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RESEARCH ARTICLE

The Correlation between Age, Fat Intake, and Visceral Fat and Body Mass Index at the Gym

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Abstract:

Background:

This study aimed to investigate the correlation between age, fat intake, visceral fat, and body mass index (BMI) of gym members.

Methods:

A cross-sectional approach was employed with a sample of 87 respondents. Primary data were obtained from three different gyms, while secondary data was obtained from gym owners. A questionnaire was used as the research instrument, and the Chi Square test was used for data analysis.

Results:

The majority of respondents had a higher fat intake than recommended, and most had high levels of visceral fat. In terms of BMI, the majority were classified as either overweight or obese. Bivariate analysis showed significant correlations between age, fat intake, and visceral fat with BMI among gym members.

Conclusion:

This study found that age, fat intake, and visceral fat were significantly correlated with BMI among gym members. The findings suggest the importance of promoting healthy dietary habits and exercise among gym members, particularly those older or with high visceral fat levels.

Keywords: Age, Body mass index, Correlation, Fat intake, Visceral fat, Gymmembers.

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1. BACKGROUND

Health development is an investment in developing socially and economically productive human resources. Indonesia is currently experiencing a double burden, *i.e.*, unresolved communicable disease-related problems and a significant increase in non-communicable diseases [1].

According to WHO statistics, there are more than one billion overweight persons in the globe, which corresponds to an average of one in seven people you interact with on a daily basis.. Of such a number, 475 million people are considered obese. The WHO data also suggest that globally, 2.8 million people die annually due to being overweight and obesity. It is estimated that 35.8 million disability-adjusted life years (DALY) are also due to overweight and obesity [2].

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According to the data from Basic Health Research in 2013 in Palembang, the prevalence of overweight in young adults experienced an increase from 9.3% in 2010 to 12.7% in 2013, and the obesity prevalence grew from 9.3% to 16.7% in 2013. A study conducted by Nyangasa (2019) discovered that 26.4% of 195 people aged ≥18 years were obese with a BMI >26 kg/m2, and the prevalence of waist circumference >88 cm was 24.9% [3]. Overweight and obese people will undergo physiological adaptation, such as increased blood volume, leading to high blood pressure [4]. This indicates that being overweight and obese requires special attention to prevent the risk of metabolic syndrome, including hypertension, often called a “silent killer” because it has no symptoms yet is potentially dangerous [5].

On that ground, it is essential to perform innovative attempts by involving several parties from the central government and local government, community, and entrepreneurs. The attempts are expected to restrain the rate of

obesity prevalence in Indonesia by 15.4% until the end of 2019 as by the indicators in the National Medium-Term Development Plan (RPJMN) of 2015-2019 stipulated in Presidential Regulation Number 2 of 2015.

The prevalence of overweight (BMI ≥ 25 to < 27) and obesity (BMI ≥ 27) among adults has dramatically risen. Besides, obesity has now presented a major challenge to Indonesia. From 2013 to 2018, the prevalence of obesity increased by 6%, higher than the target of RPJMN of 2015-2019 [6].

Gorontalo Province was ranked second among other areas in Indonesia, with an obesity prevalence of 21% higher than the national obesity prevalence of 15.4%. The highest obesity prevalence was in the city of Gorontalo, with 24.2%, and the lowest was in Boalemo Regency, with 13.6% [7, 8]. By taking into account the high prevalence of this problem, a test is required to identify the risk of non-communicable diseases. Being overweight is widely known as pre-obesity yet considered trivial, making it one of the factors contributing to the high prevalence of obesity. People are inattentive in controlling their weight, especially when overweight [1].

According to the National Socio-Economic Survey of Statistics Indonesia (BPS), the consumption of oil and fat per person per day has been increasing nationally, exceeding the recommended limit of 215 kcal per person per day [7]. Fat is a nutrient with the most calories, and high-fat or too much energy-sourced food consumption can result in excessive fat stored in the body's cells. Foods with fat provide more energy than proteins, containing two times more calories [9].

Measuring body fat is crucial to monitor obesity and regulating dietary patterns in healthcare programs. The human body has two types of fat, subcutaneous and visceral [10]. Reduced energy expenditure by the body is due to slow metabolism, physical activity, and food thermic effect. Fat's thermic effect is lower than carbohydrates and protein [11]. Obesity is influenced by dietary habits and food intake [12].

