Journal of Surgical Radiology
https://journalsurgrad.com/
ISSN Print 2156-213X| ISSN Online: 2156-4566 Volume: 02 Issue: 04 Open Access

Research Article

A Prospective study on Etiological Evaluation of Amenorrhea at Tertiary Care Teaching Center

Dr. Mule Manasa Reddy[1] and Dr. Savitha Desai[2]
[1]Assistant Professor, Department of OBG, Ayaan Institute of Medical Sciences, Teaching Hospital & Research Centre
[2]Associate Professor, Department of OBG, Ayaan Institute of Medical Sciences, Teaching Hospital & Research Centre

*Corresponding Author
Savitha Desai

Article History
Received: 05.11.2023
Revision: 19.11.2023
Accepted: 06.12.2023
Published: 31.12.2023

Citations:
Reddy M M, *et. al* A Prospective study on Etiological Evaluation of Amenorrhea at Tertiary Care Teaching Center. *J Surg Radiol, 02*(04);2023; 20-23.

Abstract: Introduction: Amenorrhea, the absence of menstrual periods, is a common gynecological condition with diverse etiological factors, including endocrine disorders, genetic conditions, and lifestyle influences. This study aims to evaluate the underlying causes of amenorrhea in a cohort of women presenting with this condition, focusing on identifying the most prevalent etiological factors and their clinical implications. **Material and Methods:** A total of 250 women aged 15-45 years with primary or secondary amenorrhea were included in the study. Inclusion criteria comprised women with no menstrual periods for at least three months (secondary amenorrhea) or no menstruation by age 16 (primary amenorrhea). Exclusion criteria included pregnancy, known hormonal disorders, or recent use of hormonal contraceptives. A comprehensive evaluation, including medical history, physical examination, hormonal assays (FSH, LH, prolactin, TSH, estradiol), and pelvic ultrasound, was conducted to identify the etiological factors. **Results**: The study revealed that polycystic ovary syndrome (PCOS) was the most common cause of amenorrhea (35%), followed by hypothalamic amenorrhea (25%), hyperprolactinemia (15%), and primary ovarian insufficiency (10%). Other causes accounted for 15% of cases. Laboratory findings showed elevated FSH levels in 40% of patients, while imaging studies identified polycystic ovaries in 35% of cases. **Conclusion**: This study highlights the diverse etiological factors contributing to amenorrhea, with PCOS being the predominant cause. A systematic diagnostic approach, including hormonal and imaging evaluations, is essential for accurate diagnosis and effective management. Early identification of the underlying cause can significantly improve patient outcomes and guide targeted therapeutic interventions.

Keywords: Amenorrhea, Etiology, Polycystic Ovary Syndrome (PCOS), Hypothalamic Amenorrhea, Hyperprolactinemia, Primary Ovarian Insufficiency, Diagnostic Evaluation.

INTRODUCTION

Amenorrhea is defined as the absence of menstrual cycles in women of reproductive age. It is classified into primary amenorrhea, where menarche has not occurred by the age of 15, and secondary amenorrhea, where menstrual cessation occurs for at least three months in women with previously regular cycles or six months in those with irregular cycles. [1] The prevalence of amenorrhea varies depending on the population studied and underlying causes, with estimates ranging from 2% to 5% among reproductive- aged women. [2].

A comprehensive etiological evaluation of amenorrhea is essential for determining the underlying cause and implementing appropriate treatment strategies. The causes can be broadly categorized into hypothalamic, pituitary, ovarian, uterine, and systemic disorders. [3] Functional hypothalamic amenorrhea, polycystic ovary syndrome (PCOS), hyperprolactinemia, and primary ovarian insufficiency (POI) are among the most common causes. [4]

The etiology of primary amenorrhea primarily involves chromosomal abnormalities, structural defects, or hormonal imbalances. Some of the key causes include: Turner syndrome (45, X karyotype) is a major cause of primary amenorrhea, characterized by ovarian dysgenesis and lack of estrogen production. [5]

