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The relationship of physical activity, dietary patterns, and energy intake with overweight incidence among Sabhara members at Langkat police station

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ABSTRACT
Occupational Safety and Health (OSH) is an effort to ensure the physical and mental well-being of workers, which is essential for productivity. Health and work ability are closely related to nutritional status, where balanced calorie intake supports energy and effective task performance. Conversely, being overweight or obese increases the risk of degenerative diseases and is influenced by multifactorial causes such as genetics, lifestyle, and poor diet. This study aimed to examine the relationship between physical activity, dietary patterns, and energy intake with overweight among SABHARA members at the Langkat Police Headquarters as an important basis for health interventions. This study employed an analytical quantitative method with a cross-sectional design. The sample was obtained through simple random sampling, consisting of 49 members. The data collected included nutritional status (body scale, micrometer), energy intake (24-hour food recall), dietary patterns (FFQ), and physical activity (IPAQ Short-Form). The data were analysed using the Chi-Square test. The results showed that 57.1% of members were overweight, 18.3% had low physical activity, 53.1% had poor energy intake, and 49.0% had inadequate dietary patterns. The findings showed a significant relationship between physical activity, dietary patterns, and energy intake with overweight. The Langkat Police are advised to establish a scheduled weekly exercise or fitness programme and conduct regular socialisation on healthy eating patterns for all members, so that this step can directly reduce obesity cases and improve the health of members.
Keywords: *Overweight, physical activity, dietary patterns*

1. Introduction

Occupational Safety and Health (OSH) is a strategic approach to creating a safe and healthy work environment that supports the physical and mental well-being of workers. OSH not only prevents physical injuries but also encompasses psychological, social, and behavioral aspects. As an interdisciplinary field, OSH integrates physics, chemistry, biology, and human behavior (Lewaherilla et al., 2022).

In Indonesia, the problem of overweight among the working-age population remains high. Data from the Indonesian Health Survey (2023) indicate that the proportion of workers, particularly civil servants/military personnel/police/officers, and employees of state-owned enterprises, whose nutritional status based on their BMI falls into the overweight and obese categories is 19.4%, and the BMI category for obesity is 33.7%. In rural areas of Indonesia, the proportion of workers classified as overweight and obese based on their BMI is 13.5% and 19.3%, respectively (Kementerian Kesehatan RI, 2023). In North Sumatra Province, workers such as civil servants/military personnel/police officers/state-owned enterprise employees with BMI-based nutritional status not falling into the normal category account for 61.27%, with 60.4% of them having an overweight and obese BMI (Kementerian Kesehatan RI, 2019). Among adults in Langkat Regency, North Sumatra Province, the proportion of individuals with nutritional status based on BMI falling into the overweight and obese categories is 14.70% each (Kementerian Kesehatan RI, 2019).

Workers who are overweight or underweight have physical limitations, low energy levels, lack motivation, and work slowly, which leads to decreased work productivity (Farikha & Ardyanto, 2017). The SABHARA unit is a police unit tasked with maintaining public security and order, as well as handling riots and crowd control. They are equipped with specialized training and equipment to address various challenges in maintaining social stability. The SABHARA unit also plays a role in law enforcement, especially in handling violations related to public order. This unit is often involved in securing large events, demonstrations, and other emergencies, as well as acting as the front line in preventing criminal acts that could disrupt public security. However, recently, there have been important issues related to the physical fitness and nutritional status of SABHARA members, which could potentially reduce their ability to carry out operational tasks that require high physical endurance. Low physical activity, unhealthy eating patterns, and potential energy imbalance are issues that are becoming increasingly apparent and have the potential to affect their work performance. This study aimed to determine whether there is a relationship between physical activity, diet, and energy intake with overweight among SABHARA at the Langkat Police station.

2. Methods

This research was a quantitative analytical research with a cross-sectional approach, conducted at the Langkat District Police Headquarters from February 2025 until completion, with a research population consisting of all 98 members of the SABHARA police force at the Langkat District Police Headquarters. Sampling in this research used simple random sampling techniques with a sample size of 49 members.

