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Physical Fitness Profile of Community Representatives in Purbalingga Regency within the 2025 Sports Development Index Assessment

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ABSTRACT

This study aimed to describe the physical fitness profile of the community in Purbalingga Regency in 2025 as part of the measurement of the Sport Development Index (SDI). The research employed a quantitative descriptive approach using a cross-sectional survey design. The target population consisted of residents of Purbalingga Regency aged 12-60 years. However, operationally the study involved an accessible population comprising officially appointed representatives from each district participating in the 2025 SDI data collection process. Each of the 18 districts was represented by three individuals, resulting in a total sample of 54 participants. The sampling technique applied was total sampling of the accessible population, as all designated district representatives were included in the study. Physical fitness was measured using the Multistage Fitness Test (MFT) to estimate maximal oxygen uptake (VO_2max) as an indicator of cardiorespiratory fitness. Data were analyzed using descriptive statistics to determine mean VO_2max values, fitness categories, and inter-district variations. The results showed that the overall mean VO_2max of the Purbalingga Regency community representatives was 27.42 ml/kg/min, which falls into the poor category. Of the 18 districts, 13 districts (72.22%) were classified as poor and 5 districts (27.78%) as very poor, with no district reaching moderate or higher categories. These findings indicate that the physical fitness dimension, as the first criterion of the Sport Development Index, still requires substantial improvement. Strengthening community-based sports programs, increasing structured physical activity participation, and implementing systematic monitoring are necessary to support the enhancement of the Sport Development Index in Purbalingga Regency.

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1. INTRODUCTION

Physical fitness is a fundamental aspect of human life that plays an important role in supporting productivity and quality of life (Nurhasan & Cholil, 2019). Physical fitness is defined as the ability of the body to perform daily activities without experiencing excessive fatigue while still having sufficient energy reserves to enjoy leisure time (Irianto, 2018). In the context of national sports development, physical fitness constitutes one of the nine criteria in the Sports Development Index (SDI), which is used to measure the success of sports development in a particular region (Ministry of Youth and Sports, 2019). The Sports Development Index (SDI) is an important instrument developed by the Ministry of Youth and Sports of the Republic of Indonesia to assess sports development achievements at the district/city and provincial levels (Kristiyanto, 2020). The IPO consists of nine criteria: (1) physical fitness, (2) sports human resources, (3) sports participation, (4) open sports spaces, (5) sports facilities and infrastructure, (6) sports culture, (7) sports industry, (8) sports championships, and (9) sports management (Mutohir & Maksum, 2020). Physical fitness, as the first criterion of the IPO, reflects its critical importance in overall sports development.

Physical fitness can be measured through various methods, one of which is assessing maximal aerobic capacity or VO2max (Volume of Oxygen Maximum). VO2max is considered the best indicator for measuring cardiorespiratory fitness and cardiovascular health (American College of Sports Medicine, 2018). The Multistage Fitness Test (MFT), also known as the Beep Test, is a valid, reliable, practical, and efficient method for measuring VO2max in large populations (Mayorga-Vega et al., 2019). Purbalingga Regency is one of the regencies in Central Java Province, consisting of 18 districts with diverse geographical characteristics, ranging from lowland to highland areas. These geographical differences may influence physical activity levels and the physical fitness of the community (Widodo et al., 2021). Data on community physical fitness profiles are essential as a basis for designing targeted sports development programs and evaluating SDI achievements in Purbalingga Regency.

Previous research indicates that the physical fitness level of the Indonesian population generally falls within the low to moderate category (Giriwijoyo & Sidik, 2019). Factors influencing physical fitness include age, sex, genetics, physical activity patterns, diet, and lifestyle (Corbin et al., 2020). A study conducted by Nugroho and Ardiyanto (2021) found that urban populations tend to have lower fitness levels compared to rural populations due to differences in physical activity levels. Based on the above explanation, it is important to conduct research on the physical fitness profile of the Purbalingga Regency community in 2025 as an effort to map physical fitness conditions that can serve as a foundation for community sports development programs and the improvement of the IPO in Purbalingga Regency. This study is expected to provide a comprehensive overview of physical fitness levels across the 18 districts in Purbalingga Regency.

