues compared to those with sedentary habits, poor diet, high stress levels, or disrupted sleep cycles. Understanding this relationship is crucial for promoting preventive health measures and guiding interventions focused on lifestyle modification to support hormonal well-being among women.

Table 6: Model Summary of Lifestyle Factors and Hormonal Symptoms

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	159.113 ^a	.235	.319

The binary logistic regression analysis was conducted to examine the impact of various lifestyle factors on the likelihood of experiencing hormonal imbalance symptoms. The model includes seven predictors: physical exercise, dietary habits, fast food intake, stress levels, sleep duration, caffeine consumption and a constant. The overall model was statistically significant and shows a reasonable level of fit, as indicated by the Nagelkerke R^2 of 0.319, suggesting that approximately 32% of the variance in hormonal imbalance symptoms can be explained by the lifestyle variables included in the model. The -2 Log Likelihood = 159.113 further indicates that the model fits better than the null model.

Table 7: Binary Logistic Output of Lifestyle Factors and Hormonal Symptoms

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	Physical exercise?	-.506	.241	4.401	1	.036	.603
	Dietary habits and nutritional intake?	-.352	.207	2.896	1	.089	.703
	Fast food or Processed food	.272	.403	.457	1	.499	1.313
	Stress levels?	-1.417	.343	17.052	1	.000	.243
	Average sleep per night?	.640	.345	3.442	1	.064	1.897
	Caffeinated beverages - Consumption (coffee, energy drinks, soda)	-.215	.256	.706	1	.401	.807
	Constant	4.329	1.806	5.743	1	.017	75.876

Among the significant predictors, physical exercise demonstrated a meaningful association with hormonal health. The negative coefficient ($B = -0.506$, $p = .036$) indicates that as the frequency of physical exercise increases (moving from sedentary behavior to more regular physical activity), the likelihood of experiencing hormonal imbalance symptoms decreases. The odds ratio ($\text{Exp}(B) = 0.603$) suggests that women who engage in more frequent physical exercise are approximately 40% less likely to report hormonal imbalance symptoms compared to those with lower physical activity levels. This finding aligns with existing literature highlighting the role of regular physical activity in regulating hormonal cycles and improving reproductive health. The most significant predictor identified was stress level, which had a strong inverse association with hormonal balance ($B = -1.417$, $p < .001$). The odds ratio ($\text{Exp}(B) = 0.243$) implies

that lower stress levels are associated with a 76% reduction in the odds of experiencing hormonal imbalance symptoms. This result underscores the critical influence of psychological and emotional stress on endocrine function, particularly in relation to menstrual health and hormonal regulation. Chronic stress is known to disrupt the hypothalamic–pituitary–adrenal (HPA) axis, which can interfere with the secretion of reproductive hormones and contribute to irregularities in the menstrual cycle. On the other hand, several lifestyle variables did not show statistically significant associations with hormonal imbalance in this model. Dietary habits, although not significant ($p = .089$), showed a potential trend suggesting that healthier diets might reduce the likelihood of hormonal issues. The direction of the coefficient ($B = -0.352$) supports this assumption, indicating a protective role of balanced nutrition, though further investigation with a larger sample may be necessary to confirm this relationship. Similarly, sleep duration approached significance ($B = 0.640$, $p = .064$), suggesting a possible link between sleep patterns and hormonal health, although the positive coefficient here requires cautious interpretation, as excessive sleep might be confounded with underlying health conditions rather than directly influencing hormonal balance. Other predictors, such as frequency of fast food or processed food consumption ($p = .499$) and caffeine intake ($p = .401$), did not yield significant effects on hormonal symptoms in this model. While these factors are often discussed in relation to metabolic and reproductive health, their isolated impact may be limited or masked when analyzed in combination with other lifestyle variables. The lack of statistical significance for these variables does not rule out their influence entirely but suggests that within the context of this specific model and sample, their role may be less pronounced or require a more nuanced analysis. Therefore, the findings highlight the importance of regular physical exercise and effective stress management as key lifestyle factors in maintaining hormonal balance in women. These results support the inclusion of lifestyle modifications as part of holistic approaches to managing reproductive health. Other lifestyle factors may still be relevant and should be further explored in future studies with larger and more diverse samples.

