ORIGINAL RESEARCH

Exploring the Interplay of Anti-Mullerian Hormone (AMH) Levels in Fertile and Infertile Individuals

[1]Dr. Rizwana Habib Kanth, [2]Dr. Huzaifa Ashraf, [3]Dr. Bilal Ahmad Wani, [4]Dr. Waafia Muzafar

[1]Professor and Head, [2,3,4]Post Graduate, Department of Obstetrics and Gynecology, Lala Ded Hospital, GMC, Srinagar, India

Corresponding author
Dr. Waafia Muzafar
Post Graduate, Department of Obstetrics and Gynecology, Lala Ded Hospital, GMC, Srinagar, India
Email: waafiamuzafar13@gmail.com

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ABSTRACT

Background: Fertility dynamics within the unique demographic of Kashmiri females under the age of 40 remain a subject of intrigue. This study endeavors to shed light on these complexities by delving into the intricate interplay of Anti-Mullerian Hormone (AMH) levels, a pivotal biomarker of ovarian reserve, among fertile and infertile individuals. **Methods:** In a meticulously conducted prospective observational case-control study, we sought to elucidate potential disparities in AMH levels between these contrasting groups. Two hundred participants undergoing infertility assessments were compared to an equal number of controls with documented fertility. AMH levels were quantified through rigorous hormonal assays, complemented by the compilation of relevant clinical data. **Results:**Our findings unveiled notable distinctions in AMH levels between fertile and infertile Kashmiri females under 40 years of age. Significant differences in AMH levels were observed between age groups. In the 25-29 years category, cases had lower AMH levels (1.57 ng/ml) compared to controls (3.12 ng/ml) ($p < 0.001$*). In the 30-34 years group, cases had lower AMH levels (0.82 ng/ml) than controls (2.61 ng/ml) ($p < 0.001$*). Among those aged 35-39 years, cases had reduced AMH levels (0.54 ng/ml) compared to controls (2.01 ng/ml) ($p < 0.001$*). The optimal cutoff value for AMH in predicting infertility was less than 1, serving as a threshold for identifying individuals at risk of infertility. Sensitivity, indicating AMH's ability to correctly identify individuals with infertility, was calculated at 80.5% (95% CI: 74.5% - 85.3%). Overall, the diagnostic accuracy of AMH in predicting infertility was determined to be 79.3% (95% CI: 75.0% - 82.9%), highlighting its effectiveness in categorizing individuals as infertile or not with an accuracy of 79.3%.**Conclusion:** AMH demonstrates its potential as a reliable tool for categorizing individuals as either infertile or not, offering valuable insights into reproductive health and fertility potential. These insights contribute to our broader comprehension of the complex interplay of factors shaping fertility in the Kashmiri context and may pave the way for more tailored approaches to address reproductive challenges within this unique population.

Keywords: Age; Anti-Müllerian Hormone; Follicle Stimulating Hormone; Infertility; Women

INTRODUCTION

In the contemporary milieu, the imperative to formulate a discerning approach for the management of female infertility through the meticulous assessment of ovarian reserve has ascended to a paramount status. Traditionally, the evaluation of ovarian reserve relied upon rudimentary metrics, including age and the deployment of ultrasonographic scrutiny to ascertain pertinent parameters such as Follicle Stimulating Hormone (FSH), Antral Follicle Count (AFC), and estradiol levels during the incipient follicular phase.[1] However, the emergence of Anti-Müllerian Hormone (AMH), also known as Müllerian Inhibiting Substance, has ushered in a new era of promise in the realm of ovarian reserve assessment.[2] AMH, a dimeric glycoprotein of notable complexity, plays a pivotal role in growth and differentiation within the physiological context. [2,3] It constitutes a cardinal gonadal factor, orchestrating the regression of the Müllerian duct during embryonic development while concurrently serving as a precursor to the intricate female reproductive tract.[3,4] The plasma concentration of AMH follows a distinctive trajectory across the life course, manifesting its presence at birth and gradually ascending through the period of puberty, only to undergo a gradual decline, ultimately becoming undetectable upon the advent of menopause.[1,5]In essence, the utilization of AMH as a marker for ovarian reserves signifies a paradigm shift in the assessment of female fertility potential, offering

a nuanced and comprehensive perspective that transcends the limitations of traditional methodologies. This sophisticated and multifaceted biomarker holds the potential to revolutionize the landscape of fertility medicine and, in so doing, contribute to the enhancement of reproductive health and the quality of care afforded to individuals navigating the complexities of infertility.

