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THE EFFECT OF NUTRITION EDUCATION "BOOKLET MAHIR GIZI OLAHRAGA (BOMAZIGA)" ON KNOWLEDGE AND ATTITUDES OF FOOTBALL ATHLETES IN PALEMBANG

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Abstract
Currently, sports performance in Indonesia, especially in football, remains unstable, with fluctuations in performance. One of the contributing factors to this decline is inadequate knowledge and attitudes regarding dietary patterns and nutritional status, which can negatively effect athletes' performance and consequently their achievements. Therefore, preventive efforts are needed, such as nutrition education that involves and stimulates curiosity through BOMAZIGA (Booklet Mahir Gizi Olahraga). This study aims to investigate the effect of nutrition education through the BOMAZIGA game on the knowledge and attitudes of football athletes in Palembang City.The research method used was a Quasi-Experimental design with a pre-test post-test control group approach, involving 80 respondents, consisting of 40 participants in the treatment group and 40 in the control group. Purposive sampling was employed to select the sample. The variables studied were knowledge and attitudes based on pre-test and post-test scores. The effect analysis was conducted using the Wilcoxon test and Mann-Whitney test. The results of the study indicated a significant improvement in knowledge about dietary patterns and nutritional status by 95.2% and a positive attitude improvement of 81% after the intervention. The Wilcoxon test for knowledge and attitudes showed $p = 0.000$ ($p < 0.05$), indicating a significant difference before and after the intervention. The Mann-Whitney test showed $p = 0.000$ ($p < 0.05$), suggesting that nutrition education using the BOMAZIGA media had an effect on both knowledge and attitudes of athletes. The BOMAZIGA game proved to be an effective tool for improving knowledge and attitudes regarding dietary patterns and nutritional status, making it an efficient educational medium for delivering information to athletes.
Keywords: Football Athletes, Nutritional Education, Knowledge, Attitudes, Booklet

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INTRODUCTION

Sports have increasingly become a key indicator in assessing the success of national development. The fostering and development of sports should be an integral component of both national and regional policies (Indrawan *et al*., 2019.).

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Generally, sports are categorized into three types: competitive sports, recreational sports, and educational sports. Competitive sports are typically structured with the primary goal of achieving high performance, with the athlete's performance serving as a critical determining factor (Hikmah & Hafidz, 2023). In 2022, performance was evaluated based on the number of medals earned in various sports, including achievements in para-sports at the national championships, and the 14 priority sports listed in the National Sports Grand Design, in line with Presidential Regulation No. 86 of 2021 (Kementerian Pemuda dan Olahraga RI, 2022).

According to the National Sport Development Index data for 2021, the national sports performance index was 0.385, which falls into the low category (Mutohir *et al*., 2021). In 2022, a significant decline occurred, with the index dropping to 0.166, much lower than in 2021(Kementerian Pemuda dan Olahraga RI, 2022). The performance of athletes in South Sumatra Province, particularly in Palembang City, is reflected in the results of the Provincial Sports Week (Pekan Olahraga Provinsi). In 2021, Palembang City ranked first with 341 medals, in 2022 it ranked second, and in 2023 it ranked third with 268 medals (Dinas Pemuda dan Olahraga, 2023).

Football has experienced rapid development among children and adults, both amateur and professional (Ray *et al*., 2023). However, efforts to improve performance are not easy and require time as well as other supporting factors. Football, with its high game intensity, demands optimal performance to achieve the best results in every match (Pamungkas *et al*., 2023). One of the challenges often faced by Indonesian athletes is the rapid decline in stamina during competition (Dieny *et al*., 2020). Football achievements in Palembang have also been notable, as seen in the ranking of Persijatim Sriwijaya FC in Liga 2, which placed 4th in 2021, 6th in 2022, and 5th in 2023 (Footystats, 2023). This reflects that sports performance in Indonesia, especially football, is fluctuating and requires focus on various influencing factors, both external (coaches, facilities,

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research, and nutrition intake) and internal (motivation and talent) (Dieny *et al*., 2021).

Athlete performance is highly dependent on nutrition knowledge (Wijaya, 2021).). With proper nutrition knowledge, an athlete can choose the right foods to maintain health, fitness, and support optimal performance during training and competition, which ultimately helps achieve the best possible results. (Rohmansyah *et al*., 2020). The importance of proper nutrition intake to maintain stamina and body endurance is often overlooked by coaches, who focus more on physical training, speed, and game strategy. In fact, sports like football require significant energy and adequate nutrition to support maximal performance (Khasanul Bisri *et al*., 2021).

