



Original Research

## Association Between Andropause and Demographic Factors with Depression Among Police Officers In Bali

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### Abstract

*Andropause is a health problem in men caused by a decrease in free testosterone levels. Depression is a mental disorder that happens with a person that is related to mood. This research aims to determine the relationship between Andropause and Depression in police officers in Polda Bali in 2023. This research is a descriptive-analytical study with a cross-sectional study design. Andropause was assessed using the ADAM questionnaire, and depression was assessed using the PHQ-9 questionnaire. The sample was selected using a purposive sampling technique. There were 60 respondents in this study. A total of 31 people (51.7%) respondents were positive for Andropause, and 29 people (48.3%) were negative for Andropause. Meanwhile, 12 people (20.0%) of respondents experienced mild depression, and 48 people (80.0%) did not experience depression. Ten (10) respondents experienced Andropause with Depression. There is a significant relationship between Andropause and Depression ( $p=0.003$ ). The odds ratio (OR 95% CI) obtained was 6.429 (1.270-32.541). Also there is a significant relationship between Stress and Depression with  $p<0,001$  (0,000), with OR 21 (4,4-100,1). The majority of police officers in Polda Bali were found to experience Andropause and Depression, as many as 10 people (32.3%). As age increases, the incidence of Andropause increases, and in the respondent population, most of whom are in the mid-life crisis period, it increases the possibility of depression. Police officers in Polda Bali with Andropause have a 6.429 times greater risk of experiencing depression*

## 1. Introduction

Everybody will experience an aging condition, one of the conditions caused by aging in men is the decrease in testosterone levels or andropause. In someone with andropause, testosterone levels will decrease by 1% per year and this decrease occurs in free testosterone levels. The rate of decrease in testosterone levels in andropause can also be influenced by chronic diseases, such as obesity, emotional stress, and drugs, and unhealthy lifestyles such as smoking and consuming alcohol. This decrease in testosterone can be slowed by managing health and lifestyle factors.<sup>1-3</sup>

Andropause causes several symptoms, the most common symptom is loss of sexual desire. The percentage of andropause sufferers is quite large, the number of andropause sufferers in America reaches 15% of the total number of older adult men aged 40-60 years and only 5% are undergoing treatment.<sup>4</sup> According to research reported by Taher in 2005, the percentage of Andropause sufferers in Jakarta was 70.94% according to research using the Androgen Deficiency in Aging Males (ADAM) questionnaire. Andropause sufferers in 2020 are estimated to reach 24.7 million people.<sup>5-6</sup> The prevalence of Andropause in Bali, which was studied at the Niti Mandala Renon Field, reached 49.1% of 55 samples.<sup>7</sup> Apart from decreased libido or sexual desire, low testosterone causes several symptoms, namely decreased performance, erectile dysfunction, decreased muscle mass and strength, cognitive decline, especially visual-spatial, loss of pubic hair, and endurance decrease. These symptoms in a man will cause feelings of anxiety, decreased self-confidence, difficulty sleeping, irritability, and ongoing stress that can lead to depression.<sup>8</sup>

Depression is one of the health problems that can arise during Andropause. When someone experiences andropause, many symptoms appear, one of which is stress. If this condition is not handled properly, over time it can trigger depression. Depression is a mental health disorder related to mood and mood accompanied by deep and prolonged feelings of sadness and a feeling of loss of interest in hobbies or things you like. Depressed patients have different symptoms depending on the level of depression experienced by a person, but the general symptoms are feelings of sadness that persist for a long time, a sense of hopelessness, reduced energy, and enthusiasm for doing things that are of interest.<sup>9,10</sup>

Depressive conditions are usually caused by various factors, or what is called multifactorial. These factors include physical factors, psychological factors, and social factors. Depression occurs in 3.8% of the global population or around 300 million people in the world. The prevalence of depression in Indonesia reaches 6.2% and is mostly experienced by the 75 year age group, namely 8.9%, 8.0% in the 65-74 year age group, and 6.5% in the 55-64 year age group.<sup>11</sup>

In the case of Andropause itself, sufferers generally experience a decrease in libido. This can reduce sexual satisfaction, self-confidence, and relationships with partners. This can reduce the patient's enjoyment, ended in stress, and untreated stress can be the beginning of depression. Apart from that, the condition of decreased testosterone also causes other happiness hormones to become unstable, such as serotonin, norepinephrine, and dopamine, which can cause a person's pleasure to decrease to the point of depression.<sup>12</sup>

In productive age until old age, apart from a decrease in androgen levels in the body, other things can occur that contribute to stress, such as lifestyle, as well as mental stress or workload. Changes since the pandemic which led to the preservation of almost all technology-based systems have resulted in job changes. Apart from that, routine tasks, high demands, time pressure (deadlines), requests from superiors, and handling conflict situations or problems in society that need help to mediate or resolve also provide psychological pressure and affect mental health. Therefore, the author chose police officers at the Bali Regional Police as research subjects to prove the relationship between andropause and depression.

