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RELATIONSHIP BETWEEN BODY MASS INDEX AND PSYCHOPATHOLOGY: ANALYSIS OF PERIODIC HEALTH EXAMINATION RESULTS IN 2021

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ABSTRACT
Psychopathology is a mental disorder that can occur in police officers. Many factors influence psychopathology, one of which is obesity. This study was conducted to determine the relationship between body mass index and 10 psychopathology scales in police officers. Analytical research with a cross-sectional approach was conducted by analyzing secondary data from the Aceh Police Periodic Health Examination. A total of 709 police officers with records of physical examination results and mental health examinations using the Minnesota Multiphasic Personality Inventory (MMPI)-2 questionnaire participated in this study. Multivariate analysis used multiple logistic regression tests with a 95% confidence level. The results showed that respondents who were underweight or overweight were 52.33%. Statistically, body mass index was associated with depression (OR=2.57; 95%CI=1.22–5.40; p=0.012), psychopathic deviation (OR=1.43; 95%CI=1.03–1.99; p=0.030), paranoia (OR=1.72; 95%CI=1.05–2.81; p=0.029), psychasthenia/nerosa (OR=2.31; 95%CI=1.24–4.30; p=0.008) and schizophrenia (OR=2.13; 95%CI=1.32–3.43; p=0.002).

Keywords: body mass index; police; psychopathology

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INTRODUCTION

Mental health is a significant contributor to the burden of disease and disability worldwide. Five of the 10 leading causes of disability worldwide are mental health problems. The burden of mental health disorders on health and productivity has long been overlooked. The Department of Health and the UK Industry Confederations estimate that approximately 15-30% of workers experience some form of mental health problem during their working lives. Mental health problems are a leading cause of disease and disability (Gabriel & Liimatainen, 2000). It is estimated that 20% of the adult working population has experienced a mental health problem at any given time. In the United States, it is estimated that over 40 million people have some mental health disorder and of that number, 4-5 million adults are considered seriously mentally ill (Khotimah & Nainggolan, 2019). Psychopathological problems such as emotional and mental disorders in the population aged ≥15 years have increased. In 2013, as many as 6% of the Indonesian population aged ≥15 years experienced emotional mental disorders, which increased to 9.8% (around 19 million people) in 2018. The older the age, the higher the emotional mental disorders detected. Likewise with education, the lower the education, the higher the emotional and mental disorders. When viewed from the occupation, someone who does not work has higher emotional disorders (13.0%). Emotional and mental disorders in Civil Servants/Indonesian National Army/Indonesian National Police/State-Owned Enterprises/Regional-Owned Enterprises workers are 3.9% (Kemenkes, 2018).

Emotional and mental disorders (symptoms of depression and anxiety) in Aceh province detected in the population aged ≥15 years is 9/1000 (9‰). Severe mental disorders (psychotic) are also the same, namely 9/1000 (Dinkes Aceh, 2019). According to data from Kemenkes (2018), emotional mental disorders in Civil Servants/Indonesian National Army/Indonesian National Police/State-Owned Enterprises/Regional-Owned Enterprises workers are 3.42% higher than private employees, namely 2.56%.A problem that can have an indirect impact on emotional and mental disorders is obesity, which has reached epidemic proportions globally. More than 1 billion adults are overweight, at least 300 million of whom are clinically obese and are a major contributor to the global burden of chronic disease and disability (Puska et al., 2003). Obesity and mental health are major health problems worldwide (Liapi et al., 2021).