Various health problems, including cardiovascular disease, type 2 diabetes, stroke, breast cancer, colorectal cancer, and Alzheimer's disease, can be triggered by visceral fat accumulation [12]. Studies have shown that there is a correlation between body mass index (BMI) and visceral fat value [13], as well as a correlation between body mass index and fat intake [14].

Based on the Primary data (2021) 12 individuals did not meet the recommended fat intake of an average of 800 kcal or more than 702 kcal or 67 grams, while 3 individuals met the recommended average of 600 kcal or less than 702 kcal or 67 grams. The data was collected using an initial observation with a Bioelectric Impedance Analyzer (BIA) scale, which showed that 14 individuals had a fairly high visceral fat scale and only 1 individual had an ideal healthy visceral fat scale. Furthermore, the initial observation of measuring the body mass index (BMI) revealed that 12 individuals were classified as overweight and 3 individuals were classified as obese (Primary data, 2021).

The present study was conducted in an area where the community has a habit of consuming high-fat foods. One example is some traditional activities that require serving high-fat foods. Furthermore, gym exercise in Gorontalo is not a favored and popular sport in the community; this sport is developing along with the COVID-19 pandemic so people tend to choose indoor sports. In view of the foregoing, this case study was conducted to examine the correlation between age, fat intake, and visceral fat and body mass index of gym members in the city of Gorontalo.

2. METHODS

The research sites comprised Zahra Gym, Atlantik Gym, and D'Master Gym in Gorontalo, Gorontalo Province. The study was conducted from November to December 2022 and employed an analytical survey design with a cross-sectional approach. The population involved 87 male gym members, and the sample was taken using a total sampling technique where the entire population was sampled. The research variables consisted of age, fat intake, visceral fat, and body mass index. The data analysis was conducted using the Spearman Rank Test. The inclusion criteria for this study were individuals who were members of the gym. The exclusion criteria were individuals who were also members of the gym but did not regularly attend the gym. The body mass index (BMI) was calculated using height and weight measurements, age was determined based on the year of birth, fat intake was measured using a questionnaire, and visceral fat was measured using a Bioelectric Impedance Analyzer (BIA). The data analysis was conducted using the Chi-Square test.

3. RESULTS

3.1. Respondents' Characteristics

3.1.1. Distribution of Respondents Based on Age

Provided below are the respondents' characteristics based on age group (Table **1**).

Table 1. Distribution of respondents based on age group.

Age Group (Years)	Total	
	n	%
17 - 25	16	18.4
26 - 35	48	55.2
36 - 45	20	23.0
46 - 55	3	3.4
Sum	87	100.0

Source: Primary Data, 2021.

The above table illustrates that out of 87 respondents, most of them (48 respondents) are aged 26-35 years (55.2%), and the least age group is 46-55 years (three respondents or 3.4%).

3.1.2. Distribution of Respondents based on Sex

The following Table **2** shows the respondents' characteristics based on sex.

As shown in the Table **2** that out of 87 respondents, most of them (77 respondents) are males (88.5%), and the other ten respondents (11.5%) are females.

Table 2. Distribution of respondents based on sex.

Sex	Total	
	n	%
Male	77	88.5
Female	10	11.5
Sum	87	100.0

Source: Primary Data, 2021.

3.2. Univariate Analysis

3.2.1. Distribution of Respondents based on Fat Intake Table 3

Here are respondents' characteristics based on fat intake.

Table 3. Distribution of respondents based on fat intake.

Fat Intake	Total	
	n	%
Meet the recommended intake level	8	9.2
Exceed the recommended intake level	79	90.8
Sum	87	100.0

Source: Primary Data, 2021.

The above table shows that eight respondents (9.2%) have met the recommended fat intake level, and 79 respondents (90.8%) have exceeded the intake level.

3.2.2. Distribution of Respondents based on Visceral Fat as shown in Table 4

Given below are respondents' characteristics based on visceral fat.

Table 4. Distribution of respondents based on visceral fat.

Visceral Fat	Total	
	n	%
Ideal or healthy	4	4.6
Moderate	35	40.2
High	48	55.2
Sum	87	100.0

Source: Primary Data, 2021.