The independent variables (physical activity, dietary patterns, energy intake) and dependent variables (incidence of overweight) in this study used primary data. The nutritional status of overweight was determined based on body mass index (BMI) according to Minister of Health Regulation No. 41 of 2014 by measuring the height (TB) and weight (BB) of workers using a microtoise and weighing scale. The indicators for overweight status were divided into two categories: not overweight (BMI in the normal weight category) and overweight (BMI in the mild to severe overweight category).

Physical activity data were collected using the Short Form–International Physical Activity Questionnaire (IPAQ-SF), which records the number of days and duration of high, moderate, and light intensity activities. The results are expressed in MET-minutes/week, which is a unit for estimating the energy expended during activity. Total METs and intensity types were then categorised into light, moderate, and vigorous activities according to IPAQ standards. Activities were classified as light if they did not meet the criteria for moderate or vigorous activities. Moderate activities were defined as individuals performing high-intensity activities for at least 30 minutes on ≥3 days, moderate activities on 5 days, walking for at least 30 minutes per day, or a combination of these activities with a total of ≥600 MET-minutes/week. Meanwhile, vigorous activity is categorised if the individual engages in high-intensity activity for 3 days with a total of ≥1,500 MET-minutes/week, or a combination of moderate, vigorous, and walking activities for 7 days with a total of ≥3,000 MET-minutes/week. (IPAQ, 2005).

Dietary patterns were measured using the Food Frequency Questionnaire (FFQ) by summing the consumption scores of each food type based on consumption frequency, resulting in a total score that reflects dietary diversity; scores ≥ the population median were categorised as good and diverse dietary patterns, while scores < the median indicated less diverse dietary patterns. Energy intake was obtained through the 24-hour recall method and analysed using Nutrisurvey, then compared with the energy adequacy standards according to Indonesian Minister of Health Regulation No. 28 of 2019 and classified into severe deficiency (<70%), moderate deficiency (70–79%), mild deficiency (80–89%), normal (90–119%), and excessive (≥120%) according to the Ministry of Health guidelines (2003). (Tamimi & Rimbawan, 2015). The energy intake variable is divided into two indicators: adequate energy intake (normal energy intake) and inadequate energy intake (severe, mild, moderate energy deficit, and excessive energy intake).

3. Results

3.1. Univariate Analysis

3.1.1. Characteristics of SABHARA Members at the Langkat Police Station

Based on Table 1, SABHARA members in the Langkat Police, based on age, the median value of Sabhara members was 34; members over the age of 34 are more numerous, numbering 26 members.

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Table 1. Frequency Distribution of Member Characteristics Based on Age

Age	n	%
< 34 years	23	46,9
≥ 34 years	26	53,1
Total	49	100,0

Based on Table 2, of the total 49 members of SABHARA in the Langkat Police, the post guard division became the division with the highest frequency distribution, with 11 members (22.4%).

Table 2. Frequency Distribution of Member Characteristics Based on Work Division

Work Division	n	%
Detention Room Guarding	5	10,2
Patrol	5	10,2
Guard of the leader's house	4	8,2
Bank Security	8	16,3
Plantation Security	9	18,4
Post Guarding	11	22,4
Administration	3	6,1
DALMAS	4	8,2
Total	49	100,0

3.1.2. Nutritional Status of SABHARA Members at Langkat Police Station

Of the total 49 members of SABHARA in the Langkat Police, members with a normal body mass index category were the most numerous, with 21 members (42.9%).

Table 3. Frequency Distribution of Body Mass Index of Members

Body Mass Index	n	%
Normal Weight	21	42,9
Mild Overweight	11	22,4
Severe Overweight	17	34,7
Total	49	100,0

The results of data analysis of SABHARA members at the Langkat Police Headquarters showed that there were more members who were overweight, with 28 members (57.1%).