Table 8: Model Summary of Lifestyle Factors and Medical Tests for Hormonal Imbalance

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	185.782 ^a	.086	.117

The binary logistic regression analysis was performed to assess the impact of various lifestyle factors on whether women have undergone medical tests for hormonal imbalance, such as thyroid, FSH, LH, prolactin, or AMH tests. The model included predictors such as physical exercise, dietary habits, fast food intake, stress levels, sleep duration and caffeine consumption. The model fit statistics indicate a relatively modest explanatory power, with a Nagelkerke R^2 value of 0.117, suggesting that about 11.7% of the variation in the likelihood of undergoing medical tests for hormonal imbalance is explained by the lifestyle variables in the model. The -2 Log Likelihood = 185.782 suggests a moderate fit compared to the null model, indicating that the included predictors provide some insight into the outcome.

Table 9: Binary Logistic Output of Lifestyle Factors and Medical Tests for Hormonal Imbalance

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	Physical exercise?	-.036	.201	.031	1	.860	.965
	Dietary habits and nutritional intake?	.307	.207	2.195	1	.138	1.359
	Fast food or Processed food	-.676	.344	3.858	1	.050	.508
	Stress levels?	-.199	.232	.735	1	.391	.819
	Average sleep per night?	.130	.306	.180	1	.671	1.139
	Caffeinated beverages - Consumption (coffee, energy drinks, soda)	-.499	.228	4.796	1	.029	.607
	Constant	2.306	1.410	2.676	1	.102	10.034

The results of the binary logistic regression analysis revealed notable insights into how various lifestyle factors influence the likelihood of women undergoing medical tests for hormonal imbalance. Among the predictors, two variables were found to be statistically significant, while the remaining factors did not show significant associations. The consumption of fast food or processed food emerged as a significant predictor, with a regression coefficient of $B = -0.676$, a Wald statistic of 3.858 and a p-value of .050, which is right at the conventional threshold of statistical significance. The corresponding odds ratio ($\text{Exp}(B)$) = 0.508 indicates that women who frequently consume fast or

processed food have approximately 49.2% lower odds of having undergone medical testing for hormonal imbalance compared to those who consume such food less frequently. This inverse relationship may reflect a lack of health awareness or preventive health-seeking behavior in women with less healthy dietary patterns. Similarly, caffeinated beverage consumption was also significantly associated with the outcome. The coefficient for this variable was $B = -0.499$, with a Wald statistic of 4.796 and a p-value of .029, indicating a meaningful contribution to the model. The odds ratio ($\text{Exp}(B)$) = 0.607 suggests that higher caffeine consumption is associated with a 39.3% reduction in the odds of having undergone hormonal testing. This could be interpreted as a behavioral pattern where individuals with higher caffeine intake might either normalize symptoms such as fatigue and mood swings or be less inclined to seek medical evaluation for hormonal issues. In contrast, physical exercise showed no statistically significant effect on the likelihood of hormonal testing ($B = -0.036$, $p = .860$, $\text{Exp}(B) = 0.965$), indicating that frequency of physical activity does not appear to influence this particular healthcare behavior in the current sample. Likewise, dietary habits and nutritional intake, although showing a positive trend ($B = 0.307$, $p = .138$, $\text{Exp}(B) = 1.359$), did not reach statistical significance. This may suggest that while a healthier diet could be associated with greater health awareness, the association was not strong enough to draw definitive conclusions in this model. Perceived stress levels also did not significantly predict the likelihood of undergoing hormonal tests ($B = -0.199$, $p = .391$, $\text{Exp}(B) = 0.819$), contrary to what might be expected given that stress is often linked to reproductive and hormonal health issues. Similarly, sleep duration failed to show a significant relationship ($B = 0.130$, $p = .671$, $\text{Exp}(B) = 1.139$), suggesting that sleep patterns, in isolation, may not strongly influence the decision or need for hormonal testing. The overall model, while modest in its explanatory power (Nagelkerke R Square = 0.117), still highlights important behavioral trends. Notably, unhealthy consumption behaviors such as high fast food and caffeine intake are negatively associated with engagement in medical testing for hormonal imbalance. These findings underscore the potential influence of lifestyle on preventive healthcare practices and suggest the importance of targeted awareness and intervention strategies to encourage hormonal health monitoring, particularly among women exhibiting less healthy lifestyle behaviors.