However, existing studies in Indonesia and globally have primarily examined general predictors of physical fitness or compared population groups, without integrating cardiorespiratory fitness profiles into a regional sport development evaluation framework such as the Sports Development Index. Specifically, there is a lack of empirical research that provides detailed, district-level fitness data linked to structured sport development criteria, which limits the ability of policymakers to identify priority areas for intervention. This gap undermines academic efforts to operationalize physical fitness as both a health and sport development indicator within multilevel evaluation models. Addressing this gap is academically important because physical fitness is not only a marker of individual health but also an indicator of community capacity to engage in and sustain sport participation, as demonstrated in internationally indexed research highlighting its association with public health outcomes and policy impact (Loprinzi et al., 2019; Ortega et al., 2020; Ruiz et al., 2018). Scientifically, this study contributes by providing the first district-level cardiorespiratory fitness profile within an official sport development index framework, linking quantitative VO_2 Max measurements with sport development outcomes. The findings offer empirical evidence to support data-driven policy formulation, enhance localized sport development strategies, and provide a replicable model for other regions seeking to integrate physical fitness metrics into multidimensional sport evaluation paradigms.

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2. METHODS

This study implements a quantitative descriptive approach using a cross-sectional survey design. The design aimed to objectively describe community physical fitness levels within the context of measuring the Sports Development Index (SDI) without manipulating variables (Creswell & Creswell, 2018; Sugiyono, 2022). This study employed a quantitative descriptive approach using a cross-sectional survey design.

2.1. Participants

The target population consisted of residents of Purbalingga Regency aged 12-60 years. Operationally, however, the study used an accessible population comprising individuals officially appointed as representatives of each district in the 2025 SDI measurement process in accordance with the *Kementerian Pemuda dan Olahraga RI* guidelines (2022). Each of the 18 districts delegated three representatives from different community elements, resulting in a total sample of 54 participants. Therefore, the sampling technique applied was total sampling of the accessible population, meaning all officially registered Sports Development Index measurement participants were included in the study.

The sampling technique applied was total sampling of the accessible population, as all members of the SDI measurement group were included. Total sampling is appropriate when all members of the operational population are reachable and relatively limited in number (Sugiyono, 2022; Fraenkel et al., 2019). Therefore, the findings represent the physical fitness profile of district representatives within the SDI evaluation framework rather than the entire regency population. The sample represents district representatives participating in the Sports Development Index measurement, rather than the entire general population of Purbalingga Regency. Consequently, the findings describe the physical fitness profile within the evaluation framework of sport development and do not claim statistical generalization to all residents of the regency.

2.2. Procedures

The data collection procedure was carried out through the following's stages:

1. Preparation
    a. Obtaining research permits from the relevant authorities.
    b. Coordinating with representatives from each district.
    c. Preparing the testing location and equipment.
    d. Providing instructions to participants regarding the implementation of the MFT.
2. Test Implementation
    a. Participants performed a warm-up for 10-15 minutes.
    b. Explanation of the technical procedures of MFT.
    c. Participants ran back and forth over 20 meters following the rhytm of the beep sound.
    d. Running speed increased every minute (Level)
    e. The test was terminated when participants failed to reach the line in time with the beep on two consecutive occasions.
    f. Recording the final level and shuttle achieved by each participant.
    g. Participants performed a cool-down.
3. Data Processing
    a. Converting the final level and shuttle into VO_2 max values using the Léger conversion table
    b. Calculating the average VO_2 max for each district
    c. Calculating the overall average VO_2 max for Purbalingga Regency

The data obtained were analyzed using descriptive statistics with the following steps:

1. Tabulating the VO_2 max measurement results of each participant.
2. Calculating the mean VO_2 max for each district.
3. Calculating the overall mean VO_2 max for Purbalingga Regency.
4. Categorizing fitness levels based on VO_2 max norms.
5. Presenting the data in tables and graphs.