The selection of police officers in the Bali Regional Police for research was based on the work, environment, and work situation of a police officer which allows for high levels of work stress and can lead to depression due to encouragement from other factors, one of which is low testosterone levels. Besides that, the appropriate research subjects are adult men >30 years old, as the peak of the decrease in testosterone is the basis for selecting subjects as police officers, because of their work class at that age. Research by Hayati (2020) obtained that 100% of the sample were police officers experiencing work stress incidents.<sup>13</sup> Research by Sari (2019) also obtained results of 100% from 97 research samples who were police officers experiencing work stress.<sup>14</sup> The high prevalence of andropause and depression

also makes the author want to study these things. The lack of research regarding Andropause and its relationship with depression also made the author choose this topic in the hope that it can become a reference for other research and help provide solutions to the increase in the elderly population in the future.

## 2. Method

This research is a cross-sectional study with an analytic design. The sample of this study is male police officers aged 35–58 who worked as police officers in Bali Regional Police. The sample criteria are male police officers, aged 35–58, someone who actively works in the Bali Regional Police, and agreed to this research with informed consent. The exclusion criteria for this study were samples that did not answer the questionnaire completely. The sampling technique used is purposive sampling, which was chosen to ensure the research objectives are met, and the samples are more relevant. The total samples in this study consist of 60 samples.

The dependent variable in this study is depression, measured using a PHQ-9 questionnaire consisting of 10 Likert scale questions. Depression is considered positive if the PHQ-9 questionnaire score is 5-27, while it is considered negative if the score is 0-4. Questions number 1-9 ask about the

frequency of complaints the respondent feels, while question number 10 asks how difficult it is for the respondent to carry out their daily life with the complaints they feel. The Independent variable in this study is Andropause measured using an ADAM questionnaire consisting of 10 'Yes' or 'No' questions. Andropause is considered positive if the subject answers "Yes" to question number 1 or 7, or more than 3 questions in the ADAM questionnaire. Control variables in this study include age, obesity, stress, smoking history, alcohol consumption history, and past medical history.

Data to process is obtained from primary data of ADAM and PHQ-9 questionnaires. The instrument that used to process the data is Microsoft Excel and Microsoft Word. Data analysis is conducted using Statistical Package for the Social Sciences version 27.0. The statistical analysis in this study includes univariate, bivariate analyses, and logistic regression analysis, all categorical data are converted into percentages, the correlation is tested using the Continuity Correction<sup>b</sup> Chi-Square test, and calculations of odds ratio (OR 95% CI).

## 3. Result

This research yielded the following outcomes:

**Table 1.** Prevalence of Depression Based on The Characteristics of Respondents at the Bali Regional Police in 2023

Variable	Frequency (n=35)	Percentage (%)
Age (years)		
25-35	20	57.1
36-45	15	42.9
Infertility Type		
Primary	18	51.4
Secondary	17	48.6
Duration of Infertility (years)		
1-4	16	45.7
>4	19	54.3
Smoking History		
Yes	14	40.0
No	21	60.0
Alcohol Consumption		
Yes	14	40.0
No	21	60.0
Origin		
Denpasar	10	28.6
Outside Denpasar	25	71.4
Pekerjaan		
Civil Servant	6	17.1
Private Employee	21	60.0

Military/Police	1	2.9
Others	7	20.0
<b>Sperm Preparation Techniques</b>		
Density Gradient Centrifugation	22	62.9
Simple Wash and/or Swim-Up	13	37.1
<b>Number of IUI Cycles</b>		
1 Cycle	33	94.3
2 Cycle	1	2.9
3 Cycle	1	2.9

**Table 2.** The Relationship Between Andropause and Demographic Factors with Depression in Police Officers at the Bali Regional Police in 2023

