Assessment of Inhibin-B hormone level and its relationship with some gonadal hormones in males having idiopathic infertility

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ABSTRACT

The aim of the current study to determine levels of Inhibin-B hormone and its relationship with some gonadal hormones, including follicle-stimulating hormone (FSH), luteinizing hormone (LH) prolactin, and testosterone hormones in some males with idiopathic infertility in Shirqat city.

Blood and seminal fluid samples from (60) idiopathic male infertile and (30) healthful individuals as (control group) aged (18 to 60 years) were collected from private clinics. Enzyme-linked immunosorbent assay (ELISA) was used to estimate serum Inhibin B, FSH, LH, prolactin, and testosterone hormones.

According to types of sperm count, patients have divided onto two groups 49 persons as azoospermia group (zero /ml) and 11 persons as oligospermia group less than 20 million/ml. Inhibin B and testosterone levels were significantly decreased (P≤0.01) in the infertile men compared with the control group. While the FSH level, LH, and prolactin were significantly higher (P≤ 0.01) in the infertile men than in the control group, the results of Inhibin B were non-significant.

In contrast, levels of FSH, LH, and prolactin were higher significant (P≤ 0.01), except testosterone level was significant differences (P≤ 0.05) in the age groups <20-30 year, 31–40 year, and ≥ 40 years. There were significant differences (P≤ 0.01) in levels of FSH and prolactin, but the levels of Inhibin B and LH were non-significant in the infertility period ≤10 year, 11 – 20 years, ≥ 20 years. Smoker infertile men have low levels (P≤ 0.01) in the prolactin while had high levels in the Inhibin B and LH hormones compared with control. Patients with a family history showed a significant difference (P≤0.05) in the levels of Inhibin B, testosterone, LH, and prolactin.

In conclusion, this study revealed a significant decrease in the Inhibin-B levels of the Azoospermic and oligospermia infertile men. The negative correlation between inhibin B and testosterone and weak correlation with other gonadal hormones. Therefore, Inhibin-B has an important role in diagnosing idiopathic male infertility, and it’s one of the important markers in the diagnosis of normal spermatogenesis.

Introduction

Human infertility

Human infertility is considered as a major health problem; it induces the incapability of marriages who are unfertilized from unprotected sexual correlation at least after 12 months of marriage, the impact of infertility on both male and female, referring to the word infertility, in females is a complete lack of pregnancy ability [1]. About 20-35% and 20-30% cases of infertility that either female and male factors can describe, respectively, while 25-40% of patients may be due to a concern with both partners. In 10-20 % of instances, there may be no recognized cause[2]. Like female infertility, male infertility has always been a heterogeneous disorder that can be based on congenital and genetic influences in 15-30 % of cases, acquired impacts in approximately 20%, and

