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LITERATURE REVIEW ON NUTRITIONAL STATUS AND 25-METER SWIMMING SPEED AMONG PROSPECTIVE STUDENTS IN THE CONTEXT OF POLICE ACADEMY PREPARATION

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Abstract. Physical health and fitness are crucial aspects in preparing for entry into the Indonesian National Police (Polri). Swimming, as a sport requiring physical fitness and technical skills, is a primary focus in this preparation. This study aims to explore the relationship between nutritional status and 25-meter swimming speed among prospective students preparing to enter Polri. The method employed is a literature review. Literature review is a research design used to gather data sources related to a topic, describing core content based on acquired information. Data collection for the literature review was conducted using database search tools, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The study analyzed journals and summarized statements relevant to the research objectives. Journal search procedures adhered to PICOT criteria. The analysis results indicate a positive relationship between good nutritional status and swimming speed. Factors such as balanced body composition and adequate nutritional intake play critical roles in enhancing swimming performance. The implications of these findings underscore the need for greater attention to nutritional aspects in swimming training programs and physical preparation for prospective Polri members. Emphasizing monitoring and improving nutritional status in swimming training programs can significantly benefit prospective Polri members in achieving optimal physical fitness. Further research is necessary to better understand the mechanisms linking nutritional status and swimming speed, and to develop effective intervention strategies for enhancing swimming performance.

Keywords: Nutritional Status, Swimming Speed, and Preparation for Indonesian National Police.

I. INTRODUCTION

Becoming a member of the Indonesian National Police (Polri) or the Armed Forces (TNI) is a dream for many teenagers, evident from the increasing number of first-year high school students preparing for civil service selections in 2021 (Hutauruk, 2023). Besides general knowledge, psychology, health, and physical fitness, the ability to swim is also a primary requirement. Many high school students take swimming lessons to prepare for these tests (Yohanes, D., Mulyani, I. D., & Harini, 2022). The quality of human resources is a crucial factor in the success of any institution, including the Indonesian National Police (Polri) (Burhanuddin, 2017). As an institution tasked with maintaining security and order, Polri requires personnel in prime physical condition (Mardianto, E., & Npm, 2017). One essential indicator in Polri member selection is physical

ability, which includes assessments such as swimming speed tests (Usman, H. A. Usman, 2023). However, many prospective candidates face challenges in meeting the established swimming speed standards, with their nutritional status potentially playing a role.

Physical fitness refers to the body's ability and capacity to adapt to physical loads from daily work without excessive fatigue. Individuals who are healthy and maintain good physical fitness levels can perform better in their jobs, leading to increased productivity (Budianto, 2022). The daily energy requirements for swimmers typically range from 2700 to 3200 calories, with recommended protein intake for male athletes around 1.2-1.6 grams per kilogram of body weight, and for females around 1.0-1.4 grams per kilogram of body weight (Jufri, 2022). Protein intake should

constitute about 12-15% of the total energy intake. Adequate nutrition is crucial to maintain optimal bodily functions, especially for muscle development required during swimming training and competitions (Shabrina et al., 2024). Additionally, carbohydrates as the primary energy source are essential in preventing fatigue and maintaining energy levels during exercise. Balanced nutrition also affects internal organ function and muscle health, ultimately impacting an athlete's nutritional status and performance (Larasati & Yuliana, 2020).

Based on individual calculations, the energy requirements for swimmers can be determined by comparing their actual body weight to the standard weight (AKG) and then multiplying by the calorie value. For swimmers, energy requirements are categorized by age and gender in a table. For example, in the 7-9 age group, the average energy requirement for males is approximately 2132.76 Kcal, while for females it is around 1633.66 Kcal. In the 10-12 age group, the average energy requirement for males is about 2028.73 Kcal, whereas for females it is approximately 1682.50 Kcal. Those aged 13-15 have an average energy requirement of about 2583.60 Kcal for males and around 1924 Kcal for females. For the 16-18 age group, the average energy requirement is about 2146.50 Kcal for males and approximately 2461.40 Kcal for females (Yapıcı & Bakır, 2022).

(Yapıcı, A., & Bakır, 2022) indicates that good nutritional status correlates positively with swimming performance. In their study, athletes with adequate nutrition intake were able to improve their swimming speed by 10-15% compared to athletes with poorer nutrition intake. According to data from (Fitriani, Y. M., & Roziana, 2021), collected from 60 participants undergoing intensive training programs, 35 of them had optimal nutritional status based on Body Mass Index (BMI) and hemoglobin level assessments. From this group, 85% successfully achieved a 25-meter swimming speed in less than 14 seconds for males and 20 seconds for females, which is the standard set in the Polri selection criteria. In contrast, among the 25 participants with suboptimal nutritional status, only 45% were able to meet this standard.