Obesity is a health problem that can cause mental and social health problems (Syachroni et al., 2013). A person is said to be overweight if their weight is 10% to 20% of normal body weight, while a person is said to be obese if their excess weight reaches more than 20%. The standard measure of obesity is generally the Body Mass Index (BMI), which is calculated by calculating a person's weight in kilograms and dividing it by the square of their height in meters. BMI is a simple, inexpensive, and reliable measure that shows a positive correlation between body mass and obesity-related disease risk.Frequent direct contact with the public makes police vulnerable to the adverse effects of work stress because police officers have no control over the assignments given to them and the difficulty of the perpetrators of the crimes they face (Widjanarko & Prabamurti). Research in Dallas-Fort Worth, Texas, showed that 54 officers (12%) reported a lifetime mental health diagnosis (Jetelina et al., 2020). Research conducted in Rio de Janeiro State, Brazil, showed a higher prevalence of mental disorders (according to the self-reporting questionnaire-20 or SRQ-20) in police, namely 21% (Pinto et al., 2013).

The results of a systematic review and meta-analysis involving 272,463 police personnel in 24 countries also showed 14.6% for depression (95% CI 10.9% to 18.6%), 14.2% for post-traumatic stress disorder (PTSD; 95% CI 10.3% to 18.7%), 9.6% for generalized anxiety disorder (95% CI 6.7% to 12.9%), 8.5% for suicidal ideation (95% CI 6.1% to 11.2%), 5.0% for alcohol dependence (95% CI 3.5% to 6.7%) and 25.7% for hazardous drinking (95% CI 19.6% to 32.4%). The strongest risk factors for depression and suicidal ideation were higher job stress and the strongest risk factors for PTSD were higher job stress and avoidance coping strategies (Syed et al., 2020). Abdullah et al. (2021) study showed that out of 4,590 police officers, 2.14% were diagnosed with mental disorders. The results of the multivariate analysis adjusted for BMI, gender, and age; concentrations of ketones, protein, and specific gravity in urine and the number of lymphocytes in the blood were important predictors of mental disorders in police officers in Indonesia.In addition, police are also at risk of obesity, which can be caused by multiple factors. Diet, physical activity, and sleep duration are associated with obesity in police (Kurniawati et al., 2016). According to the researcher's literature study, there is still limited research on obesity factors related to psychopathology problems in police (Abdullah et al., 2021; Vancini et al., 2018). This study aims to determine the relationship between body mass index and psychopathology problems using a 10-scale scale in Aceh police.

METHOD

The research design used was observational analytic with a cross-sectional research design to analyze the relationship between body mass index (BMI) and psychopathology in the Aceh Regional Police work environment (analysis of the results of the 2021 Rikesla). The population in this study were all employees working in the Aceh Regional Police work environment. The sample in this study consisted of all police who had recorded physical examination results and mental health examinations at the Aceh Police Periodic Health Examination and had complete data according to the variables studied, as many as 709 people. The sampling technique used was total sampling.The data collection instrument in this study was designed to measure the independent and dependent variables consisting of

respondent characteristics, Body Mass Index (BMI) and psychopathology problems. The data is secondary data from recording the physical and mental health examination results at the Aceh Police Periodic Health Examination.

The collection of psychopathology scales used the MMPI-2 (Minnesota Multiphasic Personality Inventory) questionnaire consisting of 567 questions to measure 10 scales of psychotic disorders, namely the hypochondriasis scale, depression scale, hysteria scale, psychopathic deviation scale, sexual orientation scale, paranoid scale, psych asthenia/rosa scale, schizophrenia scale, hypomania scale, and social introversion scale. The determination for each scale is categorized into 2, namely normal (T-score ≤57) and abnormal (T-score> 57). BMI was obtained from the Aceh Police Periodic Health Examination weight and height records. BMI is categorized into two categories, namely normal (BMI 18.5 - 25.0) and underweight or overweight (BMI <18.4 or BMI> 25.0). Data analysis in this study used a logistic regression test to determine the relationship between body mass index (BMI) and psychopathology in the Aceh regional police work environment