Variables	Depression		OR	95% CI	p	B
	Yes (%)	No (%)				
<b>Andropause</b>						
Yes	10 (16.7)	21 (35.0)	6.42	1.27-	0.033	1.223
No	2 (3.3)	27 (45.0)		32.54		
<b>Age</b>						
Transition	2(3.3)	25 (41.7)	0.184	0.03-	0.06	
Clinical	10 (16.7)	23 (38.3)		0.93		
<b>Obesity</b>						
Obese	10 (16.7)	39 (65.0)	1.15	0.21-	1.0	
Not Obese	1 (3.3)	9 (15.0)		6.20		
<b>Stress History</b>						
Yes	9 (15.0)	6 (10.0)	21	4.4-	<0.001	2.752
No	3 (5.0)	42 (70.0)		100.1	(0.0000)	
<b>Smoking History</b>						
Yes	7 (11.7)	18 (30.0)	2.33	0.64-	0.326	
No	5 (8.3)	30 (50.0)		8.45		
<b>Alcohol Consumption History</b>						
Yes	9 (15.0)	30 (50.0)	1.80	0.43-	0.636	
No	3 (5.0)	18 (30.0)		7.53		
<b>Past Medical History</b>						
Yes	1 (1.7)	7(11.7)	0.53	0.05-	0.924	
No	11 (18.3)	41 (68.3)		4.79		

Table 1 shows the prevalence of depression based on the characteristics of the respondents. The characteristics of respondents include age, obesity, stress history, smoking history, alcohol consumption history, and past medical history. Table 1, shows that of the 60 people who were respondents in this study, there were more respondents in the clinical phase of aging, namely 33 respondents (55,0%). Based on the data taken, more respondents were obese with body mass index  $\geq 25$ , namely 49 people (81,7%), and 11 people who were not obese (18,3%). The majority

of respondents did not experience stress, 45 (75,0%), and only 12 people (25,0%) experienced stress. In this study, more respondents did not have a history of smoking, namely 58,3%. Most respondents had a history of alcohol consumption (65,0%). The majority of respondents had no previous medical history (86,6%). As many as 13.4% of respondents had a history of previous illnesses, and some respondents experienced type 2 diabetes mellitus (DM), hypertension, dyslipidemia, and metabolic syndrome with 3,3%, 3,3%, 5,0%, and 1,7%. Based on this research, 31

respondents (51,7%) were positive for andropause, and 29 respondents (48,3%) were negative for andropause. Meanwhile, of the 60 respondents, only 12 respondents (20,0%) experienced depression, and 48 people (80,0%) did not experience depression.

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Table 2 shows the results of the relationship between andropause and depression, as well as the relationship with other control variables, namely age, obesity, stress, history of smoking, history of alcohol consumption, and history of previous illnesses. The test used to find the relationship between these variables is a bivariate analysis using the Continuity Correction<sup>b</sup> Chi-Square test. Table 2 also shows the results of the logistic regression test to find out which variables have more influence on the occurrence of depression.

Based on Table 2, it can be seen that of the 31 respondents who experienced andropause, 10 respondents (16.7%) experienced depression, with  $p=0.003$ , which means there is a relationship

between andropause and depression, the odds ratio is 6,42. Apart from that, another factor that influences the occurrence of depression is stress, of the 15 respondents who experienced stress, 9 respondents (15.0%) experienced depression, with  $p=<0.001$  (0.0000) which means there is a relationship between stress and depression, it was found that the odd ratio is 21. Meanwhile, other factors were not found to be statistically related to depression. Based on age, it was found that from 33 respondents of clinical age, 10 respondents (16.7%) experienced depression, from these results it was found that  $p = 0,06$ . There were 49 respondents who were obese, and 10 respondents (16.7%) were depressed, it was found that  $p=1.0$ . Of the 25 respondents who smoked, it was found that 7 people (11.7%) experienced depression, with  $p=0.326$ . It was found that 39 respondents had a history of alcohol consumption, and only 9 people (15.0%) experienced depression, with  $p=0.636$ . A total of 8 respondents had a history of previous illnesses, and only 1 person (1.7%) of them experienced depression, with  $p=0.926$ .