The categorization of physical fitness levels based on VO_2 Max values followed the norms established by the American College of Sports Medicine (2018) as:

Tabel 1. Physical Fitness Level's VO_2 Max Convertion

Category	Score *(ml/kg/mins)*
Very Poor	< 25
Poor	25 - 33
Moderate	34 - 42
Good	43 - 52
Very Good	> 52

3. RESULTS

The study was conducted on December 11, 2025, at Munjuluhur Campground, Purbalingga, involving 54 participants representing 18 districts. Physical fitness was measured using the Multistage Fitness Test (MFT) to obtain VO2max values as indicators of cardiorespiratory fitness. According to the test result, there was the data of the VO2max each district in Purbalingga Regency:

Table 2. Measurement Results per District of Purbalingga Regency in 2025

No	District	VO_2 Max Mean	Category
1	Bobotsari	32.40	Poor
2	Bojongsari	28.70	Poor
3	Bukateja	23.20	Very Poor
4	Kaligondang	32.50	Poor
5	Kalimanah	32.20	Poor
6	Karanganyar	22.10	Very Poor
7	Karangjambu	22.10	Very Poor
8	Karangmoncol	28.40	Poor
9	Karangreja	25.93	Poor
10	Kejobong	25.50	Poor
11	Kemangkon	30.90	Poor
12	Kertanegara	31.00	Poor
13	Kutasari	29.20	Poor
14	Mrebet	31.90	Poor
15	Padamara	28.70	Poor
16	Pengadegan	20.70	Very Poor
17	Purbalingga	22.80	Very Poor
18	Rembang	25.30	Poor
	Mean	27.42	Poor

The results showed that the average VO2max of the Purbalingga Regency Community was 27.42 ml/kg/min, which falls within the poor category. The highest average VO2max was recorded in Kaligondang District (32.50 ml/kg/min), followed by Bobotsari (32.40 ml/kg/min) and Kalimanah (32.20 ml/kg/min). The lowest values were found in Pengadegan (20.70 ml/kg/min), Karanganyar and Karangjambu (22.10 ml/kg/min), and Purbalingga District (22.80 ml/kg/min). Based on the physical fitness level categorization, from 18 districts in Purbalingga Regency, 13 districts (72.22%) categorized as poor category, and 5 districts (27.78%) fall into the very poor category. No district reached the moderate, good, or very good categories.

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Table 3. Frequency Distribution of Fitness Levels in Purbalingga Regency (2025)

Physical Fitness Category	*Number of Districts*	*Percentage*
Very Poor	5	27.78%
Poor	13	72.22%
Moderate	0	0%
Good	0	0%
Very Good	0	0%
Total	18	100%

To visualize the comparison of fitness levels between sub-districts, the data is presented in order from the highest to the lowest VO2max value:

Table 4. VO_2max-Based Ranking of Districts in Purbalingga Regency (2025)

Rank	*District*	*VO_2max (ml/kg/mins)*	*Deviation from Mean*
1	Kaligondang	32.50	+5.08
2	Bobotsari	32.40	+4.98
3	Kalimanah	32.20	+4.78
4	Mrebet	31.90	+4.48
5	Kertanegara	31.00	+3.58
6	Kemangkon	30.90	+3.48
7	Kutasari	29.20	+1.78
8	Bojongsari	28.70	+1.28
8	Padamara	28.70	+1.28
10	Karangmoncol	28.40	+0.98
11	Karangreja	25.93	-1.49
12	Kejobong	25.50	-1.92
13	Rembang	25.30	-2.12
14	Bukateja	23.20	-4.22
15	Purbalingga	22.80	-4.62
16	Karanganyar	22.10	-5.32
16	Karangjambu	22.10	-5.32
18	Pengadegan	20.70	-6.72

**Identical VO_2max values share the same rank using the standard competition ranking method.*

Table 4 indicate a considerable variation in fitness levels among districts in Purbalingga Regency. The difference between the district with the highest VO2max value (Kaligondang) and the lowest (Pengadegan) reachea 11.80 ml/kg/min, or approximately 57% to the lowest value. Based on geographical characteristics, districts in Purbalingga Regency can be classified into highland and lowland areas. The analysis results show a tendency for districts located in higher topographical areas, such as Kaligondang, Bobotsari, and Kalimanah, to have better VO_2max values compared to districts in lowland areas such as Pengadegan, Karanganyar, and Purbalingga.

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4. DISCUSSION

1. Profile of Physical Fitness of The Purbalingga Community

The results of the study indicate that the average VO_2max of the Purbalingga Regency community in 2025 was 27.42 ml/kg/min, which falls into the poor category based on the norms established by the American College of Sports Medicine (2018). This finding is consistent with Giriwijoyo and Sidik (2019), who reported that the overall physical fitness level of the Indonesian population generally ranges from poor to moderate. The low level of physical fitness among the Purbalingga community may be influenced by several factors. According to Corbin et al. (2020), determinants of physical fitness include age, sex, genetics, physical activity patterns, nutrition, and lifestyle. In the Indonesian context, the decline in physical activity due to modern lifestyle changes has become a dominant factor contributing to reduced physical fitness levels (Nugroho & Ardiyanto, 2021).