Table 10: Model Summary of Lifestyle Factors and Hormonal Medication

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	94.232 ^a	.222	.380

The binary logistic regression analysis assessing the influence of lifestyle factors on the likelihood of taking hormonal medication revealed a moderately strong model, as reflected in the Nagelkerke R Square value of 0.380, indicating that approximately 38% of the variance in the use of hormonal medication can be explained by the combined lifestyle variables.

Table 11: Binary Logistic Output of Lifestyle Factors and Hormonal Medication

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	Physical exercise?	-.410	.331	1.532	1	.216	.664
	Dietary habits and nutritional intake?	1.518	.604	6.313	1	.012	4.564
	Fast food or Processed food	-1.025	.475	4.648	1	.031	.359
	Stress levels?	-1.211	.346	12.220	1	.000	.298
	Average sleep per night?	.576	.619	.865	1	.352	1.779
	Caffeinated beverages - Consumption (coffee, energy drinks, soda)	-1.187	.396	8.973	1	.003	.305
	Constant	2.113	2.081	1.031	1	.310	8.275

Dietary habits were found to be a statistically significant predictor of hormonal medication use ($p = 0.012$). The odds ratio [$\text{Exp}(B) = 4.564$] indicates that individuals with better dietary quality are 4.56 times more likely to use hormonal medication. This may suggest that those who are more health-conscious or experience hormonal issues might also adopt healthier diets and seek medical treatment. Fast food consumption was significantly and negatively associated with hormonal medication use. The odds ratio [$\text{Exp}(B) = 0.359$] implies that individuals who frequently consume fast/processed food are 64.1% less likely to take hormonal medication. This may indicate a lack of awareness or health-seeking behavior among those with unhealthy eating patterns. Stress was also a highly significant predictor. With

[Exp(B) = 0.298], individuals experiencing higher stress levels are 70.2% less likely to use hormonal medication. This could reflect barriers to care or psychological avoidance behaviors among stressed individuals. Caffeine intake emerged as another significant negative predictor. The odds ratio [Exp(B) = 0.305] indicates that those with higher caffeine intake are 69.5% less likely to take hormonal medication. Excess caffeine may be associated with hormonal imbalance but not necessarily with proactive medical intervention. Although exercise showed a negative association, it was not statistically significant. No strong evidence suggests that frequency of physical activity directly influences the likelihood of using hormonal medication in this sample. Similarly, average sleep duration did not significantly predict hormonal medication use. The positive coefficient suggests a weak, non-significant trend where more sleep might slightly increase the odds of medication use, but this effect is not reliable.

Hypothesis 2: Effect of hormonal levels on reproductive ability

This hypothesis explores the relationship between hormonal levels and reproductive ability in women. Hormones such as FSH, LH, prolactin, AMH and thyroid hormones play a central role in regulating the menstrual cycle, ovulation and fertility. An imbalance in these hormones can directly impact a woman's ability to conceive, maintain a pregnancy or experience regular menstrual cycles. The hypothesis assumes that women experiencing hormonal imbalances are more likely to face reproductive challenges such as delayed conception, infertility (primary or secondary), irregular menstruation, or pregnancy-related complications. To evaluate this, the study analyzes participants' self-reported symptoms of hormonal imbalance. By examining this association, the hypothesis aims to highlight the critical role of hormonal health in female reproductive function. The findings are expected to offer insights into how hormonal disruptions may serve as a key indicator or contributing factor to reproductive difficulties, thus supporting the need for early detection, diagnosis and management of hormonal disorders in reproductive health care.