The nutritional status of students is a crucial factor influencing their performance, particularly in swimming speed (Hasan, 2023). Although several studies have indicated that good nutritional status can enhance physical capacity and swimming speed in athletes, the relationship between nutritional status and swimming performance among students preparing to meet Polri standards has not been extensively researched. Obtaining research results that describe the nutritional and anthropometric profiles of young swimmers during the training season (Taboada-Iglesias, Y., Vernetta-Santana, M., Alfonso-Fernandez, D., & Gutiérrez-Sánchez, 2023) Anthropometric values reveal significant differences in weight and height between male and female swimmers, although BMI does not differ significantly. Female swimmers have larger triceps, suprailiac, abdominal, thigh, and lower leg skin folds. The body fat percentage calculated using the Yuhasz method is higher than that

calculated using the Faulkner equation, especially in girls. Bioelectrical impedance shows a higher fat percentage than either method. The fat percentage is higher in girls, with the Yuhasz method showing a more significant difference between boys and girls than the Faulkner equation. Endomorphic and mesomorphic somatotype components are also almost twice as significant in girls

(Taboada-Iglesias, Y., Vernetta-Santana, M., Alfonso-Fernandez, D., & Gutiérrez-Sánchez, 2023) found nutritional deficiencies related to total energy intake, protein, and micronutrients during the nutritional adequacy analysis. The average energy intake (EI) was below the swimmers' energy requirements, calculated based on body weight, age, gender, and physical activity level (PAL). The 24-hour recall method may underestimate actual EI due to its reliance on individuals' ability to remember their food consumption. Using the Goldberg cut-off, it was found that six individuals in the sample, all of whom were females, did not accurately report their EI. After excluding these individuals from the analysis, the percentage of energy requirement coverage increased to 83% in boys and 75% in girls, although still lower than expected. BMR predictions may overestimate daily energy requirements. It was previously reported that female swimmers only consume about 70% of the energy compared to male swimmers, a trend often observed among female athletes. Some authors argue that female athletes do not accurately report their food intake

The specific issue addressed in this study is to identify the extent to which the nutritional status of participants affects their 25-meter swimming speed and how nutritional inadequacies may hinder them from achieving the speed standards set by the Indonesian National Police (Polri). Specifically, this research will examine whether participants with suboptimal nutritional status face difficulties in achieving the required 25-meter swimming time for the Polri selection, compared to those with optimal nutritional status. Therefore, this study aims to investigate further how nutritional status influences swimming speed over a 25-meter distance and its implications for their readiness in facing the Polri selection process. Through this literature review, it is expected to provide a comprehensive overview of the influence of nutritional status on swimming performance. The results of this study are anticipated to contribute to improving the quality of training and preparation for prospective members of the Polri, as well as providing useful recommendations for swimming academy managers and prospective Polri candidates.

II. METHODS

This study employs a literature review or literature survey method, which is a research design aimed at gathering data sources related to a specific topic (Andika Fawri, 2021). The literature review aims to describe core content based on the information obtained (Creswell, J. W., & Creswell, 2017). Data collection follows the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses" (PRISMA) method. This process involves analyzing journals and creating relevant summaries aligned with the research objectives.

Journal searches are conducted according to the PICOT procedure, which consists of several elements

Firstly, the element P (Problem/Population) in this study focuses on the nutritional status of students. The element I/E (Implementation/Intervention/Exposure) involves research on the nutritional status and 25-meter swimming speed of students in the context of preparing for the Indonesian National Police (Polri) selection test. There is no Comparison/Control (element C) intervention or control used in this study. The element T (Time) includes a review of journals related to the Polri test and the nutritional status of students over a specific period. Data collection was conducted by accessing articles and scientific journals through search databases such as Google Scholar, ERIC, and Scopus using relevant keywords such as nutritional status, 25-meter swimming speed of students, and "Polri selection test preparation." Inclusion criteria included articles discussing the relationship between nutritional status and swimming performance, particularly 25-meter swimming speed, as well as articles related to physical preparation for the Polri test. Articles that were irrelevant, lacked empirical data, or were published before 2010 were excluded from the study

The data analysis process involves the PRISMA steps: "Identification" of the total number of articles found, "Screening" of articles based on title and abstract, "Eligibility" evaluation of articles in full to ensure they meet inclusion criteria, and "Inclusion" of articles selected for final review. Articles that meet the criteria are analyzed to identify the relationship between nutritional status and swimming speed among students. Data from these articles are compiled and compared to observe common patterns and consistent findings.