The level of nutrition knowledge significantly influences attitudes and behaviors in food selection. A lack of understanding of good eating habits can disrupt productivity and cognitive function (Berliandita & Hakim, 2021). Sufficient knowledge about dietary patterns and nutritional status is required to support athlete performance. A healthy diet can help improve concentration and focus during competition, which is crucial in competitive sports (Shabrina *et al*., 2023). Proper consumption patterns and nutritional needs depend heavily on nutrition knowledge and the diversity of food types consumed (Masodah & Afifah, 2022). Adequate nutritional status helps enhance stamina and endurance during training and competition. Athletes who are nutritionally well-supported generally perform better than those who are undernourished (Khasanul Bisri *et al*., 2021).

Nutrition education can be delivered through various means, one of which is media, which can facilitate audience understanding of the material. One innovation in nutrition education media is the Booklet Mahir Gizi Olahraga (BOMAZIGA), a booklet that explains the eating patterns and nutritional status of athletes. BOMAZIGA is equipped with an athlete's food requirement chart and pop-up ornaments, which are expected to make it easier for athletes to understand

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nutrition knowledge. This booklet is designed with the needs of athletes in mind, using images to make it more engaging and to avoid reader fatigue.

Based on this background, many athletes still lack an understanding of proper eating patterns, which affects their nutritional status and performance. Therefore, it is essential to provide nutrition education to athletes, particularly those who require more nutritional intake than the general population. This study aims to determine the effect of nutrition education through the "Booklet Mahir Gizi Olahraga (BOMAZIGA)" on the knowledge and attitudes of football athletes in Palembang.

METHOD

This study is a quasi-experimental research design with a pre-test post-test with control group design, conducted at the Sriwijaya State Sports High School (SMA Olahraga Negeri Sriwijaya) Palembang and the David FC football club in June 2024. The population of this study consists of football athletes in Palembang City. Sample calculation using the Lemeshow formula resulted in a total of 80 athletes, which was then increased by 10% to account for potential dropouts, resulting in a total of 88 athletes. Thus, 44 athletes were assigned to the experimental group, and 44 athletes to the control group. The selection of research subjects was performed using purposive sampling, with inclusion criteria including being registered as an athlete, aged 15-22 years, willing to remain a respondent until the completion of the study, and actively training. Exclusion criteria included illness, injury, or withdrawal from the study. The experimental group was provided with nutrition education using a booklet, while the control group received nutrition education using a board game.

The preparation phase involved the creation of questionnaires and educational materials, specifically a booklet and a board game. These materials focused on aspects of dietary patterns, including the type, quantity, and frequency of foods, as well as nutritional status. In the implementation phase, a pre-test was conducted, followed by the delivery of nutrition education, and a post-test was

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administered. Both the experimental and control groups received 30 minutes of nutrition education, followed by a 10 minutes question and answer session. The pre-test was administered prior to the education, while the post-test took place one week after the intervention. Data collection involved having participants complete questionnaires. The knowledge questionnaire utilized a true-or-false format, while the attitude questionnaire employed a Likert scale with options of strongly agree, agree, disagree, and strongly disagree.

Data analysis was performed using both univariate and bivariate techniques. Univariate analysis described each of the studied variables, including participant characteristics such as gender and age. Bivariate analysis was applied to assess the effect of nutrition education on knowledge and attitudes, by comparing pre-test and post-test scores in both the experimental and control groups, using the Wilcoxon test. To evaluate the effectiveness of the BOMAZIGA booklet in enhancing knowledge and attitudes between the two groups, the Mann-Whitney test was employed. Data analysis was carried out using SPSS software version 26.

RESULT AND DISCUSSION

Table 1. Frequency Distribution of Respondent Characteristics

Characteristics	Experiment (n=42)		Control (n=42)	
	n	%	n	%
Age				
15 years	11	26,2	7	16,7
16 years	25	59,5	20	47,6
17 years	6	14,3	15	35,7
Gender				
Male	42	100	42	100
Female	-	-	-	-

Table 1 illustrates that each of the experimental and control groups consisted of 42 respondents. The most prevalent age among participants in both groups was 16 years, with 59.5% in the experimental group and 47.6% in the control group. Additionally, the gender distribution of respondents in both groups

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was entirely male, comprising 100% of the participants in both the experimental and control groups.