Table 12: Multivariate Tests

Effect	Wilks' Λ	F	df (H, E)	Sig.	Partial η^2
Intercept	.036	529.172	(7, 137)	.000	.964
Hormonal Imbalance	.593	13.454	(7, 137)	.000	.407
Medical Tests for Hormonal Imbalance	.749	6.558	(7, 137)	.000	.251
Hormonal Medication	.739	6.911	(7, 137)	.000	.261
Hormonal Imbalance \times Medical Tests for Hormonal Imbalance	.934	1.392	(7, 137)	.213	.066
Hormonal Imbalance \times Hormonal Medication	.729	7.288	(7, 137)	.000	.271
Medical Tests \times Hormonal Medication	.866	3.039	(7, 137)	.005	.134
Hormonal Imbalance \times Medical Tests \times Hormonal Medication	1.000	.000	(7, 136)	1.000	.000

Table 13: Levene's Test of Equality of Error Variances

Variable	Levene Statistic	df1	df2	Sig.
Age at first menstrual cycle	43.800	6	143	.000
Duration of menstrual bleeding	19.270	6	143	.000
Usual length of menstrual cycle	21.365	6	143	.000
Trying to conceive but facing challenges	14.603	6	143	.000
Duration of infertility (if applicable)	4.926	6	143	.000
History of pregnancy-related complications or miscarriages	31.172	6	143	.000
Diagnosis of Polycystic Ovary Syndrome (PCOS)	7.086	6	143	.000

Table 14: Tests of Between-Subjects Effects

Factor / Interaction	Dependent Variable	F	Sig.	Partial η^2
Hormonal Imbalance	Duration of Menstrual Bleeding	14.259	.000	.091
	Length of Menstrual Cycle	22.856	.000	.138
	Challenges in Conceiving	6.363	.013	.043
	Unable to Conceive	4.227	.042	.029
	PCOS Diagnosis	78.133	.000	.353
Medical Tests for Hormonal Imbalance	First Menstrual Cycle	13.056	.000	.084
	Length of Menstrual Cycle	7.261	.008	.048
	Pregnancy Complications	17.895	.000	.111
Hormonal Medication	Length of Menstrual Cycle	8.321	.005	.055
	Challenges in Conceiving	4.051	.046	.028
	Pregnancy Complications	8.652	.004	.057
	PCOS Diagnosis	21.592	.000	.131
Hormonal Imbalance × Medical Tests	Length of Menstrual Cycle	5.322	.022	.036
	Challenges in Conceiving	4.711	.032	.032
Hormonal Imbalance × Hormonal Medication	Duration of Menstrual Bleeding	3.899	.050	.027
	PCOS Diagnosis	37.900	.000	.210
Medical Tests × Hormonal Medication	First Menstrual Cycle	5.376	.022	.036
	Length of Menstrual Cycle	4.177	.043	.028
	Pregnancy Complications	5.235	.024	.035

The multivariate test results reveal that the overall model was significant, as indicated by the high values of Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root for the intercept, with p-values of .000 and partial eta squared of .964, demonstrating a strong overall model fit. Hormonal imbalance, medical tests for hormonal imbalance and hormonal medication each had significant multivariate effects on the dependent variables (all $p < .001$), with moderate to large effect sizes (partial eta squared values of .407, .251 and .261 respectively). Among the interaction effects, the interaction between hormonal imbalance and hormonal medication was statistically significant ($p < .001$, partial eta squared = .271), suggesting a meaningful combined influence on the dependent variables. However, the interaction between hormonal imbalance and medical tests for hormonal imbalance was not significant ($p = .213$), nor was the three-way interaction involving all three factors, which showed no variance explained.