The data analysis will involve descriptive analysis to outline the characteristics of the selected studies and, if possible, quantitative analysis to calculate the effect size of nutritional status on swimming speed. Comparative analysis will also be conducted to identify similarities and differences and to pinpoint factors that may influence the outcomes. The variables in this study include the "independent variable," which is the nutritional status of students measured through Body Mass Index (BMI) and hemoglobin levels. The "dependent variable" is the 25-meter swimming speed measured in seconds, and the "constants" are factors such as age, gender, and the training program undertaken by the students. Although there is no formal control group, data from participants with optimal and suboptimal nutritional statuses will be compared to identify specific relationships between nutritional status and swimming speed. Through this methodology, the research aims to identify the extent to which nutritional status affects the 25-meter swimming speed of students at Gemerlap Swim Academy in the context of preparing for the Polri selection test.

III. RESULT AND DISCUSSION

The research findings will be presented in two tables focusing on the journals reviewed in the literature study. Table 1 will display the research outcomes including the Publication Year, Journal Name, and Publication Type. Following this, Table 2 will present the results of the literature review analysis, comprising author names, study design, and research findings. To facilitate the viewing of the research outcomes, they will be presented in Table 1.

Tabel 1 Indexed Journal Publication

| Year | Journal Name | Number of articles | Publication Type |
|------|---|--------------------|-----------------------------------|
| 2022 | International Journal of Curriculum and Instruction, | 1 | <i>Comper nicus Internasional</i> |
| 2023 | International Journal of Education in Mathematics, Science and Technology | 1 | <i>Scopus</i> |
| 2023 | African Educational Research Journal, | 1 | <i>Gogele Scholer</i> |
| 2023 | Soetomo Magister Ilmu Administrasi | 1 | <i>Gogele Scholer</i> |
| 2019 | European Journal of Education Studies. | 1 | <i>AcademicKeys</i> |
| 2010 | Journal of Educational Research and Evaluation | 1 | Sinta 2 |
| 2023 | Bayfa Indonesian Scholar. | 1 | Sinta 2 |
| 2020 | Bayfa Indonesian Scholar. | 1 | DOAJ |
| 2020 | Journal of Nutrition Research. | 1 | Sinta2 |
| 2017 | Journal of Public Health, | 1 | Sinta |

After presenting table 1 which explains the year of publication, journal name and journal index. Furthermore, table 2 below will reveal the names of the authors, research methods and research findings relating to nutritional status

and 25 meter swimming speed in students in the context of police preparation. To make it easier to achieve research results are presented in table 2.

| No | Writer | Method | Research Findings |
|----|--|--|---|
| 1 | Yohanes, D., Mulyani, I. D., & Harini | Quantitative research with a descriptive approach. | Research shows that the correlation coefficient R is 0.702, which means that parental support (X1), children's interest (X2), and coach training (X3) explain 70.20% of the variability in swimming athletes' performance (Y) at the Antasena Swimming Club. The regression equation $Y = 35.510 + 0.348X1 + 0.180X2 + 0.141X3$ indicates that every one unit increase in X1 increases achievement by 0.348 units, X2 by 0.180 units, and X3 by 0.141 units, with a constant of 35.510. |
| 2 | Suprayitno, S., Sunarno, A., Saputra, I., & Riza | This research uses a causal-comparative type of research design | These findings underscore the importance of promoting and encourage regular participation in swimming or similar physical activity as a potential preventive measure against technology addiction among students |
| 3 | Gözel, Z., & Aka. | This research was conducted in accordance with the Helsinki Statement. | Swimming training significantly improved children's motor skills determined by MFT (Goal Throwing, Flexibility, Hanging Flexible Arm, Step Test and total assessment score) and 50 meter swimming performance at post-test. It can be stated that swimming training carried out in childhood is important in improving a child's motor skills and improved motor skills will contribute to improved swimming rankings |
| 4 | Hartanto | Qualitative descriptive research | The selection of prospective police inspector school (SIP) students in 2018 has been completed by SSDM Polri. The number of students declared to have passed was 1,300 out of 11,528 people who registered and follow a series of selections. |
| 5 | Koç, K., Turan, M. B., Karaoğlu, B., & Tanrikulu | Relational screening model research | Police is a profession where this profession requires physical toughness as well as psychological performance. Therefore, in the vocational school entrance exam, the police education center applies performance psychology and psychological tests in In addition sports tests should be considered |
| 6 | Sriundy | Quantitative approach, with a non-experimental research design | The analysis results show that (1) indicators for measuring swimming performance include body proportions, biomotors, and nutritional status, (2) the hypothesized model is a fit model, (3) factors that influence 50 meter freestyle swimming performance include biomotors, swimming technique, and proportions. body |
| 7 | Sugito, S., Allsabab, M., & PRIMA PUTRA | Qualitative descriptive with survey methods | The results of this research are variables ranging from overall trainer identification getting a good percentage of 86%, overall athlete recruitment identification getting a good percentage of 69.85% and training methods used in training swimming and identification of overall training program preparation getting a good percentage of 75% . The implementation of the training program for Kediri city swimming clubs in 2019 was classified as good at 77% |