Based on Table **4**, out of 87 respondents, four respondents (4.6%) have an ideal or healthy level of visceral fat, 33 respondents (37.9%) and 50 respondents (57.5%) have moderate and high levels of visceral fat, respectively.

3.2.3. Distribution of Respondents based on Body Mass Index

The following table provides respondents' characteristics based on body mass index.

Table 5. Distribution of respondents based on body mass index.

Body Mass Index (BMI)	Total	
	n	%
Normal 18.5 - 25.0	28	32.2
Overweight 25.1 - 27.0	20	23.0
Obese > 27.0	39	44.8
Sum	87	100.0

Source: Primary Data, 2021.

Table **5** illustrates that 28 respondents (32.2%) have normal BMI, 20 respondents (23.0%) are overweight, and 39 respondents (44.8%) are obese.

3.3. Bivariate Analysis

3.3.1. The Analysis Result of the Correlation between Age and Body Mass Index of Gym Members in Gorontalo

The analysis result of the correlation between age and body mass index is presented below.

Based on Table **6**, it can be seen that the respondents aged 17-25, with a total of 20 respondents, have a normal body mass index (BMI) category of 14 respondents (16.1%), overweight category of 4 respondents (4.7%), and very overweight category of 2 respondents (2.3%). The respondents aged 26-35, with a total of 21 respondents, have a normal BMI category of 5 respondents (5.7%), overweight category of 7 respondents (8.0%), and a very overweight category of 9 respondents (10.3%). The respondents aged 36-45 a total of 40 respondents, have a normal BMI category of 8 (9.2%), overweight category of 7 respondents (8.0%), and very overweight category of 25 respondents (28.7%). The respondents aged 46-55, with a total of 6 respondents, have a normal BMI category of 1 (1.2%), overweight category of 2 respondents (2.3%), and very overweight category of 3 respondents (3.5%). Based on the test results, the p-value obtained was 0.001 or α value <0.05, which means that there is a relationship between age and BMI.

3.3.2. The Analysis Result of the Correlation between fat Intake and Body Mass Index of Gym Members in Gorontalo

The analysis result of the correlation between fat and body mass index is illustrated in the following table.

Based on Table **7**, it can be seen that the majority of respondents have a normal fat intake category with a total of 79 respondents, where 21 respondents (24.2%) have a normal BMI category, 20 respondents (23.0%) are overweight, and 38 respondents (43.7%) are very overweight. The least number of respondents is in the category of very overweight with a low fat intake, with only 1 respondent (1.1%). Based on the test results, the obtained p-value was 0.002 or α value <0.05, which means that there is a relationship between fat intake and BMI.

3.3.3. The Analysis Result of the Correlation between Visceral Fat and Body Mass Index of Gym Members in Gorontalo

Provided below is the analysis result of the correlation between visceral fat and body mass index.

Based on Table **8**, it can be seen that the largest number of respondents is in the very high category, with a total of 48 respondents, where 10 respondents (11.5%) have a normal BMI category, 10 respondents (11.5%) are overweight, and 28 respondents (32.2%) are very overweight. The least number of respondents is in the healthy ideal range, with a total of 4 respondents, where 2 respondents (2.3%) have a normal BMI category, 2 respondents (2.3%) are overweight, and 0 respondents (0%) are very overweight. Based on the test results, the obtained p-value was 0.029 or α value <0.05, which means that there is a relationship between visceral fat and BMI.

4. DISCUSSION

4.1. Fat Intake

The measurement of energy intake relied on a semi-quantitative food frequency questionnaire method, in which eight respondents (9.2%) met the recommended fat intake level, while 79 respondents (90.8%) exceeded the limit. These 79 respondents regularly consumed staple foods with a significant portion, fritters, noodles, meatballs, and local snacks high in calories. They consumed such foods every day or four to six times a week. On the other hand, respondents with a healthy fat intake solely consumed staple foods without excessive supplementary foods, making their calorie intake reach 80% of the RDA. This is because the respondents are used to eating a small amount of food.

Fat is an important energy source in the body and serves several other crucial functions. It produces more energy per gram than carbohydrates or protein, acts as a structural building block for the body, regulates body temperature, and offers protection against rapid heat loss. Fat also produces essential fatty acids and serves as a solvent for fat-soluble vitamins [15].