In the realm of reproductive endocrinology and fertility assessment, the meticulous examination and discernment of Anti-Müllerian Hormone (AMH) levels in a demographic of Kashmiri women under the age of 40, stratified by their fertility status, constitutes a compelling avenue of investigation. The juxtaposition of AMH concentrations in individuals exhibiting fecundity with those encountering infertility within this specific cohort not only underscores the imperative role of AMH as a biomarker of ovarian reserve but also furnishes invaluable insights into the nuanced interplay of biological determinants contributing to reproductive health disparities in this distinctive population. Consequently, this study seeks to elucidate the potential differentials in AMH levels between these two contrasting groups, thereby engendering a deeper comprehension of the multifaceted factors underlying fertility dynamics in the Kashmiri context.

METHODS

The present study spanned a duration of one and a half years was a hospital based analytical cross-sectional conducted within the esteemed precincts of the Postgraduate Department of Obstetrics and Gynaecology at LallaDed Hospital, Government Medical College Srinagar. The meticulous calculation of the requisite sample size was informed by stringent statistical criteria, including a confidence level of 95% and a statistical power of 80%. To this end, a discerning consideration of Anti-Müllerian Hormone (AMH) deficiency was factored, specifically delineating a prevalence of 13.2% within the cohort of infertile females and 5.1% within the fertile female group. Consequently, the chosen sample size comprises 400 participants, thoughtfully divided into two cohorts: 200 individuals grappling with infertility and an equal number of fertile controls.

The eligibility criteria for participation in this seminal study encompassed Kashmiri females aged between 18 and 39 years, with a focus on those experiencing unexplained infertility and attending the Gynaecology Outpatient Department (OPD) at LallaDed Hospital. The control group, in juxtaposition, featured fertile Kashmiri females within the same age bracket. However, certain exclusionary criteria were judiciously applied to maintain methodological rigor. Non-Kashmiri females, individuals with associated male infertility, and those afflicted by specific gynaecological disorders such as Polycystic Ovary Syndrome (PCOS), Endometriosis, Fallopian tube blockage, Pelvic Inflammatory Diseases, Genital Tuberculosis, and Congenital Uterine Abnormalities were excluded from the study. Additionally, participants who were already undergoing In Vitro Fertilization (IVF) treatment were deemed ineligible. An ethical approval from the Institutional Ethical Committee and informed consent was obtained from the involved participants. The study group encompassed 200 Kashmiri females grappling with unexplained infertility and seeking evaluation at the Gynaecology OPD. Concurrently, a cohort of 200 volunteer women was enrolled as controls. This control group consisted of Kashmiri fertile females attending the Gynaecology OPD at Govt. L.D Hospital, primarily for preconception counseling, contraceptive guidance, or tubal sterilization, all of whom boast regular menstrual cycles and the presence of both ovaries, mirroring the characteristics of the patient group. Remarkably, the age range for both patients and controls spanned from 18 to 39 years.