Tabel 2. Distribution of Athlete Knowledge Scores

Category	Experiment (n=42)		Control (n=42)	
	n	%	n	%
Pre-test				
Insufficient	1	2.3	3	7,1
Sufficient	28	66,6	23	54,7
Good	13	30,9	16	38,0
Post-test				
Insufficient	0	0	0	0
Sufficient	2	4,76	18	42,8
Good	40	95,2	24	57,1

Table 2 demonstrates that, prior to the intervention, the majority of participants in both the experimental and control groups had a "sufficient" knowledge score, with 66.6% in the experimental group and 54.7% in the control group. Following the intervention, the experimental group exhibited a significantly higher proportion of participants with a "good" knowledge score (95.2%) compared to the control group (57.1%). These findings suggest that the nutrition education intervention effectively enhanced the knowledge of both groups, with the experimental group showing a more substantial improvement in knowledge than the control group.

Table 3. Distribution of Athlete Attitude Scores

Category	Experiment (n=42)		Control (n=42)	
	n	%	n	%
Pre-test				
Positive	24	57,1	29	69
Negative	18	42,9	13	31
Post-test				
Positive	34	81	33	78,6
Negative	8	19	9	21,4

Table 3 reveals that, prior to the intervention, the majority of participants in both the experimental and control groups had a "positive" attitude score, with 57.1% in the experimental group and 69% in the control group. After the intervention, a higher proportion of participants in the experimental group (81%)

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had a "positive" attitude score compared to the control group (78.6%). These results suggest that the nutrition education intervention was effective in enhancing the attitudes of both groups, with the experimental group demonstrating a more notable improvement in attitude than the control group.

Table 4. Average Knowledge Scores Pre and Post Intervention

Knowledge Scores	Experiment (n=42)				Control (n=42)				p
	Mean ± SD	p	Min	Max	Mean ± SD	p	Min	Max	
Pre-Test	71,45 ± 9,33	0,000[a]	53	93	71,67 ± 10,99	0,027[a]	40	93	
Post-Test	90,07 ± 6,87		73	100	78,00 ± 10,84		60	100	
Δ Knowledge Scores	18,62 ± 2,46				6,33 ± 0,15				0,000[b]

a WilcoxonTest

b Mann-Whitney

Table 4 illustrates that, following the nutrition education intervention, there was an increased in the average knowledge score. In the experimental group, the average knowledge score increased from 71.45 ± 9.33 to 90.07 ± 6.87, while in the control group, the average score increased from 71.67 ± 10.99 to 78.00 ± 10.8. The increased in knowledge score was more pronounced in the experimental group (2.24 ± 0.5) compared to the control group (0.76 ± 0.57). The Wilcoxon test revealed a significant difference in knowledge before and after the intervention in both the experimental group (p=0.000) and the control group (p=0.027). Furthermore, the Mann-Whitney test after the intervention showed a significance value of $p < 0.05$ (p=0.000), indicating that the nutrition education using BOMAZIGA media had a significant effect on the athletes' knowledge.

Tabel 5. Average Attitude Scores Pre and Post Intervention

Attitude Scores	Experiment (n=42)				Control (n=42)				*p*
	Mean ± SD	p	Min	Max	Mean ± SD	p	Min	Max	
Pre-Test	45,55 ± 3,32	0,000[a]	39	51	43,88 ±4,15	0,057[a]	33	53	
Post-Test	52,48 ± 3,39		40	60	49,95 ±2,04		45	55	
Δ Attitude	6,93 ± 0,07				6,07 ± 2,11				0,000[b]

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a *Wilcoxon Test*

b *Mann-Whitney*

Table 5 demonstrates that, following the nutrition education intervention, there was an increased in the average attitude score. In the experimental group, the average attitude score increased from 45.55 ± 3.32 to 52.48 ± 3.39, while in the control group, the average score increased from 43.88 ± 4.15 to 49.95 ± 2.04. The increased in attitude score was more substantial in the experimental group (6.93 ± 0.07) compared to the control group (6.07 ± 2.11). Analysis using the Wilcoxon test revealed a significant difference in attitudes before and after the intervention in the experimental group (p= 0.000), while in the control group, the difference was marginally significant (p= 0.057). The Mann-Whitney test after the intervention indicated a significance value of $p < 0.05$ (p= 0.000), suggesting that the nutrition education utilizing BOMAZIGA media had a significant effect on the athletes' attitudes