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idiopathic infertility in. Male infertility is a severe disease involving environmental as well as genetic factors. Abnormal sperm production or activity is probably related to various acquired or congenital factors that act on the pretesticular, post-testicular, or directly testicular level [3]. Genetic disorders, such as chromosomal abnormalities and single-gene mutations, could occur in about 15 percent of men's infertility cases [4,5]. Due to acquired or congenital urogenital deformities, tumours, infections of the urogenital tract, elevated scrotal temperature (e.g., in the case of varicocele), endocrine disorders, genetic mutations, and immunological status can also be decreased male fertility[6]. The infertility of males can be categorized by hormonal investigation and seminal fluid analysis using the light microscopy. The total lack of sperms in semen is termed azoospermia, but if it is less than 20 million / ml, termed oligospermia, whereas if the total number is 20 million / ml, termed Asthenospermia[7]. Human Inhibin B is a glycoprotein hormone (32 kilo Daltons) and a heterodimeric glycoprotein consisting of one alpha-subunit and one beta-subunit; the independent subunits typically have no physiological effects. Thus, the inhibin’s bioactivity relies on the development of a dimeric alpha-beta structure. Inhibin B is a dimeric polypeptide gonadal hormone that controls FSH synthesis and releases of a negative feedback system. Inhibin B plays an essential role in maintaining the hypothalamic-pituitary-gonadal hormonal axis during human male childhood and puberty development[8]. Measurement of inhibin B is a useful marker of fertile state than LH and FSH. In patients with infertility, the inhibin B level could provide useful spermatogenesis information and may serve as a specific spermatogenesis marker. Sertoli cells produce inhibin B, which creates negative responses on FSH releasing, and it could also be a good indicator for the function of the seminiferous tubules [9]. FSH enhances inhibin B production from the tests; on the other hand, the inhibin B inhibits FSH secretion. Clinical results showed a significant inverse relationship between FSH and inhibin B in healthful males and males with the disorder in testicular function [10]. Additionally, except for LH-testosterone, the manufacture of Inhibin B doesn’t depend solely on FSH post-puberty. The central control unit for inhibin B in the availability of FSH Levels is spermatogenesis, and inhibin B manufacturing is directly related to the spermatogenesis's quantity, even though demonstrated by a direct relation between sperm count and serum inhibin B[8]. As in testicular irradiation or Sertoli cell-only syndrome, damage of spermatogenesis leads to falling the Inhibin B and elevation FSH. In these situations, Sertoli-cells alter the function, even though the germ cells’ lack prevents Sertoli cells from fulfilling one’s roles. In every event, even if FSH stimulates the secretion of inhibin B in normal male[11]. Previous studies investigated the role of inhibin B in the diagnosis of men’s infertility 90 samples of semen were collected for analysis, and serological assay Antisperm antibodies (ASAs) and 90 serum samples were collected for serological assay (ASA), which used micro agglutination and hormonal assay tests and showed a significantly low level of inhibin B for infertile men compared with the fertile control group[12]. In other study the average age (24 to 45 years) in 30 patients (infertile men) and 14 healthy controls (fertile men). The two groups of patients were divided into oligospermia and azoospermia. They showed a significant decrease in testosterone and inhibin B levels in infertile men than in the control group[13].

In Iraq Clinical diagnostic and hormone levels features related to the infertile patients’ male infertility factor (n=75) and known fertile men were studied as a control (normozoospermic ones) (n=25) and concluded from this study that low levels of LH, inhibin B, and Testosterone, but the high level of FSH hormone were showed in the azhenoospermia group as an example of infertile men and raised in LH levels, inhibin B, and Testosterone with a reduced level of FSH was showed in normozoospermic as the control group[14]. specimen of 80 adults’ men aged 25-55 years were studied and showed significantly low levels of testosterone and inhibin B in the azoospermic patients group compared with the control group, while significantly increased LH and FSH levels in the azoospermic patient's group compared with the control group[15].

This study is aimed to determine the Inhibin-B hormone levels and their relationship with some gonadal hormones such as FSH, LH, prolactin, and testosterone in males with idiopathic infertility in Shirqat city.

Materials and Methods
The sample included 90 men, 60 of them were infertile and 30 healthful individuals as a control group from private clinics in Shirqat city in the province of Salahuddin from the beginning of October to the end of December 2019. Patients obtained the information were ranged from 18 to 60 years old and divided onto three categories (under 20-30 years, 31-40 years, and more than 40 years). The period of infertility was recorded after marriage, and the patients were classified in to detect the effects period of infertility in three categories (less than 10 years, 11-20 years, and over 20 years). The impact of family medical history investigated. The patients are classified into two categories based on this factor (10 men have a family history with infertility and 50 men do not.). The impact of smoking was investigated. The patients were classified into two groups (15 men smokers and 45 men non-smokers). According to types of sperm count, patients have divided into two groups 49 persons as azoospermia group and 11 persons as oligospermia.
Inhibin B and gonadal hormones such as FSH, LH, testosterone, and prolactin were measured using the ELISA method according to the manufacturer’s instructions (Sunlong Biotech company).

**Statistical Analysis**

Statistical analyses were performed using SPSS version 20 computer software. The mean, standard deviation (SD), and p-value of hormones parameters were calculate using the student’s t-test and ANOVA test (which considered significant when \( p<0.05 \) and highly significant when \( p<0.01 \) for the patients and healthy group.

**Results**

Results of table indicated a significant decrease (\( P \leq 0.01 \)) in the levels of Inhibin B and testosterone compared with control group. In addition, there was a significant increase (\( P \leq 0.01 \)) in the level of FSH, LH and prolactin compared with control group.