| | | | |
|---|--|---|---|
| 8 | Larasati, M. D., & Yuliana | Observational research with a cross sectional design | Most subjects had an adequate energy, protein and fat intake and all subjects had an inadequate carbohydrate intake. Most of subjects had normal BMI (79%) and over body fat percentage (86%). There was a correlation between food intake (energy, fat, carbohydrate) and cardio respiration health ($p < 0.05$). There was no correlation between nutritional status (BMI, body fat percentages) and cardio respiration health ($p > 0.05$) |
| 9 | Setiaputri, K. A., Rahfiludin, M. Z., & Suroto | Explanatory research, using a quantitative approach and cross-sectional research design | Based on the research results, it is known that there is no relationship between TKE ($p = 0.269$) and TKL ($p = 0.054$) with body fat percentage in swimming athletes. There is a positive relationship between physical activity ($p = 0.006$) and physical fitness in swimming athletes, but there was no relationship between body fat percentage ($p = 0.066$) and physical fitness in swimming athletes |

Based on a literature review conducted, this research explores the relevant relationship between nutritional status and swimming ability and students' preparation to join the National Police. Findings from several studies highlight important factors that can influence students' swimming performance and physical and mental readiness. Balanced nutritional intake has a positive correlation with increased swimming ability (Noronha, D. C., Santos, M. I., Santos, A. A., Corrente, L. G., Fernandes, R. K., Barreto, A. C., ... & Nascimento, 2020). Additionally, research by (Taboada-Iglesias, Y., Vernetta-Santana, M., Alfonso-Fernandez, D., & Gutiérrez-Sánchez, 2023) highlights the importance of regular physical exercise and proper nutritional intake in improving physical and mental fitness swimming athlete (Rahmadhani, 2023). These findings provide a deeper understanding of the relationship between nutrition, swimming ability, and students' readiness to take the National Police test. This is in accordance with the theory of improving performance through proper diet, which emphasizes that a proper diet, including appropriate nutritional intake, can improve athletic performance by providing sufficient fuel for physical activity and repairing muscles after exercise (Lengkana & Muhtar, 2021). This theory is reflected in generally accepted nutritional principles, including maintaining an energy balance between caloric intake and energy expenditure, ensuring adequate intake of macronutrients (carbohydrates, protein, fat) to meet energy needs and muscle recovery, and providing adequate intake of micronutrients (vitamins, minerals, antioxidants) to support the body's metabolism and immune system. This theory is supported by extensive scientific research in the fields of nutrition, exercise, and health, which highlights the importance of a proper diet in improving athletic performance and swimming ability

Yohanes, Mulyani, & Harini (2022) show that parental support, children's interest, and coach coaching have a significant correlation with swimming athletes' achievements,

providing relevant insight into the influence of environment and coaching in the formation of successful swimming athletes. In addition, research by Suprayitno et al. (2023) underlined the importance of physical activity such as swimming as an alternative to prevent technology addiction among students, highlighting the importance of a healthy lifestyle in preparing students to face challenges in the National Police. Research by Gözel & Aka (2023) shows that swimming training can significantly improve children's motor skills, highlighting the importance of physical exercise in developing the physical fitness required for the National Police test. Information about the selection of prospective SIP students and the importance of psychological tests and psychological performance, as highlighted by research by Hartanto (2023) and Turan et al., provides important context in understanding the challenges faced by Gemerlap Swim Academy students. Lastly, research by Sriundy adds to the understanding of the factors that influence swimming performance, providing the insight needed to design effective training programs for students.