DISCUSSION

Based on the results of the study, it was found that in the experimental group, the respondents' knowledge increased after receiving nutrition education using the booklet media, and similarly, in the control group, there was an increase in knowledge after receiving nutrition education with the board game media. This indicates that both booklet and board game media are effective in improving nutrition knowledge among respondents. However, the nutrition education with the booklet media resulted in a higher increase in knowledge. This is because the nutrition education used appropriate methods and media for the respondents, allowing them to understand the material better. Visual messages, such as images, are easier for the audience to remember compared to words. Therefore, health education will be more effective if it uses media that features more images, especially for school-aged audiences. (Siregar & Sondang, 2019). The development of the nutrition education media, the Booklet Mahir Gizi Olahraga (BOMAZIGA), is one such medium aimed at educating adolescent athletes, with the expectation that it will enhance their knowledge, understanding, and attitudes

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in a way that is well-received. The goal is to assist athletes in managing their diet according to their training schedule and nutritional status, thus supporting their stamina during training and competition. The booklet was designed with the needs and conditions of adolescents in mind and includes images to capture their attention and prevent boredom while reading (Lendra *et al*., 2018).

Based on the results of the study, it was found that in the experimental group, the respondents' attitudes improved after receiving nutrition education using the booklet media, and similarly, in the control group, there was an improvement in attitude after receiving nutrition education using the board game media. This indicates that an increase in respondents' nutrition knowledge can lead to an improvement in their attitudes. The level of nutrition knowledge affects one's attitude and behavior in food selection and also influences a person's nutritional status (Tamsil *et al*., 2023). The formation and change of attitudes are influenced by both internal and external factors. Internal factors come from an individual's ability to receive, process, and choose the information obtained, while external factors involve stimuli that can change and shape attitudes, influenced by personal experiences, culture, emotions, and significant others such as peers, parents, and teachers, who play a role in providing advice and guidance (Septiana & Suaebah, 2019).

The study results suggest that nutrition education through the use of booklet media had a significant effect on improving athletes' knowledge and attitudes related to dietary patterns and nutritional status. The Mann-Whitney test results revealed a significant effect, with a p - value of 0.000 ($\alpha < 0.05$), indicating a notable difference in knowledge and attitudes before and after the nutrition education intervention using the booklet media. When compared with the board game media developed by the researcher, the difference is quite noticeable, as the material in the booklet is more comprehensive and able to capture the athletes' attention during education, compared to the board game, which has more limited content. Additionally, the booklet design is simple, and the images are easy to

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understand even without text or dialogue, considering that athletes undergo intense physical training sessions, making their bodies susceptible to fatigue. When athletes are required to process complex information or focus on intricate material, it can add to their physical strain.

These findings are consistent with research by Ersila (2021) conducted at Puskesmas Kedungwuni II, which demonstrated a significant effect on knowledge scores $p = 0.000$ ($\alpha < 0.05$) and attitude scores (p - value $= 0.001$, $\alpha < 0.05$), indicating that the booklet had an effect on knowledge and attitudes related to the development of toddlers aged 24-36 months (Ersila *et al*., 2021). Similarly, a study by Diba (2022) at SMP Negeri 1 Malang also found a significant effect on knowledge scores $p = 0.000$($\alpha < 0.05$) and attitude scores $p = 0.000$ ($\alpha < 0.05$), suggesting that the booklet influenced knowledge and attitudes regarding overweight (Diba *et al*., 2022). Furthermore, research by Zein (2023) reported a significant effect on knowledge scores $p = 0.000$ ($\alpha < 0.05$) and attitude scores $p = 0.000$($\alpha < 0.05$). indicating that the pocket guide had an effect on knowledge and attitudes related to the risk factors of non-communicable diseases (Zein *et al*., 2023).

CONCLUSSION

The provision of nutrition education to athletes using the BOMAZIGA media has been shown to enhance athletes' knowledge and attitudes regarding dietary patterns and nutritional status. Furthermore, there were significant differences in knowledge scores $p = 0.000$($\alpha < 0.05$) and attitude scores $p = 0.000$($\alpha < 0.05$) before and after the nutrition education intervention related to athletes' dietary patterns and nutritional status. The researcher hopes that the knowledge presented in the booklet from this study can continue to be disseminated to athletes, with the expectation that it will improve their understanding of nutrition, which, in turn, could enhance their performance and positively effect their athletic achievements.

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