### Table 1: Comparison between hormonal levels of the infertile and fertile males.

<table>
<thead>
<tr>
<th>Hormones</th>
<th>infertile (No. 60)</th>
<th>Control (No. 30)</th>
<th>( p ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibin B pg/ml</td>
<td>21.103±9.504</td>
<td>55.914±10.202</td>
<td>( \leq 0.01 )**</td>
</tr>
<tr>
<td>Testosterone (ng/ml)</td>
<td>2.565±0.331</td>
<td>3.960±0.274</td>
<td>( \leq 0.01 )**</td>
</tr>
<tr>
<td>FSH (mIU/ml)</td>
<td>14.620±4.143</td>
<td>4.565±2.325</td>
<td>( \leq 0.01 )**</td>
</tr>
<tr>
<td>LH (mIU/ml)</td>
<td>8.869±2.646</td>
<td>4.632±1.110</td>
<td>( \leq 0.01 )**</td>
</tr>
<tr>
<td>Prolactin (ng/ml)</td>
<td>14.872±2.834</td>
<td>9.303±2.429</td>
<td>( \leq 0.01 )**</td>
</tr>
</tbody>
</table>

(*)Significant, \( p<0.05 \), **High significant, \( p<0.01 \). Color indicates the lowest level.

Results in the table showed a significant decrease (\( P \leq 0.01 \)) in the levels of Inhibin B and testosterone in the azoospermic and oligospermic group compared with the control group. However, there was a significant increase (\( P \leq 0.01 \)) in the level of LH and Prolactin compared with control group.

### Table 2: Hormonal levels of the infertile males according to infertility type

<table>
<thead>
<tr>
<th>Hormones</th>
<th>Azoospermia (No. 49)</th>
<th>Oligospermia (No. 11)</th>
<th>Control (No. 30)</th>
<th>( p ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibin B pg/ml</td>
<td>21.097±5.294</td>
<td>21.129±4.931</td>
<td>55.914±10.202</td>
<td>( \leq 0.01 )**</td>
</tr>
<tr>
<td>Testosterone (ng/ml)</td>
<td>2.610±0.350</td>
<td>2.368±0.244</td>
<td>3.960±0.274</td>
<td>( \leq 0.01 )**</td>
</tr>
<tr>
<td>FSH (mIU/ml)</td>
<td>14.929±1.055</td>
<td>13.248±2.472</td>
<td>4.565±2.325</td>
<td>( \leq 0.01 )**</td>
</tr>
<tr>
<td>LH (mIU/ml)</td>
<td>9.424±2.313</td>
<td>6.394±2.237</td>
<td>4.632±1.110</td>
<td>( \leq 0.01 )**</td>
</tr>
<tr>
<td>Prolactin (ng/ml)</td>
<td>15.924±2.463</td>
<td>10.722±1.953</td>
<td>9.303±2.429</td>
<td>( \leq 0.01 )**</td>
</tr>
</tbody>
</table>

(*)Significant, \( p<0.05 \), **High significant, \( p<0.01 \). Color indicates the lowest level.

no significant differences were detected (\( P>0.05 \)) in the level of the inhibin according to age group\(<20\) Year, \( 20 \) – \( 30 \) Year, \( 30 \) – \( 40 \) Year, \( \geq 40 \) Years (table 3). The current study indicated significant differences (\( P<0.05 \)) in the level of the Testosterone according to age group\(<20-30\) Year, \( 31 \) – \( 40 \) Year, \( \geq 40 \) Years. The study also, showed significant differences (\( P \leq 0.01 \)) in the levels of FSH, LH and Prolactin according to age group\(<20-30\) Years, \( 31 \) – \( 40 \) Year, \( \geq 40 \) Years.