The methodological underpinning of this study encompassed an exhaustive data collection process, incorporating a standardized registration form to capture a comprehensive array of socio-economic data, age, body mass index (BMI), demographic particulars, menstrual histories, and past medical and surgical histories. Subsequent examinations of both patients and controls were judiciously scheduled during the early follicular phase (i.e., day 2 to day 4). Blood samples, culminating in hormonal assessments for both cohorts, were meticulously obtained during the same phase, specifically on day 2 or day 3 of the menstrual cycle. The ensuing serum was expeditiously separated and preserved under refrigeration, awaiting routine hormonal analyses. These analyses comprehensively encompassed parameters such as Follicle Stimulating Hormone (FSH), Luteinizing Hormone (LH), Estrogen, Progesterone, Prolactin, Thyroid Stimulating Hormone (TSH), Triiodothyronine (T3), Tetraiodothyronine (T4), and the focal point of our study, Anti-Müllerian Hormone (AMH).The AMH testing, a pivotal facet of this investigation, was meticulously orchestrated on day 2 or day 3 of the menstrual cycle. A fraction of the centrifuged sample, totaling 4 ml, was judiciously preserved at an icy -80-degree Celsius, primed for batch analysis of AMH. This pivotal AMH assay was executed through an enzyme immunoassay technique, employing a competitive modus operandi, underscored by the utilization of a monoclonal anti-AMH antibody and an AMH-HRP conjugate. These elements converged upon an Anti-AMH-coated plate, meticulously calibrated for precision.The ensuing statistical analysis showcased a methodical approach. Data was adeptly compiled within an M.S. Excel spreadsheet, with continuous variables represented as Mean+SD for normally distributed variables and median, interquartile range (IQR) for those non-normally distributed. The Chi-square test was invoked for the analysis of relationships between two qualitative variables, whiles the delineation of cut-off

levels for AMH as predictor of ovarian reserve, constituted a cardinal objective, probed through the Receiver Operating Characteristics (ROC) curve and Youden's index.

RESULTS

The study's demographic breakdown, categorized by age, revealed that among the cases, 29.5% were aged 25-29 years, 36.5% were aged 30-34 years, and 34.0% were aged 35-39 years. Meanwhile, in the control group, 32.0% were aged 25-29 years, 37.5% were aged 30-34 years, and 30.5% were aged 35-39 years. The calculated p-value of 0.898 indicated that there was no statistically significant age-related difference between the cases and controls. The mean age for cases was 32.11 years (SD±4.37, range: 25-39), while for controls, it was 32.06 years (SD±4.24, range: 25-39). Among the cases, consisting of 200 individuals, the mean BMI was 19.8 kg/m² with a standard deviation of 2.14 kg/m². In the control group, also comprising 200 individuals, the mean BMI is slightly higher at 20.1 kg/m², with a standard deviation of 2.42 kg/m². However; the calculated p-value of 0.189, suggested that BMI was not a significant contributing factor to the observed variations between cases and controls in this study. The study cases were predominantly afflicted by primary infertility, constituting 76.0% of the total cases, while secondary infertility was observed in 24.0% of the cases. When the distribution of the duration of infertility among the cases was studied, a notable 34.0% of the cases reported experiencing infertility for less than 3 years, equating to 68 individuals.The majority, comprising 55.5% of the total cases, had been grappling with infertility for a duration spanning from 3 to 5 years, encompassing 111 individuals while as 10.5% of the cases endured infertility for a period exceeding 5 years, representing 21 individuals.The calculated mean duration of infertility within the cases was 3.4 years, with a standard deviation of 1.45 years. The range of infertility duration observed in this group extended from a minimum of 2 years to a maximum of 7 years.

Among the cases, the mean age at menarche was 12.9 years with a standard deviation of 1.19, while in the control group, it was slightly higher at 13.1 years with a standard deviation of 0.955. The p-value for this comparison was 0.181, suggesting that there is no statistically significant difference in the age at menarche between cases and controls.Cases had a mean cycle length of 28.5 days with a standard deviation of 1.48, whereas controls had a mean cycle length of 28.7 days with a standard deviation of 1.443. The p-value for this comparison was 0.125, indicating that there is no statistically significant difference in the duration of cycle length between the two groups. The mean duration of periods for cases was 4.1 days with a standard deviation of 1.54, while for controls; it was 3.9 days with a standard deviation of 1.130. The p-value for this comparison was 0.139, suggesting that there was no statistically significant difference in the duration of periods between cases and controls.