Physical fitness data serve as a key indicator within the Sports Development Index (SDI) of Purbalingga Regency. As explained by Mutohir and Maksum (2020), physical fitness constitutes the first of the nine SDI criteria, highlighting its fundamental role in sports development. The low physical fitness level observed indicates the need for more intensive and structured community-based sports development programs. *Kementerian Pemuda dan Olahraga Republik Indonesia* (2019) emphasizes that improving community physical fitness not only enhances the SDI score but also contributes to increased productivity and reduced healthcare costs. Warburton and Bredin (2017) demonstrated that an increase of 1 MET (Metabolic Equivalent of Task) in cardiorespiratory fitness can reduce mortality risk by 13%.

2. Variation in Physical Fitness Levels Across Districts

The findings reveal significant variations in physical fitness levels among districts in Purbalingga Regency, with VO_2max values ranging from 20.70 ml/kg/min (Pengadegan District) to 32.50 ml/kg/min (Kaligondang District). The 11.80 ml/kg/min difference reflects disparities in characteristics and conditions influencing community fitness levels. Districts with the highest VO_2max values, such as Kaligondang and Bobotsari, are generally located in higher-altitude or hilly areas. This supports the findings of Nugroho and Ardiyanto (2021), who reported that communities residing in hilly regions tend to have higher physical activity levels and better fitness due to physically demanding daily activities. Conversely, districts with lower VO_2max values, such as Pengadegan, Karanganyar, and Purbalingga, are typically located in lowland areas with higher levels of urbanization. Booth et al. (2019) reported that urban populations tend to engage in lower levels of physical activity due to greater transportation convenience and more sedentary occupations. Differences in physical fitness levels across districts may also be influenced by the availability and accessibility of sports facilities, community sports development programs, and prevailing sports culture within each area (Kristiyanto, 2020). Districts with more adequate facilities and active development programs tend to demonstrate higher community fitness levels.

3. Implication for the Sport Development Index (SDI)

According to the result it have important implications for the Sports Development Index (SDI) of Purbalingga Regency. As the first criterion in the SDI framework, community physical fitness forms the foundation of comprehensive sports development (Mutohir & Maksum, 2020). The data indicate that all districts in Purbalingga Regency remain in the poor to very poor categories, highlighting the urgent need for serious intervention. Widiastuti (2019) emphasizes that improving community physical fitness must be conducted systematically and sustainably through multi-stakeholder involvement. Recommended programs include: (1) promotion of physical activity and sports awareness; (2) provision of accessible and adequate sports facilities; (3) regular organization of mass sports events; (4) community-based sports development; and (5) integration of physical activity into broader development programs. *Kementerian Pemuda dan Olahraga Republik Indonesia* (2019) recommends periodic measurement of community physical fitness as part of program evaluation and policy formulation. The data from this study can serve as a baseline for future monitoring and evaluation of sports development programs in Purbalingga Regency.

Improving the SDI through enhanced physical fitness will also positively influence other SDI criteria. Communities with higher awareness of physical fitness tend to participate more actively in sports activities, thereby increasing sports participation—the third SDI criterion (Kristiyanto, 2020).

4. Physical Fitness Level's Influencing Factors

The low physical fitness levels observed in Purbalingga Regency can be explained by several factors. First, the age range of participants (12–60 years) contributes to the findings. According to Powers and Howley (2018), VO_2max declines by approximately 1% per year after the age of 25 in physically inactive individuals. The heterogeneity of age within the sample may therefore contribute to the overall average VO_2max being categorized as poor. Second, lifestyle and physical activity patterns play a significant role. Modern sedentary lifestyles, increased motor vehicle usage, and reduced engagement in traditional physically demanding occupations contribute to decreased physical activity levels (Booth et al., 2019). Garber et al. (2011) reported that only 30% of adults meet the recommended minimum of 150 minutes of moderate-intensity physical activity per week.

Third, the availability and accessibility of sports facilities are influential factors. Although sports infrastructure represents the fifth criterion in the SDI, it significantly affects community physical fitness (Widiastuti, 2019). Limited access to facilities may discourage regular physical activity. Fourth, awareness and knowledge regarding the importance of physical fitness are crucial determinants. Hoeger and Hoeger (2019) state that knowledge of the benefits of physical activity is an important predictor of exercise behavior. Low awareness may therefore hinder efforts to improve community fitness.