### Table 3: Hormonal levels of the infertile males according to Age

<table>
<thead>
<tr>
<th>Hormones</th>
<th>(&lt;20-30) Year (No. 19)</th>
<th>(31 ) – ( 40 ) Year (No. 25)</th>
<th>( \geq 40 ) Year (No. 16)</th>
<th>( p ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibin B pg/ml</td>
<td>22.620±4.872</td>
<td>20.504±3.190</td>
<td>20.236±3.966</td>
<td>0.706</td>
</tr>
<tr>
<td>Testosterone (ng/ml)</td>
<td>2.788±0.356</td>
<td>2.71±0.461</td>
<td>2.075±0.202</td>
<td>0.18*</td>
</tr>
<tr>
<td>FSH (mIU/ml)</td>
<td>15.490±4.045</td>
<td>11.758±4.593</td>
<td>18.061±3.495</td>
<td>( \leq 0.01 )**</td>
</tr>
<tr>
<td>LH (mIU/ml)</td>
<td>8.776±2.302</td>
<td>7.648±2.600</td>
<td>10.887±1.375</td>
<td>( \leq 0.01 )**</td>
</tr>
<tr>
<td>Prolactin (ng/ml)</td>
<td>17.876±3.338</td>
<td>15.427±3.614</td>
<td>10.806±2.490</td>
<td>( \leq 0.01 )**</td>
</tr>
</tbody>
</table>

(*)Significant at \( p<0.05 \), **High significant at \( p<0.01 \). Color indicates the lowest level.

This study also showed anon-significantly differences (\( P>0.05 \)) in the level of the inhibin B pg/ml 20.785±4.949, 22.382±3.460, 19.63±2.631. LH (mIU/ml) 8.632±1.445, 9.375±1.818, 8.86±1.317 respectively according to infertility period \( \leq 10 \) Year,\( 11 \) – \( 20 \) Year, \( \geq 20 \) Years (table 4). On the other hand, there was a significant difference (\( P \leq 0.01 \)) in the levels of Testosterone (ng/ml) 2.709±0.573, 2.536±0.607, 1.896±0.437. FSH (mIU/ml) 14.216±2.177, 13.075±1.937, 20.455±2.577. Prolactin (ng/ml) 16.794±1.797, 12.664±1.495, 10.351±0.981. respectively according to infertility period\( \leq 10 \) Year,\( 11 \) – \( 20 \) Year, \( \geq 20 \) Year.
Table 4 Hormonal levels of the infertile males according to infertility period

<table>
<thead>
<tr>
<th>Hormones</th>
<th>≤ 10 Year (No. 36)</th>
<th>11 – 20 Year (No. 17)</th>
<th>≥ 20 Year (No. 7)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibin B pg/ml</td>
<td>20.785±4.949</td>
<td>22.382±3.460</td>
<td>19.63±2.631</td>
<td>0.303</td>
</tr>
<tr>
<td>Testosterone (ng/ml)</td>
<td>2.709±0.573</td>
<td>2.536±0.607</td>
<td>1.896±0.437</td>
<td>≤ 0.01 **</td>
</tr>
<tr>
<td>FSH (mIU/ml)</td>
<td>14.216±2.177</td>
<td>13.075±1.937</td>
<td>20.45±2.577</td>
<td>≤ 0.01 **</td>
</tr>
<tr>
<td>LH (mIU/ml)</td>
<td>8.63±1.445</td>
<td>9.375±1.818</td>
<td>8.86±1.317</td>
<td>0.796</td>
</tr>
<tr>
<td>Prolactin (ng/ml)</td>
<td>16.79±4.797</td>
<td>12.66±1.495</td>
<td>10.35±0.981</td>
<td>≤ 0.01 **</td>
</tr>
</tbody>
</table>

(*Significant at p≤0.05, ** High significant at p≤0.01) Color indicates the lowest level.

As shown in table (5) there is a remarkable difference (P<0.05) in the level of Inhibin B pg/ml 23.269±4.037, 20.381±4.566 respectively according to smokers and non-smokers. Also, we showed a significant difference (P<0.01) in the levels of LH (mIU/ml) 11.36±2.144, 8.03±2.137. Prolactin (ng/ml) 13.30±1.841, 15.39±2.215 respectively according to smokers and non-smokers.