Table 1: Comparison based on FSH (mIU/ml) in cases and controls according to age

Age (Years)	Cases		Controls		P-value
	Mean	SD	Mean	SD	
25-29 Years	11.87	1.19	5.92	1.32	<0.001*
30-34 Years	13.72	1.32	7.69	2.75	0.003*
35-39 Years	15.28	4.56	8.61	3.84	0.034*
Overall	13.73	2.29	7.12	3.07	<0.001*

Table 1 provides a detailed comparison of FSH (Follicle Stimulating Hormone) levels between two groups, namely "Cases" and "Controls," stratified by age groups: 25-29 years, 30-34 years, and 35-39 years. In the 25-29 years age group, cases exhibit significantly higher mean FSH levels (11.87 mIU/ml) compared to controls (5.92 mIU/ml) ($p < 0.001$*), indicating a substantial difference between individuals with a specific condition and those without. Similarly, in the 30-34 years age group, cases demonstrate a notably higher mean FSH level (13.72 mIU/ml) in contrast to controls (7.69 mIU/ml), and this difference is statistically significant ($p = 0.003$*). For individuals aged 35-39 years, cases still display elevated mean FSH levels (15.28 mIU/ml) compared to controls (8.61 mIU/ml), and this difference was statistically significant ($p = 0.034$*).Overall, when considering all age groups together, the mean FSH level in cases (13.73) is significantly higher than in controls (7.12), with a p-value less than 0.001.

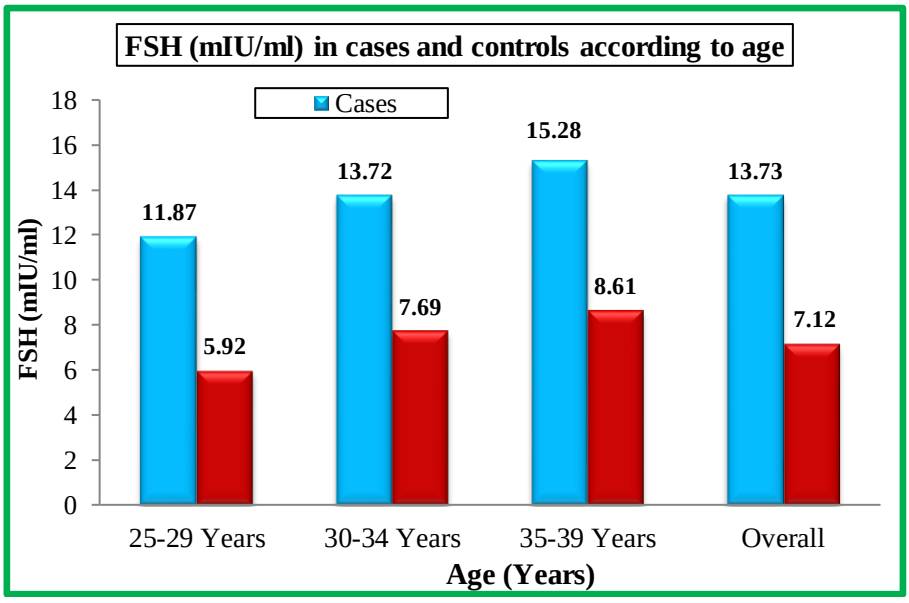


Table 2: Comparison based on AMH (ng/ml) levels in cases and controls according to age

Age (Years)	Cases		Controls		P-value
	Mean	SD	Mean	SD	
25-29 Years	1.57	0.775	3.12	0.264	<0.001*
30-34 Years	0.82	0.271	2.61	0.624	<0.001*
35-39 Years	0.54	0.273	2.01	0.571	<0.001*
Overall	0.93	0.638	2.54	0.699	<0.001*