RESULT

Table 1.
Respondent characteristics, body mass index and psychological factors

Variables	Mean	Min-Max
Age (Years)	38,04	23 – 61
Variables	f	%
Gender		
Woman	43	6,06
Man	666	93,94
Education		
Bachelor	246	34,70
Diploma III	15	2,12
Senior High School	448	63,19
Marital Status		
Marry	542	76,45
Single	167	23,55
Hypertension		
Not Hypertensive	689	97,18
Hypertension	20	2,82
Body Mass Index		
Normal	338	47,67
Underweight and Overweight	371	52,33
Hypochondriasis Scale		
Normal	616	86,88
Abnormal	93	13,12
Depression Scale		
Normal	672	94,78
Abnormal	37	5,22
Hysteria Scale		
Normal	572	80,68
Abnormal	137	19,32
Psychopathic Deviation Scale		
Normal	501	70,66
Abnormal	208	29,34
Sexual Orientation Scale		
Normal	585	82,51
Abnormal	124	17,49
Paranoid Scale		
Normal	631	89,00
Abnormal	78	11,00
Variables	f	%
Psychasthenia/Nervousness Scale		
Normal	658	92,81
Abnormal	51	7,19

Schizophrenia Scale		
Normal	621	87,56
Abnormal	88	12,41
Hypomania Scale		
Normal	695	98,03
Abnormal	14	1,97
Social Introversion Scale		
Normal	699	98,59
Abnormal	10	1,41

The study showed that the respondents had an average age of 38.04 years, were predominantly male (93.04%), and 23.55% were unmarried. About 31.31% did not meet health check requirements, 52.33% were underweight or overweight, and 2.82% had hypertension. Abnormal psychological findings included psychopathic deviation (29.34%), hysteria (19.32%), sexual orientation issues (17.49%), hypochondriasis (13.12%), schizophrenia (12.41%), paranoia (11.00%), psychasthenia (7.19%), depression (5.22%), hypomania (1.97%), and social introversion (1.41%) (Table 1).The study found that underweight and overweight respondents in the Aceh regional police had higher proportions on the hypochondriasis, hysteria, and sexual orientation scales, though these were not significantly related to BMI. However, BMI was significantly associated with higher risks of abnormal depression (OR = 2.57; p = 0.012) and psychopathic deviation (OR = 1.43; p = 0.030), highlighting the need for greater attention to mental health in relation to nutritional status among police officers. (Table 2).

Tabel 2.
The relationship between body mass index (BMI) and psychopathology

Body Mass Index	Hypochondriasis Scale		Depression Scale		Hysteria Scale		Psychopathic Deviation Scale		Sexual Orientation Scale	
	f (%)	OR (95%CI)	f (%)	OR (95%CI)	f (%)	OR (95%CI)	f (%)	OR (95%CI)	f (%)	OR (95%CI)
Normal	41 (12,13)	1,18 (0,76 – 1,83)	10 (2,96)	2,57 (1,22 – 5,40)*	60 (17,75)	1,2 (0,83 – 1,76)	86 (25,44)	1,43 (1,03 – 1,99)*	56 (16,57)	1,13 (0,76 – 1,66)
Underweight and Overweight	52 (14,02)		27 (7,28)		77 (20,75)		122 (32,88)		68 (18,33)	

Tabel 3.
Continued Relationship between body mass index (BMI) and psychopathology

Body Mass Index	Paranoid Scale		Psychasthenia/Nerosa Scale		Schizophrenia Scale		Hypomania Scale		Sexual Orientation Scale	
	f (%)	OR (95%CI)	f (%)	OR (95%CI)	f (%)	OR (95%CI)	f (%)	OR (95%CI)	f (%)	OR (95%CI)
Normal	28 (8,28)	1,72 (1,05 – 2,81)	25 (4,44)	2,31 (1,24 – 4,30)*	28 (8,28)	2,13 (1,32 – 3,43)	3 (0,89)	3,41 (0,94 – 12,33)	4 (1,18)	1,37 (0,38 – 4,90)
Underweight and Overweight	50 (13,48)		36 (9.70)		60 (16,17)		11 (2,96)		6 (1,62)	