However, excessive fat intake can lead to an increased risk of obesity and fat mass accumulation. A study of 148 participants found that 90.5% of them had excessive fat intake [16]. This highlights the importance of maintaining a balanced and healthy diet to avoid the negative consequences of excessive fat consumption. The ethical authority for the research is the Department of Public Health, Gorontalo State University. This research has obtained an Ethical Clearance Recommendation Letter Number: 13/UN47.B7/KE/2023.

4.2. Visceral Fat

This study utilized bioelectrical impedance analysis to measure the level of visceral fat in 87 respondents. The results showed that the majority of respondents (57.5%) had a high level of visceral fat, while only a small proportion (4.6%) had an ideal or healthy level of visceral fat [17].

Visceral fat is a type of adipose tissue that accumulates in the intra-abdominal area and is stored deeper beneath the skin than subcutaneous fat. Obese individuals with visceral fat tend to have increased secretion of inflammatory mediators, indicating ongoing chronic inflammation in their adipose tissue. This chronic inflammation is associated with various health risks, such as hypertension, diabetes, and cardiovascular disease [18].

The distribution of fat in different areas of the body has implications for morbidity, with abdominal fat and intra-abdominal fat having a greater impact on health risks than fat distributed in other areas of the body. A prospective study utilizing anthropometric measurements found that visceral obesity is closely related to health risks such as hypertension, diabetes, and cardiovascular disease [19].

Decades of research have shown that abdominal fat is strongly associated with cardiometabolic risk factors beyond obesity itself, and targeting abdominal fat is a key strategy for preventing and managing health risks associated with abdominal obesity [19]. A systematic review has confirmed that negative energy balance from exercise or diet is associated with a significant reduction in abdominal fat and related cardiometabolic risk factors [19].

Purwanti Susantini found that a significant proportion of respondents (18.3%) had a high visceral fat level, with 8.7% of respondents having an extremely high visceral fat level [20]. Visceral fat is located inside the peritoneal cavity and is wrapped around internal organs. Excessive visceral fat is strongly associated with an increased risk for cardiovascular disease, metabolic syndrome (including hypertension, dyslipidemia, and type II diabetes), and insulin resistance [20]. Studies have shown that obese individuals are more likely to have excessive visceral fat, and that visceral fat can contribute to waist circumference, making central obesity a higher risk for those with a higher percentage of visceral fat [21].

4.3. Body Mass Index

In this study, a scale and microtoise were used to measure the body mass index of 87 respondents. The results showed that 28 respondents (32.2%) had a normal body mass index, 20 respondents (23.0%) were overweight, and 39 respondents (44.8%) were obese. Body mass index is a method used to measure an individual's nutritional status, which is indicative of malnutrition or overnutrition. According to Irianto, [22], body mass index is used to determine the nutritional status of individuals who are 18 years of age or older. It is important to note that self-reported weight and height can be systematically compared to objectively measured body mass index calculation data. However, errors in self-reported weight and height can lead to significant misclassification in the body mass index category.

Body composition is determined by height, weight, and fat thickness. To measure height accurately, individuals should stand straight with their feet flat on the floor and their heels against the corner where the wall and floor meet, while their shoulders, buttocks, and hips touch the wall.

The present study's findings are consistent with those of a previous study by Amalia Rahma and Peggy Setyaning Baskari, which showed that out of 148 respondents, four respondents (2.70%) had a body mass index (BMI) of <18.5, 34 respondents (22.97%) had a BMI of 18.5-22.9, 44 respondents (29.72%) had a BMI of 23-24.9, 48 respondents (32.43%) had a BMI of 25-29.9, and 18 respondents (12.16%) had a BMI of >30 [16]. Increasing BMI is associated with an increase in body weight and the accumulation of fat in the body.

4.4. The Correlation between Age and Body Mass Index of Gym Members in Gorontalo

Based on Table **6**, it can be seen that the respondents are in the age categories of 17-25 with a total of 20 respondents, where 14 respondents (16.1%) have a normal BMI category, 4 respondents (4.7%) are overweight, and 2 respondents (2.3%) are very overweight. For respondents in the age category of 26-35, with a total of 21 respondents, 5 respondents (5.7%) have a normal BMI category, 7 respondents (8.0%) are overweight, and 9 respondents (10.3%) are very overweight.