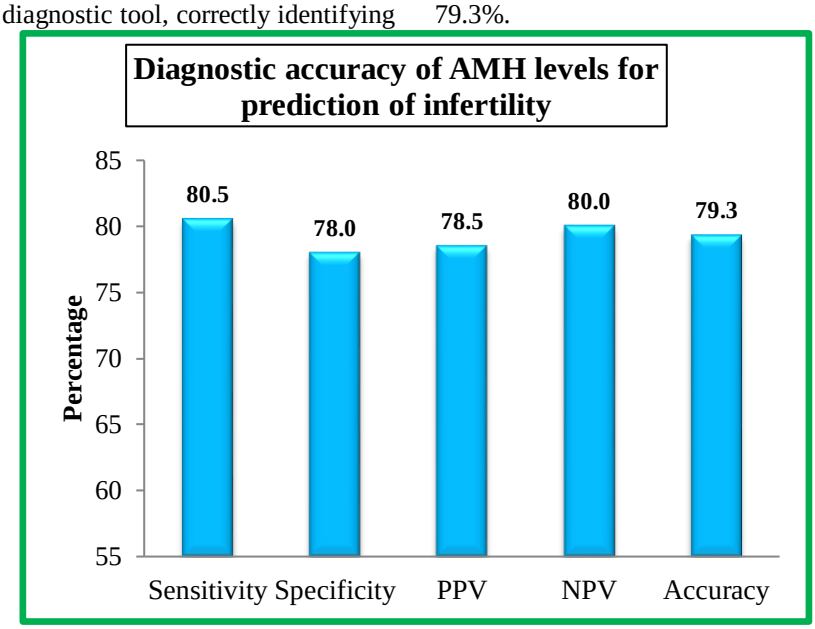
When we examined the comparison of AMH (Anti-Mullerian Hormone) levels between two distinct groups, categorized by age, we observed a significant difference in the 25-29 years age group. In this age category, cases displayed notably lower mean AMH levels (1.57 ng/ml) in contrast to controls (3.12 ng/ml). This finding underscores a substantial distinction between individuals with a particular health condition and those without it ($p < 0.001$*). Similarly, in the 30-34 years age group, cases demonstrate notably lower mean AMH levels (0.82 ng/ml) in contrast to controls (2.61 ng/ml), and this difference is highly statistically significant ($p < 0.001$*). For individuals aged 35-39 years, cases also display significantly reduced mean AMH levels (0.54 ng/ml) compared to controls (2.01 ng/ml), and this difference was highly significant ($p < 0.001$*). These findings offer valuable insights into the relationship between AMH levels and the studied health conditions across different age categories.

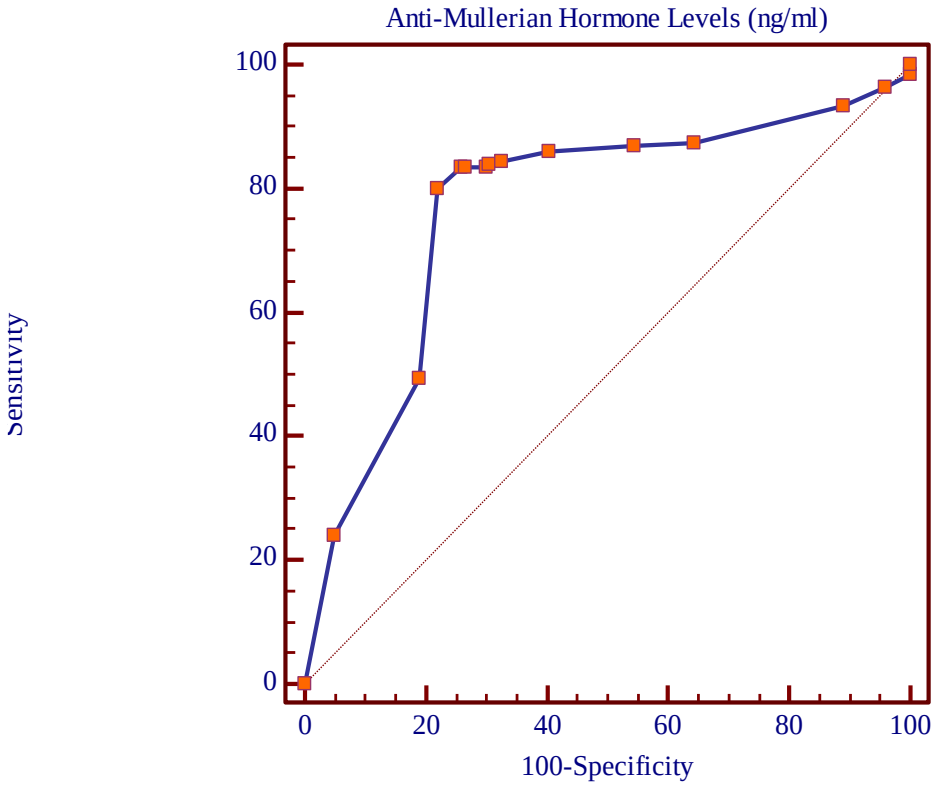
Table 3: Diagnostic accuracy of AMH levels for prediction of infertility