#### 4. Discussion

The assessment of Andropause in respondents was assessed using the Androgen Deficiency in the Aging Male (ADAM) score questionnaire. The prevalence of Andropause among Police Officers at the Bali Regional Police in 2023 shown in Table 1 was obtained from 60 respondents, 31 people (51.7%) were positive for Andropause, and 27 people (48.3%) were negative for Andropause. This is related to previous research conducted by Bactiar and Hidayah (2015) who researched Andropause and obtained results from 60 respondents, 35 people (58.3%) were positive for Andropause (Bactiar and Hidayah, 2015). Likewise, research conducted by Hidayatullah (2018) obtained results from 106 respondents, 62 people (58.5%) were positive for andropause.<sup>4,15</sup>

The incidence of Andropause in police officers at the Bali Regional Police, which reached 51.7% of the total sample, was caused by various factors, such as age, stress, BMI, history of alcohol consumption, smoking history, and history of previous illnesses. According to research by Goleman, in the clinical phase (age > 45 years), the decrease in hormones becomes increasingly significant, including the hormone dehydroepiandrosterone (DHEA), melatonin,



estrogen, testosterone, growth hormone, and an increase in thyroid hormones, which causes andropause. This is due to a decrease in hormones caused by a decrease in the ability of the testicles to produce hormones due to aging.<sup>2</sup> A high body mass index also causes leptin resistance and suppresses the work of the hypothalamus-pituitary-testicular axis which works to produce testosterone.<sup>16,17</sup> Stress factors can also be a cause of high Andropause, these psychological disorders can reduce testosterone levels in the blood circulation. This is because the secretion of ACTH and glucocorticoids increases, suppressing testosterone secretion.<sup>18,19</sup>

Depression assessment in respondents was assessed using the Patient Health Questionnaire (PHQ-9) score questionnaire. The prevalence of depression among police officers at the Bali Regional Police in 2023 in Table 1 was obtained from 60 respondents, 12 people (20.0%) were positive for depression, and 48 people (82.8%) were negative for depression. Of the 12 people who experienced depression, all (100%) experienced mild depression. The level of depression is obtained from the total score of the questionnaire answered by the respondent. Mild depression means the respondent gets a total score of 5-9 out of a maximum total of 27 scores. This means that not all symptoms of depression are felt by the respondent, and the frequency of symptoms felt is only a few times or not every day and does not cause difficulties in carrying out daily activities.<sup>20</sup>

Research by Simanjuntak (2022) examined the prevalence of depression in 27,622 people and found that 6,391 people (23.14%) experienced depression, and 21,231 (76.86%) did not experience depression.<sup>21</sup> Depression can occur due to various factors, if we look at it based on age, the level of depression is more common in teenagers and adults due to studying, work, marriage, and being in a transitional phase of life. Meanwhile, as age increases, the possibility of experiencing depression decreases because emotional control and responses are better maintained.<sup>10</sup> However, other factors such as lifestyle, such as smoking, alcohol consumption, previous medical history, and stress influence the incidence of depression. Long-term exposure to nicotine in cigarettes can cause mental problems, conditions that are not handled and continue to be exposed to stressors are the causes of depression.<sup>10,21</sup>

Based on Table 2, it can be seen that of all the factors that can influence depression, only

andropause and stress are statistically related to depression. It was found that from 31 people who tested positive for andropause, 10 people (16.7%) experienced depression, and 21 people (35.0%) did not experience depression. From the results of data analysis using Chi-square with the Continuity Correction test method, the  $p=0.033$ . This means that men with Andropause have a statistical association with depression. Thus,  $H_1$  which reads "there is a relationship between Andropause and depression in police officers at the Bali Regional Police" is accepted. This is in line with research conducted by Pungus which found that there was a relationship between andropause and depression with a value of  $p=0.034$ , which means there is a relationship between andropause and depression.<sup>22</sup>

Andropause complaints arise as a result of decreased testosterone and other androgen hormones. One of the symptoms experienced is psychological symptoms, such as stress, which leads to depression. The changes experienced due to the decreasing testosterone as age increases, cause someone who has entered the andropause period to experience more severe complaints than those who have not yet entered the andropause period. Severe symptoms cause worry and affect household happiness and disharmony, which can cause stress. If stress occurs for a long time, especially not getting the right knowledge, it will result in someone experiencing depression.<sup>15,18,19,23,24</sup> This is in line with research conducted by Apriani which shows that the direction of the relationship between andropause symptoms and a person's depression status is in a positive direction. The higher the andropause symptom score, the higher the tendency to experience depression. Apart from that, this is also in line with research conducted by Bachtiar which shows that a person experiencing andropause is related to stress. The results of the Chi-square test obtained a value of  $p=0.006$ .<sup>15,23</sup>