Table 5: Hormonal levels of the infertile males according to smoking

<table>
<thead>
<tr>
<th>Hormones</th>
<th>Smokers (No. 15)</th>
<th>Non-Smokers (No. 45)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibin B pg/ml</td>
<td>23.269±4.037</td>
<td>20.381±4.566</td>
<td>0.033 *</td>
</tr>
<tr>
<td>Testosterone (ng/ml)</td>
<td>2.63±0.555</td>
<td>2.54±0.532</td>
<td>0.565</td>
</tr>
<tr>
<td>FSH (mIU/ml)</td>
<td>14.74±2.477</td>
<td>14.58±2.399</td>
<td>0.886</td>
</tr>
<tr>
<td>LH (mIU/ml)</td>
<td>11.36±2.144</td>
<td>8.03±2.137</td>
<td>≤ 0.01 **</td>
</tr>
<tr>
<td>Prolactin (ng/ml)</td>
<td>13.30±1.841</td>
<td>15.39±2.215</td>
<td>≤ 0.01 **</td>
</tr>
</tbody>
</table>

(*Significant at p≤0.05, ** High significant at p≤0.01). Color indicates the lowest level.

Results in table (6) showed significantly differences (P<0.01) in the levels of Inhibin B pg/ml 23.269±4.037, 20.381±4.566 respectively according to smokers and non-smokers. Also, we showed a non-significant difference (P>0.05) in the levels of Testosterone (ng/ml) 2.63±0.555, 2.54±0.532. FSH (mIU/ml) 14.74±2.477, 14.58±2.399 respectively according to smokers and non-smokers.

Table 6: Hormonal levels of the infertile males according to family history

<table>
<thead>
<tr>
<th>Hormones</th>
<th>Have family history (No. 10)</th>
<th>Don’t have family history (No. 50)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibin B pg/ml</td>
<td>18.60±1.757</td>
<td>21.58±2.269</td>
<td>≤ 0.01 **</td>
</tr>
<tr>
<td>Testosterone (ng/ml)</td>
<td>2.357±0.376</td>
<td>2.60±0.323</td>
<td>0.034 *</td>
</tr>
<tr>
<td>FSH (mIU/ml)</td>
<td>19.82±2.543</td>
<td>13.58±2.073</td>
<td>≤ 0.01 **</td>
</tr>
<tr>
<td>LH (mIU/ml)</td>
<td>7.41±1.993</td>
<td>9.16±1.714</td>
<td>≤ 0.01 **</td>
</tr>
<tr>
<td>Prolactin (ng/ml)</td>
<td>12.18±2.851</td>
<td>15.41±3.767</td>
<td>0.021 *</td>
</tr>
</tbody>
</table>

(*Significant at p≤0.05, ** High significant at p≤0.01). Color indicates the lowest level.

The results in the table (7) show non-significant differences between Inhibin B and FSH, LH, prolactin and testosterone. and non-significant weak correlation between Inhibin B and FSH, LH, and prolactin R factor 0.015, 0.08, 0.092 respectively. While negative correlation between Inhibin B and Testosterone R factor-0.135.

Table 7: Correlation between Inhibin-B and hormonal levels of the infertile males

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Hormones</th>
<th>R factor</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibin-B</td>
<td>FSH (mIU/ml)</td>
<td>0.015</td>
<td>0.909</td>
</tr>
<tr>
<td></td>
<td>LH (mIU/ml)</td>
<td>0.08</td>
<td>0.543</td>
</tr>
<tr>
<td></td>
<td>Prolactin (ng/ml)</td>
<td>0.092</td>
<td>0.484</td>
</tr>
<tr>
<td></td>
<td>Testosterone (ng/ml)</td>
<td>-0.135</td>
<td>0.303</td>
</tr>
</tbody>
</table>

*Significant at p≤0.05. (− indicates negative correlation)
Discussion
In this study we observed that the LH, FSH and prolactin in infertile men were significantly \( P \leq 0.01 \) increased compared with controls. Conversely, the Total testosterone had also been significantly lower in infertile men compared to control. The cause of these results are the signalling of negative feedback system. In agreement with [16] in the Egyptian that the serum FSH level in infertile men has increased significantly compared with The fertile group and level of serum testosterone decreased significantly while no statistically significant relationship with serum LH was recognised.

In general, increased FSH levels are a good predictor of germinal epithelial destruction and are commonly associated with azoospermia or oligospermia, and lower Total testosterone levels are markers of hypothalamic or pituitary origin hypogonadism. [17] In the Iranian population, discovered that the FSH serum level in infertile men was greater than in control and the Luteinizing hormone and Testosterone serum levels in sperm count were lower than the control group, but the difference did not reach statistical significance among two groups \( (P=0.08 \) and \( P=0.06) \).[18] found that in the oligozoospermia subgroup the connection with significantly elevated FSH \( (P=0.01) \) and extremely low Inhibin B \( (P=0.046) \) was significant. Interestingly, meta-analysis from across Estonian idiopathic infertility group as well as the Baltic male cohort achieved statistically significant correlation with not only the reduced serum Inhibin B \( (P=0.037) \) as well as with decreases testosterone level \( (P=0.034) \).