Levene's test for equality of variances revealed significant results for most dependent variables, indicating heterogeneity of variances among groups. For instance, questions such as "At what age did you have your first menstrual cycle?", "What is the duration of your menstrual bleeding?" and "What is the usual length of your menstrual cycle?" all had p-values $< .001$ for means and trimmed means, suggesting significant variability in responses across groups. The variable "Have you been diagnosed with Polycystic Ovary Syndrome (PCOS)?" also showed significant variance in responses across groups based on mean, although median-based tests showed nonsignificant differences in some cases, indicating sensitivity to data distribution.

In the Tests of Between-Subjects Effects, significant main effects were observed for several dependent variables. Hormonal imbalance significantly affected the duration of menstrual bleeding ($F = 14.259$, $p = .000$), length of menstrual cycle ($F = 22.856$, $p = .000$), challenges in conceiving ($F = 6.363$, $p = .013$) and PCOS diagnosis ($F = 78.133$, $p = .000$). Medical tests for hormonal imbalance had significant effects on the timing of first menstruation, length of the menstrual cycle and pregnancy-related complications, all with $p < .01$. Similarly, hormonal medication significantly affected length of menstrual cycle ($F = 8.321$, $p = .005$), challenges in conceiving ($F = 4.051$, $p = .046$), pregnancy-related complications ($F = 8.652$, $p = .004$) and PCOS diagnosis ($F = 21.592$, $p = .000$). Significant two-way interaction effects were noted between hormonal imbalance and medical tests for hormonal imbalance on variables such as length of menstrual cycle and conception challenges. The interaction between hormonal imbalance and hormonal medication significantly affected duration of bleeding and PCOS diagnosis, while the interaction between medical tests and hormonal medication significantly influenced first menstrual cycle, menstrual cycle length and

pregnancy complications. No three-way interaction was statistically significant, indicating no combined effect of all three factors on the dependent variables. Therefore, the findings suggest that hormonal imbalance, diagnostic testing and treatment through hormonal medication each significantly influence various aspects of women's reproductive health such as menstrual characteristics, fertility challenges and PCOS diagnosis. Additionally, specific interactions between these factors further shape these health outcomes, emphasizing the multifaceted nature of hormonal health and its management.

V. CONCLUSION

Numerous researchers have demonstrated a correlation between lifestyle behaviours and infertility in both genders. While the reproductive health status of the sample in our study appears largely favourable, sustained efforts are needed to educate and support women in adopting healthier lifestyles. For instance, **Clark et al. (1998)** found that physical activity positively influences fertility, which aligns with our findings indicating that regular exercise contributes to improved reproductive outcomes. Similarly, data for balanced dietary habits in our study supports **Chavarro et al. (2008)**, who demonstrated that replacing carbohydrates with vegetable protein has a protective effect on ovulatory infertility. Our results also found that women with higher caffeine intake had a slightly lower reproductive health score, which corroborates the findings of **Bolúmar et al. (1997)**, who reported a link between caffeine intake and delayed conception. Furthermore, **Mutsaerts et al. (2012)** emphasized that stress—especially due to long working hours—can negatively influence time to conception. This is in line with our result where stress levels show its significant role in menstrual and fertility health. Additionally, the study confirms that obesity and high body mass index are associated with poorer reproductive outcomes. This finding is supported by **Boots and Stephenson (2011)**, who reported that obese women (due to stress and consumption of fast food) face a higher risk of miscarriage in spontaneous conception. In conclusion, the study establishes that a healthy lifestyle—promotes hormonal balance and reproductive health. Conversely, sedentary behaviour and poor sleep quality emerge as key risk factors that must be addressed.

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