For respondents in the age category of 36-45 with a total of 40 respondents, 8 respondents (9.2%) have a normal BMI category, 7 respondents (8.0%) are overweight, and 25 respondents (28.7%) are very overweight. For respondents in the age category of 46-55 with a total of 6 respondents, 1 respondent (1.2%) has a normal BMI category, 2 respondents (2.3%) are overweight, and 3 respondents (3.5%) are very overweight. Based on the test results, the obtained p-value was 0.001 or α value <0.05, which means that there is a relationship between age and BMI.

The correlation between age and body mass index was analyzed using the Chi-Square test. The results showed a p-value of 0.12 (p or $\alpha < 0.05$), indicating no significant correlation between age and body mass index. The correlation coefficient (r-value) was calculated to be 0.24, suggesting a very weak correlation.

4.5. The correlation between fat intake and body mass index of gym members in Gorontalo

According to Table **7** , it can be seen that the majority of respondents had a normal category of fat intake with a total of 79 respondents, of which 21 had a normal body mass index (24.2%), 20 were overweight (23.0%), and 38 were very overweight (43.7%). The fewest respondents were in the low-fat intake category with only 1 respondent (1.1%) in the very overweight category. Based on the test results, a p-value of 0.002 or $\alpha < 0.05$ was obtained, indicating that there is a relationship between fat intake and body mass index.

The Chi-Square test was used to analyze both variables, fat intake and body mass index, to determine their correlation. The results show a p-value of 0.03 (p or $\alpha < 0.05$), indicating that there is a correlation between fat intake and body mass index. The correlation coefficient (r-value) is 0.31, representing a moderate correlation.

Fat is an important source of energy and helps with the absorption of fat-soluble vitamins [15]. Vegetable fat is recommended as it contains essential fatty acids that can prevent cholesterol build-up and blood vessel constriction [15]. The RDA for fat intake in adolescents aged 10 to 18 years old ranges from 70 to 89 grams per day for boys and 67 to 71 grams per day for girls [23].

A study conducted by Gagah Mukti Widodo found a significant correlation between fat intake and body mass index with a p-value of 0.04 and a correlation coefficient (r) of 0.208 [24]. This indicates a low but definite correlation between the two variables, with the higher fat intake associated with a higher body mass index [24]. These results are consistent with the work of Sari, who reported that long-term consumption of fat increases the risk of overnutrition and obesity [25].

One participant in the study met the recommended fat intake level but was still obese due to excess body weight from muscle and bone. Additionally, 21 respondents exceeded the recommended fat intake level but had a normal body mass index because they engaged in regular exercise and monitored their body mass index.

4.6. The Correlation between Visceral Fat and Body Mass Index of Gym Members in Gorontalo

Based on Table **8** , it can be seen that most respondents were in the very high category, with a total of 48 respondents, with a normal BMI of 10 respondents (11.5%), overweight 10 respondents (11.5%) and very obese 28 respondents (32.2%). The fewest respondents were in the healthy ideal range, with a total of 4 respondents, with a normal BMI of 2 respondents (2.3%), overweight 2 respondents (2.3%) and very obese 0 respondents (0%). Based on the test results, a p-value of 0.029 or $\alpha < 0.05$ was obtained, indicating a relationship between visceral fat and BMI.

Table 6. Analysis result of the correlation between age and body mass index of gym members.

Age	Body Mass Index						Total		r-value	p-value
	Normal		Overweight		Obese					
	n	%	n	%	n	%	n	%		
17-25	6	37.5	6	37.5	4	25	16	100		
26-35	15	31.5	10	20.8	23	47.9	48	100	**0.24**	**0.12**
36-45	7	35	2	10	11	55	20	100		
46-55	0	0	2	66.7	1	33.3	3	100		
Sum	**28**	**32.2**	**20**	**23**	**39**	**44.8**	**87**	**100**		

Source: Primary Data, 2021.

Table 7. Analysis result of the correlation between fat intake and body mass index of gym members.

Fat Intake	Body Mass Index						Total		r-value	p-value
	Normal		Overweight		Obese					
	n	%	n	%	n	%	n	%		
Meet the recommended intake level	7	87.5	0	0	1	12.5	8	100	**0.31**	**0.03**
Exceed the recommended intake level	21	26.6	20	25.3	38	48.1	79	100		
Sum	**28**	**32.2**	**20**	**23**	**39**	**44.8**	**87**	**100**		

Source: Primary Data, 2021.