Hyperprolactinemia diminishes men fertility when testosterone is suppressed. Synthesis, since hyperprolactinemia is well known to decrease libido and cause reduce sperm production, hyperprolactinemia may, on the other hand, be caused by a number of pathological factors, such as hypothalamic disorders, adenoma of pituitary gland, hypothyroidism, and hypogonadism and this may imply some disturbances in the spermatogenesis phases in infertile patients. The results of this study are compatible with Al-Nahi survey results [19] significant statistical are present differences \( (P \leq 0.05) \) in the FSH, prolactin and testosterone hormone averages in infertile men compared with the fertile men control group.[20] demonstrated significant improvements in LH, FSH and testosterone levels total as well as showed no significant differences in prolactin between both the infertile men and fertile men control groups.

References
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تقييم مستوى هرمون Inhibin-B وعلاقته بهرمونات الغدد التناسلية الأخرى عند الذكور المصابين بالعجز مجهول السبب
فخري غزال محمد، عدنان فاضل العزاوي
قسم علوم الحياة، كلية العلوم، جامعة تكريت، تكريت، العراق

الملخص
هدف هذه الدراسة تحديد مستوى هرمون Inhibin-B وعلاقته مع بعض هرمونات الغدد التناسلية مثل هرمون محفز الجريبات (FSH)، هرمون اللوتيني (LH)، هرمون الحليب، والتستوستيرون لبعض الذكور الذين يعانون من العقم مجهول السبب في مدينة الشرقاط. جمعت عينات الدم والسائل المنوي من (60) من الرجال العقيمين مجهولين السبب ومن (30) من الرجال الاصحاء (مجموعة سيطرة) تتوافق مع المعايير المطلوبة. استخدمت تقنية اختبار الأمتزاز المناعي (Enzyme linked immune-sorbent assay ELISA) لقياس مستويات هرمونات Inhibin B، هرمونات محفز الجريبات (FSH) والهرمون اللوتيني (LH)، والتستوستيرون.

حسب نوع اعداد الحيوانات المنوية تم تقسيم المرضى إلى مجموعتين الأولى 49 شخص كمجموعة انعدام الانطاف (صفر/ مل) والثانية 11 شخصا كمجموعة فئة النطاف أقل من 20 مليون/ مل. انخفض مستويات Inhibin B، هرمون الحليب، الهرمون اللوتيني (LH) بالعمل مع مجموعة السيطرة. في حين كان مستويات هرمونات محفز الجريبات (FSH) مستقرة أو ارتفعت بشكل لطيف. كانت نتائج هرمون ال Inhibin B مستقرة في جميع الفئات العمرية (P≤0.05) في مجموعتين (0.5-0.05) 0.01≤P≤0.04 سنة. هناك اختلافات كبيرة (P≤0.01) بين الفئات العمرية (20-30 سنة و 30-40 سنة) في مستويات الهرمونات. كانت مستويات Inhibin B مستقرة في معظم الفئات (0.5-0.05) في الفئة العمرية (P≤0.05) 0.01≤P≤0.04 سنة. مستويات الهرمونات مستقرة في جميع الفئات العمرية (P≤0.05) 0.01≤P≤0.04 سنة. هناك اختلافات كبيرة (P≤0.01) بين الفئات العمرية (20-30 سنة و 30-40 سنة) في مستويات الهرمونات. في الختام، نشأت هذه الدراسة الخلاصة كبيرة في مستويات إنhibitin-B لدى الرجال المعالجين من نوع عدمي وقليل النطف. هناك ارتباط سلبي في مستويات إنhibitin-B في سن 20-30 سنة، ومستويات ال Inhibin-B في سن 30-40 سنة. هذه النتائج تشير إلى أن Inhibin-B يستخدم كمؤشر في تشخيص تكوين الحيوانات المنوية الطبيعية.