The odds ratio (OR 95% CI) between Andropause and Depression is 6.429 (1.270-32.541). The odds ratio results show that respondents who were positive for Andropause had a 6.42 times greater risk of experiencing depression, compared to those who did not. These results follow the research by Hermawati (2010) which obtained results from 30 respondents who experienced Andropause, and as many as 22 people who experienced depression. From this research, it was found that the risk was 12.65 with a

$p=0.01608$ , which means that people who experienced Andropause had a 13 times greater risk of experiencing Depression compared to those who did not experience Andropause 25. The same thing, although with a smaller number It was also found in research conducted by Pungus (2009) that the results showed that two factors were most related to depression, one of which was Andropause (OR 2.773;  $p=0.034$ ).<sup>22</sup> This was also supported by Jebres who obtained results for people with andropause, 6.571 times more at risk of experiencing depression. This is due to a decrease in testosterone levels which also affects a person's mood, sleep quality, and quality of life.<sup>12</sup>

However, hormonal decline is not the only factor that influences or causes depression. Decreased concentrations of norepinephrine, serotonin, and dopamine also play a role in the incidence of depression. This is because these hormones are hormones that provide a feeling of joy and happiness to the brain, thereby increasing the feeling of happiness, thereby reducing the possibility of depression. If testosterone levels decrease it will cause various symptoms such as erectile dysfunction, lack of sexual satisfaction, affect mood, muscle mass, fatigue, and can be a direct cause of stress and depression. On the other hand, if there is an increase in testosterone levels, it can become a natural antidepressant for the body which can reduce the incidence of depression.<sup>12,23</sup> Research by Kheirkhah (2014) makes it clear that the risk of depression due to Andropause is significant, it is said that if testosterone levels are high then the Depression score is low, conversely if testosterone levels are low then the Depression score is high.<sup>25</sup>

Based on Table 2, it was found that of the 15 people who experienced stress, 9 people (15.0%) got positive results for depression, and the majority of respondents who did not experience stress, namely 45 people, got negative results for depression, 42 people (70.0%). These results show that there is a relationship between stress and depression with  $p<0.001$  and  $OR=21$  (4.4-100.1). This is in line with research conducted by Sudarsani (2021) which found a relationship between stress and the occurrence of depression with  $p<0.001$ . The higher the level of stress, the greater the chance of experiencing depression. If we look at the risk, then people who experience stress are 21 times more likely to experience depression. When a person experiences stress, the central nervous system (CNS) will release the

hormones cortisol, epinephrine, and norepinephrine, which are stress hormones to produce a preparatory response for the body to face stressors. However, if this occurs chronically or continuously, the system and hormones will disrupt or affect brain function and can lead to depression. So it can interfere with neurotransmitters such as serotonin, which helps control a person's mood.<sup>26</sup>

Based on these results, it can be said that not all of these factors have a statistical relationship with the occurrence of depression. A logistic regression test was also carried out to determine the factors that most influence depression. Based on Table 2, the results show that 2 factors are most significant in the occurrence of depression in this study, namely stress ( $B=2.752$ ), and andropause ( $B=1.223$ ).

## 5. Conclusion

Based on the results of research on the relationship between andropause and depression in police officers at the Bali Regional Police in 2023, it was found that 60 sample respondents met the inclusion criteria, it can be concluded as follows:

1. The prevalence of Andropause among police officers at the Bali Regional Police in 2023 is 51.7%.
2. The prevalence of Depression among police officers in Bali Police in 2023 is 20.0%.
3. There is a significant relationship between Andropause and Depression in Police Officers at the Bali Regional Police in 2023 ( $p=0.033$ ). Other than andropause, there was a significant relationship between stress and depression with  $p=0,0000$ .
4. Police officers at the Bali Regional Police who experience Andropause have a 6,429 times greater risk of experiencing Depression.

There are several suggestions that can be given for further research:

1. It is also hoped that future research will conduct direct interviews to provide more detailed explanations regarding ambiguous questions to respondents or assess patient honesty through expressions.
2. It is hoped that this research can educate and increase public awareness of the occurrence of Andropause in old age. And

it is hoped that patients can maintain their lifestyle and psychological health.

### Author's Contribution

All authors played a role in shaping the final manuscript. The first author gathered and processed data, analyzed and interpreted data, drafted the manuscript, and created figures. The second and third authors contributed to outlining the main conceptual ideas of the research and providing critical revisions to the article.

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### Conflict of Interest

The authors assert that there are no conflicts of interest concerning this research.

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### Ethics Approval

Ethical clearance for this research was obtained from Ethics Commission of the Faculty of Medicine, Udayana University, as indicated by approval letter number

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