The evaluation of amenorrhea begins with a thorough history, including menstrual history, lifestyle factors, stress levels, and systemic symptoms. A physical examination should focus on secondary sexual characteristics, signs of androgen excess, and systemic manifestations. [6] Imaging studies such as pelvic ultrasound and MRI of the hypothalamic-pituitary axis may be warranted in cases where structural abnormalities or pituitary lesions are suspected. [7] Genetic testing may be useful for diagnosing chromosomal abnormalities, particularly in cases of primary amenorrhea. [8]

The etiological evaluation of amenorrhea requires a methodical approach, integrating clinical, biochemical, and imaging findings. [9] Early identification of the underlying cause is essential for effective management and preventing long-term complications such as osteoporosis, cardiovascular disease, and infertility. [10] Further research is needed to refine diagnostic algorithms and improve treatment outcomes for affected individuals.

MATERIALS AND METHODS

This cross-sectional study was conducted at a tertiary care hospital over a period of 18 months. A total of 250 women aged 15-45 years presenting with primary or secondary amenorrhea were enrolled. The study aimed to

evaluate the etiological factors contributing to amenorrhea using a systematic diagnostic approach.

Inclusion Criteria:

1. Women aged 15-45 years presenting with primary or secondary amenorrhea.
2. Absence of menstrual periods for at least three months in women with previously regular cycles (secondary amenorrhea) or no menstruation by the age of 16 (primary amenorrhea).
3. Willingness to undergo a comprehensive diagnostic evaluation, including hormonal assays and imaging studies.
4. No history of hormonal contraceptive use or other medications affecting menstrual cycles for at least three months prior to enrollment.

Exclusion Criteria:

1. Pregnancy or recent pregnancy within the last six months.
2. Known diagnosis of a condition that could explain amenorrhea (e.g., polycystic ovary syndrome (PCOS), thyroid disorders, or congenital adrenal hyperplasia).
3. Use of hormonal contraceptives or other medications known to affect menstrual cycles within the last three months.
4. Presence of chronic systemic diseases such as diabetes mellitus, chronic kidney disease, or liver disorders that could interfere with hormonal regulation.

Methods:

A structured and systematic approach was employed to evaluate the etiological factors of amenorrhea. The evaluation process included the following steps:

Laboratory Investigations:

Blood samples were collected for the following hormonal assays:

Follicle-stimulating hormone (FSH) and luteinizing hormone (LH): To assess ovarian function and differentiate between hypothalamic-pituitary and ovarian causes of amenorrhea.

Prolactin: To identify hyperprolactinemia, a common cause of amenorrhea.

Thyroid-stimulating hormone (TSH): To rule out thyroid dysfunction.

Estradiol: To evaluate ovarian estrogen production.

Imaging Studies: Transabdominal or transvaginal ultrasound was performed to evaluate ovarian morphology, uterine structure, and the presence of polycystic ovaries or other anatomical abnormalities. In cases of suspected pituitary adenomas or hypothalamic lesions, MRI of the brain was conducted.

Statistical Analysis:

Data were analyzed using statistical software (SPSS version 25). Descriptive statistics were used to summarize demographic and clinical characteristics. Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were expressed as frequencies and percentages. Chi-square tests and t-tests were used to compare groups, with a p-value <0.05 considered statistically significant.

Ethical Considerations:

The study was approved by the Institutional Ethics Committee, and written informed consent was obtained from all participants. Confidentiality of patient data was maintained throughout the study. This comprehensive approach ensured a thorough evaluation of the etiological factors contributing to amenorrhea, enabling accurate diagnosis and appropriate management.

RESULTS

Table 1: Demographic Characteristics of the Study Population

Age Group (years)	Number of Patients	Percentage
15-20	50	20%
21-30	100	40%
31-40	70	28%
41-45	30	12%

The majority of participants (40%) were in the 21-30 age group, which is consistent with the peak reproductive age. A significant proportion (28%) were aged 31-40, indicating that amenorrhea is also prevalent in women approaching perimenopause. The younger age group (15-20 years) accounted for 20% of cases, highlighting the importance of evaluating primary amenorrhea in adolescents.

Table 2: Distribution of Primary vs. Secondary Amenorrhea

Type of Amenorrhea	Number of Patients	Percentage
Primary	30	12%
Secondary	220	88%

Secondary amenorrhea was far more common (88%) than primary amenorrhea (12%).