Table 4. Frequency Distribution of Overweight SABHARA Members

Overweight	n	%
Overweight	28	57,1
Not Overweight	21	42,9
Total	49	100,0

Based on the frequency distribution data of Sabhara members who are overweight according to their work division, it is known that the Guard Post division has the highest proportion, with all of its members (100%) classified as overweight. The Detention Room Guard and Patrol divisions also show a high prevalence of overweight, at 80% (4 out of 5 people), respectively.

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Table 5. Frequency Distribution of Overweight Members Based on Work Division

Work Division	Overweight				Amount	
	Overweight		Overweight			
	n	%	n	%	N	%
Detention Room Guarding	4	80,0	1	20,0	5	100,0
Patrol	4	80,0	1	20,0	5	100,0
Guard of the leader's house	3	75,0	1	25,0	4	100,0
Bank Security	3	37,5	5	62,5	8	100,0
Plantation Security	3	33,3	6	66,7	9	100,0
Post Guarding	11	100,0	0	0	11	100,0
Administration	0	0	3	100,0	3	100,0
DALMAS	0	0	4	100,0	4	100,0

3.1.3. Level of Physical Activity of SABHARA Members at the Langkat Police Station

Table 6 showed that members with moderate physical activity had the highest number, with 24 members (49.0%). There were 16 members (32.7%) who had heavy physical activity, while light activity was the lowest level of physical activity, with 9 members (18.3%).

Table 6. Frequency Distribution of Physical Activity Levels of Members

Physical Activity	n	%
Light	9	18,3
Moderate	24	49,0
Heavy	16	32,7
Total	49	100,0

Based on Table 7 regarding the frequency distribution of physical activity among Sabhara members by work division, it can be seen that the level of physical activity varies between divisions. The DALMAS division shows the highest proportion of heavy physical activity, at 75% (3 out of 4 members), followed by the Prison Guard division at 60% (3 out of 5 members) and the Plantation Security division at 44.4% (4 out of 9 members) in the heavy activity category. This indicates that these divisions tend to have high physical demands in the performance of their duties.

Table 7. Frequency Distribution of Members' Physical Activity Levels Based on Work Division

Work Division	Physical Activity						Amount	
	Light		Moderate		Heavy			
	n	%	n	%	n		N	%
Detention Room Guarding	0	0	2	40,0	3	60,0	5	100,0
Patrol	1	20,0	3	60,0	1	20,0	5	100,0
Guard of the leader's house	0	0	3	75,0	1	25,0	4	100,0
Bank Security	1	12,5	4	50,0	3	37,5	8	100,0
Plantation Security	0	0	5	55,6	4	44,4	9	100,0
Post Guarding	6	54,5	4	36,4	1	9,1	11	100,0
Administration	1	33,3	2	66,7	0	0	3	100,0
DALMAS	0	0	1	25,0	3	75,0	4	100,0

3.1.4. Energy Intake Levels of SABHARA Members at the Langkat Police Station

The table below showed that out of the total 49 SABHARA members in the Langkat Police Department who were studied, the majority had energy intake in the normal category, namely 23 members (46.9%). There were no members with western-level energy deficits, while there were 16 members (32.7%) with excessive energy intake. There were 5 members (10.2%) with mild energy deficits, the same number as those with moderate energy intake levels.

Table 8. Frequency Distribution of Energy Intake Adequacy Levels of Members

Adequate Energy Intake	n	%
Normal Energy Intake	23	46,9
Severe Energy Deficit	0	0
Moderate Energy Deficit	5	10,2
Mild Energy Deficit	5	10,2
Excess Energy Intake	16	32,7
Total	49	100,0

The results of the analysis of the energy intake of SABHARA police officers at the Langkat Police Station showed that the majority of officers have poor energy intake, with 26 officers (53.1%) experiencing excessive energy intake.

Table 9. Frequency Distribution of Energy Intake of Members

Energy Intake	n	%
Good Energy Intake	23	46,9
Bad Energy Intake	26	53,1
Total	49	100,0

Based on the table below regarding the frequency distribution of energy intake among Sabhara members based on work division, it can be seen that there were significant differences in the quality of energy intake between divisions. The DALMAS division showed the highest proportion of members with good energy intake, namely 100% (4 out of 4 members), followed by the PAM Perkebunan division with 77.8% (7 out of 9 members), and Administration with 66.7% (2 out of 3 members).