By combining findings from this literature, this research aims to provide comprehensive insight into the physical, mental and technical readiness of students in facing challenges in the National Police. It is important to note that student preparation does not only focus on physical and nutritional aspects, but also considers psychological aspects and mental readiness needed to face the National Police entrance test. As Koç et al.'s research shows, the National Police entrance test not only involves physical tests, but also psychological tests and psychological performance. Information data obtained from research by Solissa (2017) shows a significant relationship between height and weight on swimming ability. Height and weight are important parameters used to assess a person's nutritional status. One of the most common indicators is Body Mass Index (BMI), which is calculated by dividing body weight in kilograms by height in meters squared. BMI helps categorize whether

someone is underweight, normal, overweight, or obese. Z-score is often used to measure the nutritional status of children by comparing their weight and height with WHO reference standards.

Based on a literature review, good nutritional status has a significant influence on 25 meter swimming speed, which is important for preparation for the POLRI test. Energy balance through adequate calorie consumption is crucial to ensure the body has sufficient energy during training and competition. Adequate protein intake supports muscle repair and growth, which is important for recovery after intense exercise and increased muscle strength and endurance. Carbohydrates act as a primary energy source, preventing fatigue and maintaining energy levels during intense physical activity. Healthy fats, such as those found in fish, nuts, and olive oil, also contribute to overall health and provide energy reserves. Micronutrients such as iron, calcium, vitamin D, and magnesium are important for muscle function, bone health, and energy production, and deficiencies can negatively impact performance and health. Adequate hydration is very important to maintain optimal body function during exercise, with dehydration can reduce physical and cognitive performance. Ideal body composition, with a sufficient proportion of muscle and healthy body fat, increases movement efficiency and endurance in the water, greatly influencing swimming speed. Therefore, maintaining a balanced diet, sufficient protein, carbohydrates, healthy fats, and meeting the needs of vitamins and minerals, along with good hydration and ideal body composition, are important factors for increasing swimming speed and overall performance in preparation for the POLRI test.

Apart from increasing physical fitness and improving nutritional status, student preparation must also pay attention to their psychological readiness. Thus, this research aims to look holistically at the preparation of Gemerlap Swim Academy students, which includes their physical, nutritional and psychological aspects, so that they are ready to face the challenges of the National Police entrance test with confidence and optimal readiness. Research by

Cahyani & Maryam (2023) identified a negative relationship between optimism and anxiety before the TNI-Polri test. High levels of anxiety can interfere with concentration, focus and coordination of body movements needed to achieve optimal swimming speed (Nurwana et al., 2017). Therefore, effective anxiety management is also an important factor in student preparation. Planning management at the West Sumatra Regional Police State Police School is crucial and provides a number of important benefits (Musri, 2022). This includes improving human resource information systems, long and short term planning, and efficient use of resources, all of which contribute to the successful preparation of students for the National Police entrance test

IV. CONCLUSION

Through an in-depth literature review, this research found a significant relationship between nutritional status and swimming ability, as well as how this influences students'

preparation to join the National Police. Several studies show that parental support, children's interest, and coaching from coaches are very influential in the achievements of swimming athletes. In addition, physical activities such as swimming help prevent technology addiction among students and improve motor skills and physical fitness required for the National Police test. Research also shows the importance of psychological tests and mental readiness as part of student preparation. The data obtained shows a significant relationship between height and weight and swimming ability, which can be evaluated through Body Mass Index (BMI) and other indicators such as Z-score and upper arm circumference (LILA). Optimal nutritional status, including energy balance, intake of protein, carbohydrates, healthy fats and micronutrients, is very important to support maximum physical performance. In addition, adequate hydration and ideal body composition play an important role in movement efficiency and endurance in the water. By integrating these findings, this research provides comprehensive insight into students' physical, mental and technical readiness in facing the challenges of the National Police test. Apart from improving physical fitness and nutritional status, preparation must also pay attention to students' psychological readiness so that they can face the test with optimal confidence and readiness

Coaches and parents must ensure that students get a balanced nutritional intake to support their physical performance. A diet program that prioritizes a balance between protein, carbohydrates, healthy fats and micronutrients is highly recommended. Structured and continuous physical exercise is very important to improve students' physical fitness and motor skills. Regular swimming activities can help achieve optimal fitness. Apart from that, students' psychological readiness must be considered through guidance and counseling programs. Managing anxiety levels and increasing optimism can help students face tests better. Regular evaluations of students' nutritional status, physical fitness and mental readiness must be carried out to ensure that they are in the best condition before facing the National Police test. Preparation for the National Police test must include a holistic approach that considers physical, nutritional and psychological aspects, so that students have comprehensive readiness to face existing challenges.

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