The results showed that underweight and overweight respondents tended to have higher percentages on the paranoid scale (13.48% vs 8.28%), psychasthenia/nerosa (9.70% vs 4.44%), and schizophrenia (16.17% vs 8.28%) compared to normal weight respondents. Statistically, there was a significant relationship between BMI and the three scales, where respondents with abnormal body weight had a higher risk of experiencing paranoia (OR=1.72; p=0.029), psychasthenia/nerosa (OR=2.31; p=0.008), and schizophrenia (OR=2.13; p=0.002). Meanwhile, although underweight and overweight respondents also had higher proportions on the hypomania scale (2.96% vs 0.89%) and social introversion (1.62% vs 1.18%) compared to normal weight respondents, the results of statistical tests did not show any significant relationship between BMI and these two scales. These findings confirm the link between weight status and the risk of certain mental disorders in the Aceh regional police work environment (Table 3).

DISCUSSION

The results of the study showed that body mass index was associated with several psychopathology scales, namely depression (OR=2.57; 95%CI=1.22–5.40; p=0.012), psychopathic deviation (OR=1.43; 95%CI=1.03–1.99; p=0.030), paranoid (OR=1.72; 95%CI=1.05–2.81; p=0.029), psych asthenia/nerosa (OR=2.31; 95%CI=1.24–4.30; p=0.008) and schizophrenia (OR=2.13; 95%CI=1.32–3.43; p=0.002). Meanwhile, body mass index that was not related to the psychopathology scale were hypochondriasis (OR=1.18; 95%CI=0.76 – 1.83; p=0.458), hysteria (OR=1.21; 95%CI=0.83 – 1.76; p=0.312), sexual orientation (OR=1.13; 95%CI=0.76 – 1.66; p=0.538), hypomania (OR=3.41; 95%CI=0.94 – 12.33; p=0.061), and social introversion (OR=1.37; 95%CI=0.38 – 4.90; p=0.626). This study is in line with several studies that show that being underweight is a risk factor for depression (Jung et al., 2017; De Wit et al., 2009). However, this is different from the results of Ningtyas's (2022) study, which showed a weak correlation between body mass index (BMI) and depression levels. However, when grouped by gender, there was no relationship between BMI and depression levels in male samples. In contrast, in female samples, there was a moderate relationship between BMI and depression levels (Ningtyas, 2022). Likewise, research conducted by Permatasari (2019) showed that the prevalence of respondents with obese Body Mass Index who experienced symptoms of depression was 62.5%. There is a significant relationship between Body Mass Index and depression in vocational high school students (Permatasari, 2019).

Other studies have also shown that obesity is a risk factor for depression (RR = 1.15; 95% (CI) = 1.06-1.25) (Amiri et al., 2018). Depression and obesity are both associated with social stigma, feelings of low self-esteem, and chronic health conditions. When depression and obesity occur together, the adverse health and social consequences are significant. Depressive symptoms in obese patients are strongly associated with poor quality of life, especially social functioning, emotional roles, and mental health. Furthermore, obesity coupled with depression has significant economic implications due to reduced participation in the workforce (Nikolic, 2015). A study with elite Brazilian police confirmed the association between overweight and depression (Vancini et al., 2018). Another study supported the association between obesity and depression, but only for male officers (Burchfiel et al., 2011).The results of the study also showed a relationship between body mass index and psychopathic deviation. Psychopathic deviation describes psychopathic, asocial, and amoral attitudes and is the inability to establish deep affective relationships. Psychopathic deviation is also known as psychopathic or antisocial disorder. Psychopathic or antisocial disorder is a condition in which a person cannot feel empathy and tends to be able to commit violence against other humans without being followed by feelings of guilt and carrying out this behavior for their satisfaction. They tend to justify themselves for their actions (Santoso et al., 2017).

