

The Relationship of Dietary Intake and Nutritional Status to the Risk of Eating Disorders among University Students in Yogyakarta, Indonesia

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ABSTRAK

Eating disorders are linked to poor nutritional status, often driven by dietary inadequacies such as caloric restriction or unhealthy eating behaviors. A university student was a vulnerable group in terms of susceptible to develop eating disorders. Understanding how dietary intake and nutritional status contribute to eating disorders' risk is essential. This study aim to examining the relationship between dietary intake, nutritional status, and eating disorders' risk among university students in Yogyakarta, Indonesia. We conducted a cross-sectional study in June-August 2024, assessing dietary intake via a 24-hour food record and analyzing nutritional status by body mass index (BMI). Eating disorders' risk was measured using the EAT-26 questionnaire. Results indicated that 90.4% of students had deficient dietary intake, 4.8% low dietary intake, and the rest were moderate and adequate. While 11.9% students were underweight, 52.4% had normal BMI, and the remainder were overweight or obese. Dietary intake did not significantly related with eating disorders' risk, but nutritional status significantly relateated (p 0.033). In conclusion, most participants had energy intake deficits but dietary intake was not significantly associated to eating disorders' risk. Nutritional status, however, was significantly associated with eating disorders' risk, with underweight individuals being particularly vulnerable.

Keywords: Dietary Intake, Nutritional Status, Eating Disorder, University Student

INTRODUCTION

Eating disorders have emerged as a significant public health concern globally, characterized by complex physical and psychological challenges that impact quality of life and mortality (Van Hoeken and Hoek, 2020; Milic et al., 2023). These disorders are ranging from anorexia nervosa and bulimia nervosa to binge eating disorder and ARFID (Avoidant Restrictive Food Intake Disorder), have been widely studied due to their prevalence and their serious implications on individual health (He and Xie, 2023). Eating disorders often emerge during the ages of 18 to 21. Research conducted in Spain revealed that approximately 48.1% of first-year university students were at risk for developing eating disorders, with 36.6% of those studying in the Health Science faculty being particularly susceptible (Eguren-García et al., 2024). Due to COVID-19 pandemic, the prevalence of eating disorders

escalated significantly among university students in French, with female student rates increasing from 31.8% in 2018 to 51.8% in 2021, and male student rates rising from 13.0% in 2009 to 31.3% in 2021. Followed by the changes in nutritional status, namely increases in underweight, overweight, and obesity prevalence among those students (Tavolacci, Ladner and Déchelotte, 2021).

Nutritional status, often reflected through body weight, BMI, and other physiological markers, plays a crucial role in both the development and severity of eating disorders. Poor nutritional status, whether due to excessive caloric restriction, nutrient deficiencies, or imbalanced macronutrient intake, has been identified as a contributing factor in the emergence of disordered eating behaviors (Treasure, Duarte and Schmidt, 2020). Consequently, understanding the connection between dietary intake and nutritional status is essential for assessing risk factors associated with eating disorders (Aparicio et al., 2015; Jenkins, Proctor and Snuggs, 2024).

Dietary intake directly influences nutritional status and has been shown to correlate with the risk of eating disorders. Dietary patterns characterized by high caloric restriction, low macronutrient consumption, or inadequate micronutrient intake have been linked to changes in body composition and metabolic health, which, in turn, may elevate eating disorders' risk (Assyifa and Riyadi, 2023; Magee et al., 2023). Studies have shown that specific dietary factors, such as reduced energy intake, low fat and protein consumption, and deficiency in vitamins and minerals, are related to both malnutrition and higher susceptibility to disordered eating behaviors (Kiani et al., 2022; Barakat et al., 2023). Although extensive research exists, most studies on this topic are centered around Western populations, indicating a need for broader regional representation.

In particular, there is limited research examining these relationships within non-Western populations, such as university students in Southeast Asia. This study aims to fill this gap by exploring the relationship between dietary intake, nutritional status, and eating disorders' risk among university students in Yogyakarta, Indonesia, especially in the Faculty of Medicine, Public Health and Nursing, known for the high prevalence of eating disorders in previous found. By focusing on this specific population, the research seeks to contribute new insights into the ways in which dietary patterns and nutritional status interact to influence eating disorders' risk in a non-Western context, addressing a crucial gap in the literature. The aim of this study was to examine the dietary intake and nutritional status of students of the Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada.

METHODS

This is a cross-sectional study to determine the relationship between dietary intake and nutritional status on the risk of eating disorders in college students. This study involved 42 students of the Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada. Anthropometric measurements were taken at the Department of Health and Nutrition building, and questionnaires were filled out online via Google form with a university email account. The research was conducted from August to October 2024. The research sample was selected using a stratified random sampling method. Sampling was done by dividing the population based on major, namely Medicine, Nursing Science, and Health Nutrition then from each stratum a random sample was selected.