5. Strategies to Improving Community's Physical Fitness

Based on the findings and discussion, comprehensive strategies are required to improve physical fitness in Purbalingga Regency. The American College of Sports Medicine (2018) recommends several approaches:

a. Community-Based Approach
   Establishing sports communities at district and village levels can enhance participation in physical activities. Community-based activities such as group aerobics, walking programs, cycling, and traditional sports can effectively promote physical fitness (Kristiyanto, 2020).
b. Improvement of Sports Infrastructure
   Providing accessible and free sports facilities such as sports fields, jogging tracks, and outdoor fitness equipment can encourage greater participation in physical activity (Widiastuti, 2019).
c. Education and Awareness Programs
   Mass education campaigns on the importance of physical fitness, proper exercise techniques, and the health benefits of physical activity should be implemented through various media and community initiatives (Hoeger & Hoeger, 2019).
d. Integration into Government Programs
   Physical activity should be integrated into broader governmental programs related to health, education, and community empowerment (Ministry of Youth and Sports, 2019).
e. Monitoring and Periodic Evaluation
   Regular measurement of community physical fitness is necessary to monitor progress and evaluate the effectiveness of implemented programs (Mutohir & Maksum, 2020).

Tomkinson et al. (2019) emphasize that improving community physical fitness requires long-term commitment and collaboration among government institutions, private sectors, sports organizations, and the community as a whole.

6. Interpretation within a Sport Development Framework

The variation in physical fitness levels across districts can be interpreted as an indicator of unequal sport ecosystem development. Contemporary public health and sport science literature emphasizes that physical fitness is shaped by multilevel determinants, including policy, infrastructure availability, cultural norms, and community engagement (Bauman et al., 2022; Sallis et al., 2018). Therefore, districts demonstrating relatively higher VO_2max values may benefit from more supportive environmental and social conditions that facilitate habitual physical activity. Conversely, districts in the

very poor category may require structural intervention, including improved facility accessibility, community-based sport activation, and policy-level reinforcement. From a sport development perspective, cardiorespiratory fitness serves not only as a health marker but also as a foundational indicator for sustainable sport participation and talent development (Tomkinson et al., 2019). The presence of substantial inter-district disparity suggests that policy responses should be differentiated, data-driven, and geographically targeted to reduce inequality in sport development outcomes.

5. CONCLUSIONS

Based on the research findings and discussion, it can be concluded that the physical fitness profile of community representatives in Purbalingga Regency within the 2025, as measured by VO_2max using the Multistage Fitness Test (MFT), showed an average value of 27.42 ml/kg/min, which falls into the poor category. The result from 18 districts there was 13 districts (72.22%) were classified in the poor category and 5 districts (27.78%) were in the very poor category. No district reached the moderate, good, or very good categories. There was variation in physical fitness levels among districts in Purbalingga Regency, with VO_2max values ranging from 20.70 ml/kg/min (Pengadegan) to 32.50 ml/kg/min (Kaligondang). The districts with the highest fitness levels were Kaligondang, Bobotsari, and Kalimanah, while those with the lowest levels were Pengadegan, Karanganyar, and Karangjambu. Districts located in higher-altitude areas tended to demonstrate better fitness levels compared to those in lowland areas.

Beyond descriptive reporting, this study contributes to regional sport development knowledge in several ways. First, it operationalizes physical fitness as a measurable and geographically comparable indicator within a structured sport development evaluation framework. Second, it provides district-level baseline evidence that enables policymakers to identify priority intervention areas rather than applying uniform development strategies. Third, the documented variation highlights the importance of spatially differentiated and data-driven sport policies that account for environmental and structural determinants of physical activity. By integrating cardiorespiratory fitness assessment into the regional Sport Development Index framework, this study strengthens the empirical foundation for evidence-based sport planning at the district level. The findings support the need for targeted community sport activation, improved infrastructure accessibility, and systematic monitoring of physical fitness as part of sustainable sport development governance. Consequently, this research contributes not only to local policy formulation in Purbalingga Regency but also offers a replicable model for other regions seeking to align physical fitness measurement with multidimensional sport development evaluation systems.

6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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