Body mass index is also associated with paranoia. The results of this study are in line with research showing that body image, which is a depiction of a person's body shape, is associated with higher levels of depression ($r = -0.55$, $p < 0.001$), negative self-esteem ($r = -0.52$, $p < 0.001$), paranoia ($r = -0.25$, $p = 0.006$) and hallucinations ($r = 0.21$, $p = 0.025$) (Waite et al., 2022). Paranoia is a psychological problem characterized by the emergence of excessive suspicion and fear. According to Trombini et al. (2003), patients with eating disorders that affect abnormal body mass index have parents with paranoid and schizotypal personality style behavior.Other research results obtained showed that there was a relationship between body mass index and psych asthenia/rosa. Psychasthenia is a mental disorder in which sufferers have symptoms such as loss of energy even though sometimes their physical strength is excellent. This disorder arises due to several factors, one of which is hysteria (loss of energy and enthusiasm), for example, anorexia (Fatmawati, 2019). Anorexia is an eating disorder that can be life-threatening. Some of the signs are hunger and excessive weight loss. Symptoms of

anorexia include rapid weight loss, staying on a diet when thin, fear of getting fat, strange eating habits, feeling fat, and so on.

The results of the study also showed a relationship between body mass index and schizophrenia. This is in line with research by Subramaniam et al. (2014), which showed that people living with schizophrenia are at high risk of being overweight, so an increase in body mass index is related to the worsening quality of life of people living with schizophrenia. Schizophrenia is a severe mental disorder mainly characterized by disturbances in thoughts, emotions, and behavior in sufferers. A person with schizophrenia is at high risk of being overweight, so an increase in Body Mass Index (BMI) is related to quality. There is no significant relationship between gender and body mass index in schizophrenia patients (Auliati & Lubis, 2022).In addition, body mass index is not associated with hypochondriasis, hysteria, sexual orientation, hypomania, and social introversion. This study aligns with several studies showing no changes in eating behavior in patients with hypochondriasis (Schwind et al., 2015; Kellner et al., 1987). So, based on this, body mass index is not associated with hypochondriasis. Likewise, the study of Kaneshiro et al. (2008) showed that body mass index was not significantly associated with sexual orientation. Likewise with the study of Faubion et al. (2020), underweight and obesity are associated with lack of sexual activity, in contrast to the study which showed no difference in the prevalence of female sexual dysfunction found between overweight/obese women (44.4%) and women with normal weight (55.6%).

Precenzano et al.'s (2021) study showed that mothers of obese children scored higher than mothers of non-obese children on all MMPI-2 subscales. Children with obesity had mothers with low conscientiousness personality traits. Conscientiousness was significantly associated with less use of restraint, lower pressure to eat, and greater use of feeding monitoring strategies. The authors suggested that restraint and eating pressure mediated the relationship between maternal conscientiousness and child BMI (Precenzano et al., 2021).Overweight and obese individuals are more extroverted and less sensitive. Understanding the relationship between extroversion and obesity consists of regulating excitement in extroverts. Extroverts increase their arousal levels more through food intake. In addition, extroverts are characterized by an external type of eating behavior. The external appeal of food and other sensory eating signals are stimuli for food consumption (Rychkova et al., 2019). This study shows that body mass index does not affect all psychopathology scales. The lack of research related to 10 psychopathology scales is a limitation in comparing the results obtained from this study with studies conducted by other researchers.

CONCLUSION

There is a relationship between body mass index and several psychopathology scales, namely depression, psychopathic deviation, paranoia, psych asthenia/rosa, and schizophrenia. In contrast, no significant relationship was found between body mass index and hypochondriasis, hysteria, sexual orientation, hypomania, and social introversion scales. For further research, it is recommended to expand the number and variety of samples, consider other factors such as lifestyle, stress levels, and underlying medical conditions, and use longitudinal methods to understand better the causal relationship between body mass index and psychopathology disorders.

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