Table 10. Frequency Distribution of Energy Intake Levels of Members Based on Work Division

Work Division	Energy Intake				Amount	
	Good Energy Intake		Bad Energy Intake			
	n	%	n	%	N	%
Detention Room Guarding	0	0	5	100,0	5	100,0
Patrol	2	40,0	3	60,0	5	100,0
Guard of the leader's house	1	25,0	3	75,0	4	100,0
Bank Security	4	50,0	4	50,0	8	100,0
Plantation Security	7	77,8	2	22,2	9	100,0
Post Guarding	3	27,3	8	72,7	11	100,0
Administration	2	66,7	2	33,3	3	100,0
DALMAS	4	100,0	0	0	4	100,0

3.1.5. Dietary Patterns of SABHARA Members at the Langkat Police Station

The results of the analysis of the eating habits of SABHARA police officers at the Langkat Police Station showed that the majority of officers have good eating habits, with 25 officers (51.0%) having good eating habits, while 24 officers (49.0%) have poor eating habits.

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Table 11. Frequency Distribution of Members' Eating Patterns

Eating Pattern	n	%
Poor	24	49,0
Good	25	51,0
Total	49	100,0

The Post Guard Division ranks highest in terms of poor eating habits, with 81.8% (9 out of 11 members) exhibiting this pattern, followed by the Executive Residence Guard Division and the Bank Security Division, each of which show 50% of members with poor eating habits. Similarly, the Patrol Division and Plantation Security Division also recorded relatively high figures, with 40% and 44.4% of members, respectively, exhibiting inadequate dietary patterns.

Table 12. Frequency Distribution of Members' Dietary Patterns Based on Work Division

Work Division	Eating Pattern				Amount	
	Poor		Good			
	n	%	n	%	N	%
Detention Room Guarding	1	20,0	4	80,0	5	100,0
Patrol	2	40,0	3	60,0	5	100,0
Guard of the leader's house	2	50,0	2	50,0	4	100,0
Bank Security	4	50,0	4	50,0	8	100,0
Plantation Security	4	44,4	5	55,6	9	100,0
Post Guarding	9	81,8	2	18,2	11	100,0
Administration	1	33,3	2	66,7	3	100,0
DALMAS	1	25,0	3	75,0	4	100,0

3.2. Bivariate Analysis

3.2.1. Relationship between Physical Activity and Overweight Incidence among Members of the Langkat Police Force's SABHARA Unit

The research findings showed a significant association between physical activity and overweight status among SABHARA members at the Langkat District Police Department, with a p-value of 0.033 (p-value < 0.05). The category of SABHARA members with moderate physical activity had the highest number of overweight individuals, totaling 16 members (66.7%). Among members who were not overweight, the category with the highest number of members experiencing overweight was those with high physical activity levels, totaling 11 members (68.8%). Among SABHARA members with low physical activity levels, there were 2 members (22.2%) who experienced being overweight.

Table 13. Relationship between Physical Activity and Overweight Incidence Members of the Langkat Police Force's Special Forces Unit (SABHARA)

Physical Activity	Overweight				Amount		p-value
	Overweight		Not Overweight				
	n	%	n	%	N	%	
Light	7	77,8	2	22,2	9	100,0	0,033
Moderate	16	66,7	8	33,3	24	100,0	
Heavy	5	31,3	11	68,8	16	100,0	

3.2.2. Relationship between Energy Intake and Overweight Incidence among Members of the Langkat Police Force's SABHARA Unit

The results of the study showed a significant relationship between energy intake and overweight among SABHARA members at the Langkat Police Station, with members who were overweight having poor energy intake being the largest number, totaling 21 members (80.8%).