Parameter	Value	95% CI
Optimal cutoff	< 1	-
Sensitivity	80.5	74.5-85.3
Specificity	78.0	71.8-83.2
PPV	78.5	72.4-83.6
NPV	80.0	73.8-85.1
Accuracy	79.3	75.0-82.9

Table 3 provides a comprehensive assessment of the diagnostic accuracy of AMH (Anti-Mullerian Hormone) levels as a predictive measure for infertility. The table includes key parameters and corresponding values, along with their respective 95% Confidence Intervals (CI). The table indicates that the optimal cutoff value for AMH in predicting infertility was less than 1, serving as a threshold for identifying individuals at risk of infertility. Sensitivity was calculated at 80.5%, with a 95% CI ranging from 74.5% to 85.3%. This indicates that AMH levels correctly identify approximately 80.5% of individuals who were genuinely infertile. Specificity was measured at 78.0%, with a 95% CI between 71.8% and 83.2%. This demonstrates that AMH levels accurately rule out infertility in about 78.0% of individuals who were not infertile. The PPV was determined to be 78.5%, with a 95% CI spanning from 72.4% to 83.6% while as the NPV was 80.0%, with a 95% CI ranging from 73.8% to 85.1%. This implies that when AMH levels indicate normal fertility (based on the defined cutoff), there was approximately an 80.0% probability that the individual is not infertile. The overall diagnostic accuracy of AMH levels in predicting infertility was determined to be 79.3%, with a 95% CI between

75.0% and 82.9%. This reflects the effectiveness of AMH levels as a diagnostic tool, correctly identifying individuals as infertile or not with an accuracy of 79.3%.





DISCUSSION

Infertility is a widespread medical condition that affects a significant portion of the global population, including Kashmir. The incidence of infertility is on the rise, and it can have profound physical, emotional, and societal impacts. Understanding the factors contributing to infertility is essential for addressing this public health concern effectively. While AMH has been recognized as a valuable biomarker for assessing ovarian reserve and predicting fertility, there is often a lack of population-specific data. The Kashmiri population represents a unique demographic with its genetic, environmental, and lifestyle factors. The present study was aimed to investigate AMH levels in this specific population to provide tailored insights into infertility risk.

The present investigation encompassed a cohort of 400 subjects, comprising 200 individuals afflicted by infertility (referred to as "cases") and an equal number of 200 fertile counterparts (referred to as "controls").

The study encompassed a population aged 25-39, with mean ages of 32.11 years for infertile individuals (cases) and 32.06 years for fertile individuals (controls). The most affected age group was 30-34 years (36.5%), followed by 25-29 years (29.5%), and 35-39 years (34%). A comparative perspective elucidates congruence with prior study endeavors. Notably, a study conducted by Greenwood EA et al. in 2017 involved 277 patients afflicted with unexplained infertility and 226 fertile females.[6] The mean age for patients grappling with unexplained infertility within this study cohort stood at 32.3 years, with a minimal standard deviation of 0.2 years, while the fertile control group displayed a slightly higher mean age of 33.1 years, accompanied by a similarly minimal standard deviation of 0.3 years.[6] This finding underscores a notable resemblance to the age-related demographic patterns observed within our own study. Additionally, Khan HL et al. embarked on a comprehensive study in 2019, comprising 423 infertile women designated as cases and 388 voluntary women forming the control group. Within this study, no statistically significant divergence emerged in terms of mean age between the infertile patient cohort and the control group.[7] Specifically, infertile patients exhibited an average age of 29.9 years, coupled with a standard deviation of 4.10 years, while the control group displayed a marginally higher mean age of 30.41 years, characterized by a standard deviation of 3.9 years.[7] This observation closely parallels the age-related demographic trends noted in our own study. In the current study, the mean Body Mass Index (BMI), measured in kilograms per square meter (kg/m²), among the cases stood at 19.8 kg/m², accompanied by a slight standard deviation of 2.14 kg/m². In contrast, the controls displayed a marginally higher mean BMI of 20.1 kg/m², characterized by a standard deviation of 2.42 kg/m². Notably, the disparity between these BMI measurements was found to be statistically inconsequential, as evidenced by a p-value of 0.189.In a parallel vein, Khan HL et al. (2019) conducted a comprehensive study involving 423 infertile females classified as cases and 388 fertile females constituting the control group.[7]Within this study framework, the mean BMI within the cases was determined to be 25.3 kg/m², while the control group exhibited a comparable mean BMI of 24.9 kg/m². It is worth noting that, akin to our own findings, this disparity in BMI between cases and controls was also observed to be statistically non-significant, denoted by a p-value exceeding 0.8. In our study, the majority of patients experienced a duration of infertility ranging from 3 to 5 years, comprising 55.5% of the cases, followed by duration of less than 3 years, accounting for 34% of the cases. A smaller proportion of patients, 10.5%, had been grappling with infertility for more than 5 years. These findings align with the results obtained by Ugwu EO (2014), whose research revealed that 64.8% of patients faced infertility for a duration of 0-5 years, with 22.2% enduring it for 6-10 years and 11.1% for 11-15 years.[8]