Dietary intake data was obtained from filling out the 24 hours Food Record questionnaire. The total amount of energy consumed by respondents within one day was compared with the need according to the Nutrition Adequacy Rate (AKG) multiplied by 100%. Food intake is good if $\geq 100\%$ AKG, moderate 80 - 99% AKG, low 70 - 79% AKG, and deficit $<70\%$ AKG (Akhmad Gurnida et al., 2020). Anthropometric data serves to determine the nutritional status of students. Nutritional status is determined based on anthropometric data using the Body Mass Index (BMI) indicator (Bhattacharya et al., 2019), with the classification of underweight if BMI <18.49 kg/m², normal BMI 18.5-25 kg/m², and overweight/obesity BMI >25 kg/m². The risk of eating disorders: related to eating behavior is measured using the EAT-26 (The Eating Attitude Test) questionnaire which consists of 26 statements regarding eating behavior associated with the risk of anorexia or bulimia. The reliability of the EAT-26 was good, reaching 0.85-0.90 (McLean, Kulkarni and Sharp, 2023; Janahi et al., 2024).

Data were analyzed using Spearman's bivariate test using SPSS 26 software to determine food intake and nutritional status with the risk of eating disorders. This study has received approval from the Ethics Committee of the Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada number KE/FK/1290/EC/2024.

RESULT AND DISCUSSION

The subjects in this study were undergraduate students of the Faculty of Medicine, Public Health, and Nursing Universitas Gadjah Mada (FK-KMK UGM) consisting of the study programs of Medicine, Nursing Science, and Health Nutrition from 2020 to 2023. Sample distribution according to the stratified method was not met, so sample representation based on study programmes could not be fulfilled properly (Table 1).

Table 1. The Characteristic of Respondents

Characteristics	Frequency (n)	Percentage (%)
Age		
19-20	11	26.2
21-23	31	73.8
Sex	4	9,5
Male	38	90,5
Female		
Major	4	9.5
Meating disordersicine	8	19,0
Nursing	30	71,4
Nutrition		

The findings from this study reveal a substantial deficit in dietary intake among the student population, with 90.4% of subjects not meeting adequate intake levels, based on a 24-hour food record. This observation is consistent with previous studies showing that university students often struggle to maintain balanced diets, particularly under conditions of high stress and time constraints (Sogari et al., 2018). The high prevalence of inadequate intake could potentially impact academic

performance, concentration, and overall well-being, as inadequate nutrition has been linked to both physical and mental health challenges in young adults (Wattick, Hagedorn and Olfert, 2018; Begdache et al., 2021; El-Far, 2023).

Table 2. The Descriptive Analysis of Variables

Category	Frequency (n)	Percentage (%)
Dietary Intake		
Deficit	38	90.4
Low	2	4.8
Moderate	1	2.4
Good	1	2.4
Nutrition Status (IMT)		
Underweight	5	11.9
Normal	22	52.4
Overweight/Obesity	15	35.7
Eating Disorders Risk		
Not at risk	26	61.9
At risk	16	38.1

According to Table 2, most participants (90.4%) reported having an energy deficit intake, 4.8% low dietary intake, 2.4% moderate and good intake. The nutritional status of most respondents was normal at 52.4%, overweight/obesity at 35.7%, and underweight at 11.9%. The findings indicated that 61.9% of the respondents were not susceptible to eating disorders, in contrast to 38.1% who were at risk.

This range aligns with findings in similar populations, where dietary intake, lifestyle factors, and stress collectively influence body weight (Shook et al., 2014; Kriaučionienė et al., 2023). Underweight status in some students may reflect restrictive eating behaviors, possibly related to body image concerns or stress management strategies (Barakat et al., 2023; Hasan et al., 2024). Conversely, overweight and obesity could be linked to high-calorie, low-nutrient food choices and reduced physical activity (Moschonis and Trakman, 2023). Such imbalances in nutritional status are concerning, as both underweight and overweight conditions are associated with increased health risks, including immune function impairment, metabolic complications, and psychological stress (Muscaritoli, 2021). In terms of eating disorders' risk, 38.1% of students were identified as at risk, which highlights significant concerns in this population. This is a significant concern, as university students represent a demographic vulnerable to body image pressures and stress-related coping mechanisms that may contribute to eating disorders (Barakat et al., 2023; Choirunnisa and Harahap, 2023).

Based on Table 3, moderate and good dietary intake has a 100% risk of eating disorders, among individuals with a deficit intake of up to 65.8%. As for underweight nutritional status, all of them have a risk of eating disorders. In normal BMI, 31.8% were at risk for eating disorders and 26.7% of respondents with overweight/obesity were also susceptible to eating disorders.