Table 14. Relationship between Energy Intake and Overweight Incidence among Members of the Langkat Police Force's Special Forces Unit (SABHARA)

Energy Intake	Overweight				Amount		p-value
	Overweight		Not Overweight				
	n	%	n	%	N	%	
Good	7	30,4	16	69,6	23	100,0	0,001
Not Good	21	80,8	5	19,2	26	100,0	

3.2.3. Relationship between Dietary Patterns and Overweight Incidence among Members of the Langkat Police Force's SABHARA Unit

The results of the study showed a significant relationship between dietary patterns and overweight among SABHARA members at the Langkat Police Station, with members who are overweight having the least healthy dietary patterns, accounting for the largest number, with a total of 18 members (75.0%).

Table 15. Relationship between Dietary Patterns and Overweight Incidence among Members of the Langkat Police Force's Special Forces Unit (SABHARA)

Eating Pattern	Overweight				Amount		p-value
	Overweight		Not Overweight				
	n	%	n	%	N	%	
Poor	18	75,0	6	25,0	24	100,0	0,029
Good	10	40,0	15	60,0	25	100,0	

4. Discussion

4.1 Relationship between Physical Activity and Overweight Incidence among SABHARA Members

Based on the Chi-square test, there was a relationship between physical activity and overweight. These results are in line with a study of police officers at the Tampan Pekanbaru Police Station (2017), which showed that most physical activity was moderate, but some with light activity were overweight. This confirms that even though the job requires mobility, not all members have adequate physical activity, and those with low activity tend to be overweight. These findings emphasize the importance of awareness of physical activity and healthy eating patterns to prevent overweight and health issues (Rany et al., 2018). However, these results differ from a study of civil servants at the Health Department of East Java Province (2013), which showed no association between physical activity and overweight or obesity(Dewi & Mahmudiono, 2013). In another study of traffic police officers in Padang City entitled "The relationship between diet, energy intake, physical activity, and sleep duration with obesity in police officers," it was found that there is a relationship between nutritional status and work fatigue that can hinder productivity. Traffic police officers with abnormal nutritional status and high levels of fatigue were more numerous than those with normal nutritional status and low fatigue levels. This condition caused symptoms such as excessive thirst, lack of enthusiasm for talking, and heaviness in the legs (Yulia & Rahmi, 2018).

Any form of human body movement that involves muscle contraction and requires additional energy beyond the energy used in basal metabolism is considered physical activity. An individual's level of physical activity influences the body's energy balance, which ultimately affects body weight, with energy expenditure being highly dependent on factors such as the amount of muscle used, the duration of the activity, and the intensity or severity of the activity (Setyandari & Margawati, 2017).

The results of the study show that the majority of workers have moderate physical activity, followed by heavy activity, and only a small proportion have light activity. Members of SABHARA in the guard post division have the highest level of light physical activity, and many are overweight due to work demands that

require them to remain stationary for long periods of time. A similar situation is experienced by members of the administration department, who spend most of their time sitting in front of computers with limited movement. Conversely, divisions such as bank security, plantation security, and patrol units have high mobility with moderate to heavy physical activity, so their members generally do not experience overweight issues. This study also found that the group with moderate activity levels had the highest proportion of overweight individuals (66.7%), accompanied by excessive energy intake (32.7%). This condition indicates that despite sufficient physical activity, poor energy intake, consumption of fatty foods, eating beyond daily needs, and the habit of eating late at night contribute to fat accumulation and overweight among SABHARA members of the Langkat Police Department.

4.2 Relationship between Energy Intake and Overweight Incidence among SABHARA Members

The analysis results indicated a correlation between energy intake and overweight status among members of the SABHARA Police Station in Langkat. Among members with adequate energy intake, 30.4% were overweight, while in the group with inadequate energy intake, 80.8% were overweight, ranging from mild to severe obesity. The majority of members with poor energy intake experienced mild to moderate deficits (10.2%) and excessive intake (32.7%). The post guard division had the highest number of members with poor energy intake who were also overweight.