Regarding the mean age at menarche, our study determined it to be 12.9 years accompanied by a standard deviation of 1.19 years in the cases group, and 13.1 years with a standard deviation of 0.955 years in the control group. Importantly, statistical analysis indicated an insignificant difference (p 0.181) between the two groups. These observations resonate with the findings of Khan HL et al. (2019), where the mean age at menarche among infertile females was recorded as 12.8 years, while fertile females exhibited a slightly lower mean age of 12.6 years, a statistically insignificant difference.[7]Furthermore, when assessing the mean duration of the menstrual cycle, our study identified a mean of 28.5 days, accompanied by a standard deviation of 1.48 days in infertile females, and 28.7 days with a standard deviation of 1.443 days in fertile females. These results align closely with those documented by Hvidman HW et al. (2016), who reported mean cycle lengths of 28.6 days in infertile females and 28.7 days in controls, reaffirming the consistency of these findings in the context of infertility research.[9]

The mean Follicle Stimulating Hormone (FSH) levels exhibited notable distinctions among various age groups within the study. Specifically, within the 25-29 years age category, cases displayed a mean FSH level of 11.87 mIU/ml with a standard deviation of 1.19 mIU/ml, in stark contrast to controls who manifested a considerably lower mean FSH level of 5.92 mIU/ml, accompanied by a standard deviation of 1.32 mIU/ml. This disparity between cases and controls was statistically significant, denoting a p-value of less than 0.001. Similarly, within the 30-34 years age group, cases exhibited a mean FSH level of 13.72 mIU/ml, characterized by a standard deviation of 1.32 mIU/ml, while controls demonstrated a substantially lower mean FSH level of 7.69 mIU/ml, associated with a standard deviation of 2.75 mIU/ml. This distinction between cases and controls was statistically significant as well, with a p-value of less than 0.003. In the age bracket of 35-39 years, cases displayed a mean FSH level of 15.28 mIU/ml, with a standard deviation of 4.56 mIU/ml, in comparison to controls who registered a notably lower mean FSH level of 8.61 mIU/ml, accompanied by a standard deviation of 3.84 mIU/ml. This discrepancy between cases and controls was statistically noticeable. These findings closely align with a study conducted by Prasad B et al. in 2015, which reported a statistically significant difference in serum FSH levels between infertile females (8.77+4.65 mIU/ml) and fertile females (6.71+4.12 mIU/ml).[10] Akin to our results, Raeissi A et al. in 2015 also observed significantly higher mean serum FSH levels in infertile females compared to fertile counterparts. Their study additionally revealed a consistent upward trajectory in mean FSH levels with advancing age within both cases and controls, mirroring the patterns identified in our investigation.[11]

Likewise, Okunola OT et al. in 2016 reported a significant disparity between mean serum FSH levels in fertile (6.97+3.34 mIU/ml) and infertile (13.34+5.4 mIU/ml) females, reinforcing the association between elevated FSH levels and infertility.[12]