Table 3. The Relationship of Dietary Intake and Nutritional Status on Eating Disorders' Risk

	Eating Disorders' Risk				r	p
	Not at risk		At risk			
	n	%	n	%		
Dietary Intake						
Deficit	25	65.8	13	34.2	0.044	0.784
Low	1	50	1	50		
Moderate	-		1	100		
Good	-		1	100		
Total	26		16			
Nutritional Status						
Underweight	-	0	5	100	0.330	0.033*
Normal	15	68.2	7	31.8		
Overweight/Obesity	11	73.3	4	26.7		
Total	26		16			

Our bivariate analysis showed no significant relationship between dietary intake and eating disorders' risk. However, 34.2% of students with a deficit intake were at risk, suggesting that inadequate dietary intake may still contribute to disordered eating patterns for some individuals. This finding aligns with research suggesting that even when not statistically significant, dietary deficits may influence body dissatisfaction and coping behaviors linked to disordered eating (Andrés and Saldaña, 2014). Research has shown that dietary intake deficits are often associated with increased risks of eating disorders, particularly among those who are either underweight or overweight (Barakat et al., 2023; Asna and Syah, 2021). Moreover, the relationship between poor nutritional intake and eating disorders' risk suggests a possible cyclical effect where inadequate nutrition fosters anxiety and poor body image, further leading to restrictive or binge-eating behaviors (Puspita et al., 2024).

Nutritional status, however, showed a significant relationship with eating disorders' risk. All underweight students (100%) were at risk of eating disorders, reflecting a particularly vulnerable group within the population. In addition, 31.8% of students with normal BMI and 26.7% of those classified as overweight or obese were also at risk. These findings are consistent with research indicating that both underweight individuals and those with body image concerns are more susceptible to disordered eating behaviors (Mallaram et al., 2023). For underweight students, restrictive eating may become habitual and lead to sustained patterns of disordered eating, while those with normal or higher BMI may face societal pressures or self-imposed expectations that drive similar behaviors (Eck, Quick and Byrd-Bredbenner, 2022).

Interpreting these results together highlights the complex interrelationships among dietary intake, nutritional status, and eating disorders' risk among university students. Poor dietary intake can lead to unfavorable changes in nutritional status, which, in turn, may heighten the risk for eating disorders. This complex interaction underscores the need for early interventions that promote healthy eating behaviors and nutritional awareness in this population. Addressing these issues is essential, as

prolonged poor nutrition and disordered eating can lead to long-term health implications, including chronic metabolic and mental health issues (Feng et al., 2023; Wani et al., 2023).

There are some limitations in this study that should be noted. The use of a single 24-hour food record may not fully capture usual intake, potentially introducing bias or underestimation of dietary intake levels. Additionally, the self-reported nature of dietary and body weight data may carry inherent inaccuracies (Ravelli and Schoeller, 2020). A single-day intake may not accurately reflect an individual's usual dietary patterns, especially among those with irregular or disordered eating behavior, that collecting data on multiple days on non-consecutive pattern are preferred (Bailey et al., 2019). Additionally, self-reported dietary assessments, like the 24-hour food record, are prone to underreporting, a concern that is especially relevant among individuals with eating concerns who may feel pressure to report lower intakes due to social desirability bias or because they genuinely restrict intake when they know they will be recording it (Latkin et al., 2017). This underreporting could obscure the relationship between dietary intake and eating disorders' risk, leading to non-significant findings in the analysis. Future studies could benefit from longitudinal designs and more robust dietary assessment tools to assess habitual intake more accurately and to further explore the impact of nutritional status on eating disorders' risk.

This study highlights the complex interplay between dietary intake, nutritional status, and eating disorders' risk among university students. While dietary intake alone was not significantly related to the risk of eating disorders, a notable proportion of those with deficient intake were still at risk, suggesting that inadequate nutrition may indirectly influence disordered eating tendencies. These findings emphasize the needs for targeted interventions that address both dietary adequacy and body weight management within this population. Notably, individuals with moderate or good dietary intake demonstrate eating disorders a 100% risk of eating disorders, suggesting that factors beyond mere energy consumption, such as psychological or behavioral patterns, may influence eating disorder susceptibility.

CONCLUSION

Dietary intake did not significantly related with eating disorders' risk, yet 34.2% of those with energy deficits were exhibited eating disorders' risk. Nutritional status showed a significant association with eating disorders risk, with underweight individuals at particularly high risk, underscoring the importance of body weight as a factor in eating disorder vulnerability.

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Conflict of Interest dan Funding Disclosure

We have no conflicts of interest to disclose. All authors and parties involved in this study have no conflicts of interest in terms of funding sources.

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