Table 8. Analysis result of the correlation between visceral fat and body mass index of gym members.

Visceral Fat	Body Mass Index						Total		r-value	p-value
	Normal		Overweight		Obese					
	n	%	n	%	n	%	n	%		
Ideal/healthy	2	50	2	50	0	0	4	100	**0.33**	**0.02**
Moderate	16	45.7	8	22.9	11	31.4	35	100		
High	10	20.8	10	22.8	28	58.3	48	100		
Sum	**28**	**32.2**	**20**	**23**	**39**	**44.8**	**87**	**100**		

Source: Primary Data, 2021.

Both variables were analyzed using the chi-square test to see if there was a relationship or association between visceral fat and BMI. A significant p-value of 0.029 was obtained, indicating that there is a relationship between visceral fat and BMI.

Visceral fat is an accumulation of intra-abdominal fat (central obesity) that is stored beneath the skin deeper than subcutaneous fat [17]. The increase in the secretion of inflammatory mediators in the visceral fat of obese people reflects ongoing chronic inflammation within the people's adipose tissue [18].

From the data collected by Epic Wellness, it has been found that visceral fat can lead to various health risks. Visceral fat can increase the release of proteins and hormones that trigger inflammation, which in turn can damage arteries and liver function. This makes it difficult for the body to break down sugar and fat. Visceral fat can also increase the production of low-density lipoprotein, commonly known as "bad" cholesterol, which can ultimately lead to inflammation and narrowing of arteries. This condition can increase blood pressure, strain the heart, and increase the risk of blood clotting.

Studies have shown that visceral fat is one of the body's components that can affect body weight. Body mass index is an indicator of one's nutritional status by calculating height and weight, so visceral fat, as a body component, can also affect body mass index [26].

The current study's findings are consistent with previous research [13, 27, 28] that has reported a significant positive correlation between body mass index (BMI) and visceral fat. Jin *et al.* found a significant correlation between BMI and visceral fat with $p<0.01$ [4]. Ratu also reported a positive correlation between BMI and visceral fat with $r=0.60$ [27], while Ian *et al.* suggested an association between an increase in BMI and an increase in visceral fat [28].

Furthermore, Adhitya Pradana's case study [13] on medical students at Diponegoro University and Kevin Kurniawan Soegeng's study on medical students at Surabaya Widya Mandala Catholic University also supported these findings. Adhitya Pradana reported a positive correlation between BMI and visceral fat with $p=0.005$ and $r=0.912$ [28]. Kevin Kurniawan Soegeng found a significant correlation between waist circumference, BMI, and visceral fat with $p=0.000$ and $r=0.513$ for waist circumference and visceral fat, and $p=0.000$ and $r=0.651$ for BMI and visceral fat [29].

Two respondents have ideal or healthy visceral fat, yet they are overweight as the visceral fat is only stored in the waist circumference. Although one's waist circumference is ideal yet has an overweight body mass index, fat may accumulate in other body parts, such as upper arm and thigh. Next, 16 respondents have a moderate level of visceral fat with a normal body mass index because they do not control their visceral fat. They only build muscles and bones and still consume more fats, leading to fat accumulation in the abdomen.

CONCLUSION

Based on the research on the relationship between age, fat intake, and visceral fat with body mass index among gym members in a gym in Gorontalo city, the following conclusions can be drawn:

a. There is a relationship between age and body mass index among gym members, with a significant value of p value = 0.001 ($> \alpha = 0.05$).

b. There is a relationship between fat intake and body mass index among gym members, with a significant value of p-value = 0.002 ($< \alpha = 0.05$).

c. There is a relationship between visceral fat and body mass index among gym members, with a significant value of p-value = 0.029 ($< \alpha = 0.05$).

LIST OF ABBREVIATIONS

DALY	=	Disability-adjusted life years
BMI	=	Body mass index

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This research has obtained an Ethical Clearance Recommendation Letter Number: 13/UN47.B7/KE/2023.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committees and with the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The authors confirm that the data supporting the findings of this study are available within the article.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

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