Table 3: Etiological Factors Identified in the Study Population

Etiological Factor	Number of Patients	Percentage
Polycystic Ovary Syndrome (PCOS)	88	35%
Hypothalamic Amenorrhea	63	25%
Hyperprolactinemia	38	15%
Primary Ovarian Insufficiency (POI)	25	10%
Other Causes	36	15%

Polycystic Ovary Syndrome (PCOS) is the most common cause (35%) – With 88 patients affected, PCOS stands as the leading etiology. Hypothalamic Amenorrhea accounts for 25% of cases – Affecting 63 patients, this condition results from disruptions in the hypothalamic-pituitary-ovarian axis due to excessive stress, weight loss, or physical exertion. Hyperprolactinemia is responsible for 15% of cases – With 38 patients affected, elevated prolactin levels, often due to pituitary adenomas or medication effects, lead to menstrual disturbances. Primary Ovarian Insufficiency (POI) affects 10% of patients – This condition, found in 25 patients, is characterized by premature ovarian failure, which can have genetic, autoimmune, or idiopathic origins.

Table 4: Laboratory Findings in the Study Population

Hormone	Normal Range	Mean Value in Study Population	Percentage Abnormal
FSH	3-10 mIU/mL	12.5 mIU/mL	40%
LH	2-10 mIU/mL	8.5 mIU/mL	30%
Prolactin	5-25 ng/mL	35 ng/mL	20%
TSH	0.4-4.0 mIU/L	2.5 mIU/L	10%
Estradiol	30-400 pg/mL	150 pg/mL	25%

Hyperprolactinemia (20%) is a significant cause of amenorrhea, possibly due to pituitary dysfunction. Thyroid-related abnormalities are relatively low (10%) but still relevant in some cases.

Table 5: Imaging Findings in the Study Population

Imaging Finding	Number of Patients	Percentage
Polycystic Ovaries	88	35%
Normal Ovarian Morphology	120	48%
Ovarian Atrophy	25	10%
Uterine Anomalies	17	7%

Polycystic ovaries (35%) reaffirm PCOS as a dominant cause of secondary amenorrhea. A large percentage (48%) with normal ovarian morphology necessitates further endocrine and systemic evaluations. Ovarian atrophy (10%) suggests premature ovarian failure in a subset of patients. Uterine anomalies (7%) emphasize the need for imaging in patients with suspected congenital or acquired uterine disorders.

DISCUSSION

In this study the majority of participants (40%) were in the 21-30 age group, which is consistent with the peak reproductive age. A significant proportion (28%) were aged 31-40, indicating that amenorrhea is also prevalent in women approaching perimenopause. The younger age group (15-20 years) accounted for 20% of cases, highlighting the importance of evaluating primary amenorrhea in adolescents. Secondary amenorrhea was far more common (88%) than primary amenorrhea (12%).

The findings of this study highlight the diverse etiological factors contributing to amenorrhea. Polycystic ovary syndrome (PCOS) was the most common cause, accounting for 35% of cases. This is consistent with previous studies that have identified PCOS as a leading cause of menstrual irregularities.

[11] Hypothalamic amenorrhea, often associated with stress, weight loss, or excessive exercise, was the second most common cause, affecting 25% of the study population. [12] Hyperprolactinemia, which can result from pituitary adenomas or medication use, was identified in 15% of cases. [13-15] Primary ovarian insufficiency (POI), characterized by the premature depletion of ovarian follicles, was found in 10% of patients. [14]

The laboratory findings revealed that 40% of patients had elevated FSH levels, indicative of ovarian dysfunction. Elevated prolactin levels were observed in 20% of patients, consistent with the diagnosis of hyperprolactinemia. Imaging studies confirmed the

presence of polycystic ovaries in 35% of patients, while 10% showed evidence of ovarian atrophy, consistent with POI.

The results underscore the importance of a systematic approach to the evaluation of amenorrhea, including a thorough medical history, physical examination, and appropriate laboratory and imaging studies. Early identification of the underlying cause is crucial for guiding appropriate management and improving patient outcomes. [16-18]

In current study Polycystic ovaries (35%) reaffirm PCOS as a dominant cause of secondary amenorrhea. A large percentage (48%) with normal ovarian morphology necessitates further endocrine and

systemic evaluations. Ovarian atrophy (10%) suggests premature ovarian failure in a subset of patients. Uterine anomalies (7%) emphasize the need for imaging in patients with suspected congenital or acquired uterine disorders.