The results of the study on members of the Langkat Police SABHARA showed a significant relationship between energy intake and overweight, with the highest proportion among members of the guard division who had poor energy intake. This condition is associated with the habit of consuming high-carbohydrate foods, fried foods with high oil content, and low consumption of fiber-rich vegetables and fruits. Work divisions and night shift schedules also contribute to irregular eating patterns, excessive intake beyond daily recommendations, and sleep disturbances, which lead to suboptimal digestion and fat accumulation. These findings emphasize that energy intake plays a more dominant role than physical activity in determining the incidence among members.

Overweight and obesity are pathological conditions resulting from excessive fat accumulation in adipose tissue throughout the body. Fat cell formation (adipogenesis) occurs throughout life, with significant increases during the neonatal period and puberty. This process is regulated by energy homeostasis mechanisms, which maintain a balance between energy intake and expenditure. Imbalances, such as excessive calorie intake without adequate physical activity, lead to metabolic dysfunction that triggers obesity. The brain serves as the central regulator of energy homeostasis, integrating hunger and satiety signals and controlling body weight regulation (Hastuti, 2018).

The results of this study indicate a relationship between energy intake and overweight among members of the Langkat Police Force, in line with a study by the Surabaya City Government that found a relationship between energy intake and body mass index among workers (Wulandari et al., 2019). However, research on members of the Banjarmasin City Police showed no relationship between energy intake and overweight or obesity (Kurniawati et al., 2016)

4.3 Relationship between Dietary Patterns and Overweight Incidence among SABHARA Members

The results of the study indicate a correlation between dietary patterns and the incidence of overweight among members of the Langkat Police Force's SABHARA unit. Among members with good dietary patterns, 60.0% were not overweight, and 40.0% were overweight, while among those with poor dietary patterns, 25.0% were not overweight and 75.0% were overweight. Among the overweight members with poor dietary patterns, the majority were from the guard post division.

The high proportion of overweight members of the Langkat Police SABHARA occurred even though most of them had moderate to heavy physical activity. Work demands, especially night shifts, triggered poor eating patterns such as excessive consumption of high-carbohydrate, instant, and fried foods, as well as low consumption of vegetables and fruits, resulting in fat accumulation due to a lack of fiber. The habit of eating dinner while on duty also exacerbated this condition. These findings indicate that dietary patterns play a more dominant role in determining nutritional status than physical activity, as many members remain overweight despite having sufficiently high levels of physical activity.

The relationship between meal frequency and the risk of overweight and obesity is not yet fully understood. Some studies suggest that individuals who are overweight tend to eat more frequently than those with an ideal body weight. Meal frequency is believed to influence fat metabolism and blood sugar levels, where consuming smaller portions more frequently can lower cholesterol levels and maintain stable glucose levels. Conversely, eating large meals at once can trigger higher insulin spikes compared to eating smaller portions more frequently (Hastuti, 2018)

The results of this study indicate a relationship between dietary patterns and the incidence of overweight among members of the Langkat Police Department's SABHARA unit, consistent with research on workers at PT. BUMA, which also found a significant association between dietary patterns and overweight (Juni Haryati & Pangestu Utami, 2023). However, these findings do not align with the research by (Lestady et al., 2024), which reported no association between dietary patterns and the incidence of overweight among workers. Therefore, it is very important to adopt a balanced diet by paying attention to the right frequency of meals and choosing nutritious and varied foods to maintain overall health (Maghfiroh, 2019).

5. Conclusion

The results of this study indicate that of the 49 members of the Sabhara unit at the Langkat Police Station, 57.1% were classified as overweight. In addition, 49.0% showed moderate levels of physical activity, 51.0% had adequate eating patterns, and 72.1% reported insufficient energy intake. Notably, the night shift division recorded the highest proportion of overweight cases, indicating a possible difference in the incidence of overweight between shifts.

The Langkat Resort Police are planning to implement an educational programme on healthy eating for all members, including the provision of nutritional guidance by nutritionists tailored to the needs of each individual's body and activity level. In addition, the institution will implement a weekly exercise or fitness programme, with special attention to divisions with limited physical activity, such as the guard post division. These efforts are also accompanied by stricter performance requirements and increased physical demands for members who are overweight to encourage improved overall fitness and health.

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