In our study, a comprehensive examination of Anti-Mullerian Hormone (AMH) levels revealed distinct patterns across different age groups. For individuals aged between 25-29 years within the "cases" group, the mean AMH level was quantified at 1.57 ng/ml, accompanied by a standard deviation of 0.775 ng/ml. In striking contrast, the "controls" group in the same age bracket exhibited a notably higher mean AMH level of 3.12 ng/ml, demonstrating a statistically significant divergence. Within the 30-34 years age category among "cases," the mean AMH level was determined to be 0.82 ng/ml, with a standard deviation of 0.271 ng/ml. This was in stark contrast to the "controls" group in the same age range, where the mean AMH level was notably elevated at 2.61 ng/ml. Once again, this disparity was found to be statistically significant. Similarly, individuals aged between 35-39 years within the "cases" group exhibited a mean AMH level of 0.54 ng/ml, coupled with a standard deviation of 0.273 ng/ml. In contrast, the "controls" group within this age range displayed a substantially higher mean AMH level of 2.01 ng/ml. Comparatively, a study conducted by Oke EO et al. in 2020 reported analogous findings. Their research revealed a significantly lower mean serum AMH value of 2.66 ng/ml in the study subjects when juxtaposed with the control group's mean serum AMH levels, which stood at 10.32 ng/ml.[13] This significant disparity in serum AMH levels between the study subjects and the control group underscores the role of AMH in fertility assessment and its susceptibility to age-related fluctuations, aligning closely with our study's observations. Furthermore, our findings resonate with a study undertaken by Okunola OT et al. in 2016, which documented a significant difference in AMH levels between fertile and infertile females.[12] Fertile individuals displayed a mean AMH level of 2.71 ng/ml, while infertile counterparts exhibited a notably lower mean AMH level of 1.60 ng/ml.

Utilizing ROC curve analysis in this study, the optimal threshold for serum Anti-Mullerian Hormone (AMH) levels was identified as <1 ng/ml, yielding a specificity of 78.0% (95% CI 71.8-83.2%) and a sensitivity of 80.5% (95% CI 74.5-85.3%). The positive predictive value was determined to be 78.5%, the negative predictive value stood at 80.0%, and the overall accuracy of the test was assessed at 79.3%. Notably, these findings align with the research conducted by Khan HL et al. in 2019, where an analogous optimal AMH cutoff of 0.72 was ascertained, corroborating the consistency of our results.[7] Furthermore, the outcomes of this study exhibited resonance with the research conducted by Zhou SJ et al. in 2020, wherein ROC analysis pinpointed an optimal AMH cutoff of 0.8.[14] This congruence reinforces the robustness of our findings. In a broader context, a study conducted by Alipour F et al. in 2015 reported an AMH sensitivity of 80% and a specificity of 78.89% in diagnosing infertility, with an overall diagnostic accuracy of 78.95%, closely resembling our study results.[15] However, it is pertinent to note that the positive predictive value and negative predictive value in Alipour's study were 17.39% and 98.61%, respectively, which diverged from our own findings.[15] Moreover, Zhou SJ et al.'s study in 2020 identified an optimal AMH cutoff of 0.94, associated with a sensitivity of 70% and a specificity of 86%, aligning harmoniously with the outcomes of our study.[14]

CONCLUSION

Our study encompassed a diverse age range, primarily affecting women between 25-39 years, with the most prevalent age group experiencing infertility being 30-34 years. While we observed minor variations in BMI and menstrual history between cases and controls, the primary form of infertility was found in 76% of patients, and the majority had been experiencing infertility for 3-5 years. Furthermore, serum FSH levels increased with age in both cases and controls, while serum AMH levels declined significantly as age advanced. In terms of diagnostic accuracy, our study identified an optimal serum AMH cutoff of <1 ng/ml, demonstrating a sensitivity of 80.5% and specificity of 78.0%. The positive predictive value was 78.5%, the negative predictive value stood at 80.0%, and the overall accuracy of the test was 79.3%. These findings contribute to the understanding of AMH as a valuable diagnostic tool for infertility prediction within the context of our study population.

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