The etiological evaluation of amenorrhea requires a methodical approach, integrating clinical, biochemical, and imaging findings. Early identification of the underlying cause is essential for effective management and preventing long-term complications such as osteoporosis, cardiovascular disease, and infertility. Further research is needed to refine diagnostic algorithms and improve treatment outcomes for affected individuals.

CONCLUSION

Amenorrhea is a complex condition with a wide range of etiological factors. This study highlights the importance of a comprehensive evaluation to identify the underlying cause and guide appropriate management. Polycystic ovary syndrome, hypothalamic amenorrhea, hyperprolactinemia, and primary ovarian insufficiency were the most common causes identified in this cohort. Further research is needed to explore the long-term outcomes of women with amenorrhea and to develop targeted interventions to address the diverse etiological factors involved.

REFERENCES

1. Master-Hunter, T., & Heiman, D. L. (2006). Amenorrhea: evaluation and treatment. American Family Physician, 73(8), 1374-1382.
2. Practice Committee of the American Society for Reproductive Medicine. (2008). Current evaluation of amenorrhea. Fertility and Sterility, 90(5 Suppl), S219-S225.
3. Gordon, C. M. (2010). Functional hypothalamic amenorrhea. New England Journal of Medicine, 363(4), 365-371.
4. Azziz, R., et al. (2009). The Androgen Excess and PCOS Society criteria for the polycystic ovary syndrome: the complete task force report. Fertility and Sterility, 91(2), 456-488.
5. Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group. (2004). Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome. Fertility and Sterility, 81(1), 19-25.
6. Melmed, S., et al. (2011). Diagnosis and treatment of hyperprolactinemia: an Endocrine Society clinical practice guideline. Journal of Clinical Endocrinology & Metabolism, 96(2), 273-288.
7. Nelson, L. M. (2009). Primary ovarian insufficiency. New England Journal of Medicine, 360(6), 606-614.
8. Santoro, N. (2003). Mechanisms of premature ovarian failure. Annals of the New York Academy of Sciences, 997(1), 42-48.
9. Welt, C. K., et al. (2004). Frequency of the FMR1 gene mutations in women with premature ovarian failure. Journal of Clinical Endocrinology & Metabolism, 89(2), 724-728.
10. Warren, M. P., & Perlroth, N. E. (2001). The effects of intense exercise on the female reproductive system. Journal of Endocrinology, 170(1), 3-11.
11. Santoro, N., et al. (2016). Menstrual cycle hormone changes in women with primary ovarian insufficiency. Journal of Clinical Endocrinology & Metabolism, 101(12), 4535-4543.
12. Rebar, R. W. (2009). Premature ovarian failure. Obstetrics and Gynecology, 113(6), 1355-1363.
13. Welt, C. K., & Hall, J. E. (2008). Primary ovarian insufficiency: a more accurate term for premature ovarian failure. Clinical Endocrinology, 68(4), 499-509.
14. Azziz, R., et al. (2006). Positions statement: criteria for defining polycystic ovary syndrome as a predominantly hyperandrogenic syndrome: an Androgen Excess Society guideline. Journal of Clinical Endocrinology & Metabolism, 91(11), 4237-4245.
15. Gordon, C. M., & Nelson, L. M. (2003). Amenorrhea and bone health in adolescents and young women. Current Opinion in Obstetrics and Gynecology, 15(5), 377-384.
16. Warren, M. P., & Shantha, S. (2000). The female athlete. Endocrinology and Metabolism Clinics of North America, 29(3), 487-509.
17. Santoro, N., & Goldsmith, L. T. (2000). The role of the hypothalamus in the etiology of amenorrhea. Endocrinology and Metabolism Clinics of North America, 29(3), 511-526.
18. Welt, C. K., & Hall, J. E. (2008). Primary ovarian insufficiency: a more accurate term for premature ovarian failure. Clinical Endocrinology, 68(4), 499-509.