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## Determinants of Physical Activity Engagement in Riau Province, Indonesia: A Cross-Sectional Study Based on the Andersen Behavioral Model

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### Abstract

Increasing physical activity is one of the health behaviors that are the emphasis of Indonesia's national policy on non-communicable diseases (NCDs). But putting this policy into practice will be difficult, especially when it comes to encouraging physical activity as part of the NCD plan. This study examines factors influencing physical activity engagement in Riau Province, Indonesia, using the Andersen Behavioural Model. A cross-sectional study was conducted in Riau Province from February to September 2024, using a questionnaire distributed to communities across twelve districts. Participants aged 15-59, recruited through cluster random sampling. Data were collected on demographic, health system support, and individual/family factors related to physical activity. To find important factors, logistic regression and descriptive statistics were employed. The dependent variable in the Andersen Behavioural Model is participation in the necessary 150 minutes of physical exercise each week, while the independent variables are predisposing, enabling, and need factors. To determine whether individuals had met this criterion in the previous month, a binary logistic regression test was employed. About 31.9% of the 1,577 participants in the sample met the 150 minutes per week of physical exercise recommended by the World Health Organization (WHO). Among the important variables linked to physical exercise were age (aOR = 1.030, 95% CI 1.013 to 1.047), awareness about healthy living community movement program (aOR = 1.45, 95% CI 1.135 to 1.852), and motivation to engage in physical activity (aOR = 3.653, 95% CI 1.382 to 9.656). Lower engagement was observed in males (aOR = 0.730, 95% CI 0.553 to 0.962) and Muslims (aOR = 0.511, 95% CI 0.296 to 0.883). Enabling factors that also had a substantial impact on physical activity engagement included community empowerment for communal physical exercise (aOR = 1.634), the availability of public sports facilities (aOR = 1.333), and flexible work schedules (aOR = 1.869). BMI and routine health examinations were not found to be significantly related need variables. Providing accessible physical activity spaces, encouraging communities to participate in group activities, and increasing awareness of healthy living initiatives are all necessary to strengthen the national NCD policy. Nurses and healthcare professionals play a pivotal role in this process by acting as health educators, advocates, and role models for healthy living. They can provide targeted health education, support behavior change interventions, and collaborate with community stakeholders to promote and sustain active lifestyles. This study emphasizes how crucial it is to incorporate physical activity promotion into nursing practice and public health initiatives in order to counteract the rising prevalence of NCD, while emphasizing the need for nurses and healthcare professionals to incorporate evidence-based strategies into patient care, prioritize preventive measures, and advocate for policies that support healthier communities.

**Keywords:** Health Behavior, Health Policy, Health Promotion, Noncommunicable Diseases, Physical Activity

### Introduction

These days, a sedentary lifestyle can result in harmful habits that raise the risk of non-communicable diseases (NCDs) such obesity, diabetes, and cardiovascular disease (Cassidy et

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al., 2016). NCDs are caused by metabolic, environmental, and behavioral risk factors, and one of the main modifiable variables is physical inactivity (WHO, 2022).

However, due to low knowledge, global progress in increasing physical activity has been slow (WHO, 2019). Around the world, 25% of adults and 75% of teenagers (ages 11 to 17) do not meet the WHO's recommended level of physical exercise. In addition, the number of outpatient visits and work absenteeism increased relatively in 30% and 21% respectively due to physical inactivity in Indonesia (Ihyauddin et al, 2022) and the highest prevalence of behaviour non-communicable diseases risk factors was low physical activity, which was 87.8% (Pengpid, S., & Peltzer, 2019).

Furthermore, the level of physical inactivity is still increasing from 33.5% to 37.4% in Indonesia, especially in Riau province from 32.6% to 41.2% between 2018 to 2023. Although, the target of World Health Organization (WHO) to reduce behaviour risk factors is 10% in reduction of physical inactivity.

Riau Province has characteristics that set it apart from other provinces in Indonesia, particularly in terms of geography, culture, socioeconomics and infrastructure. Geographically, Riau is dominated by vast lowland areas with oil palm plantations and peat forests, which often pose challenges to the equitable development of public infrastructure. Culturally, the people of Riau strongly uphold Malay traditions, with social activities often focused on customs and religious events, which do not always support modern physical activity patterns. Socio-economically, most of the population works in the agrarian and plantation sectors, with time and energy drained to make ends meet, making exercise or structured physical activity a lower priority. In addition, access to health and sports facilities in rural areas is still limited compared to big cities, further widening the gap in opportunities to lead an active lifestyle. Because of these factors, Riau presents a special challenge that must be addressed in order to enhance community health via physical activity (Ihyauddin et al, 2022).

The implementation of physical exercise in the society is influenced by numerous factors. Therefore, multisectoral involvement from both the government and private sectors is necessary. Since the decentralization policy in Indonesia, in 2001, there has been a delegation of authority from central government to local government, including provincial and district governments. For instance, involving some departments (multisector), such as the department of health, education, transport, public works and housing, agriculture, and other departments are needed to be collaboration for improving implementation of physical activity (Karo Karo et al., 2024).

In addition, the decentralized governance system in Indonesia places significant responsibility on provincial governments like Riau to adapt national health policies to local contexts. However, physical activity is not merely the responsibility of the government to provide the public facilities, but it is also people's behaviour and lifestyle to be active. It is advised that individuals engage in moderate-intensity physical activity for at least half an hour almost every day, as physical inactivity accounts for 9% of deaths worldwide. Once a month, Ethiopia observes a "car-free day" (Haileamlak, 2019), whereas China encourages walking, bicycling, and the creation of green parks and environments through its National Fitness Plan (NFP) (Menhas et al, 2021).

The execution of physical exercise programs in Indonesia, particularly at the provincial level like Riau, faces unique challenges compared to other countries such as Ethiopia or China. While national policies in Indonesia support physical activity promotion, provincial-level

implementation often encounters local disparities such as limited infrastructure, low public awareness, and cultural practices that prioritize traditional activities over structured physical exercises. In Riau, for instance, despite efforts to provide sports facilities, challenges like vast geographical areas and limited access to public spaces often hinder progress. Additionally, socioeconomic factors influence people's priorities, making it difficult to balance work with recreational exercise. This makes the context of Riau unique, as policies and intervention strategies must be tailored to local characteristics, including culture and available infrastructure. Riau's experience, which highlights the importance of local factors in enhancing physical activity participation, further justifies the contribution of this study in adapting the Andersen Behavioral Model to understand the specific dynamics influencing community engagement in physical activity in this province (Meilyawati, 2025).

This study makes a substantial contribution to the body of literature by modifying the Andersen Behavior Model, a reputable paradigm in health research, for the Indonesian context of physical exercise, specifically in the unique setting of Riau Province. While the model has been applied in various health-related contexts, its use in understanding physical activity, particularly within specific regional environments, remains limited. By exploring how individual factors (such as cultural norms and family dynamics), environmental aspects (like infrastructure and accessibility), and systemic influences (including policies and socioeconomic pressures) interact to shape physical activity behaviors, this research addresses a critical gap. Unlike most studies in Indonesia that rely on national-level data, this study highlights the importance of regional diversity, providing a localized understanding that can inform targeted interventions. It offers a novel application of the Andersen Behaviour Model, demonstrating its utility in capturing the interplay of multifaceted determinants of health behaviors in a provincial context, thus enriching the global and local discourse on health promotion and physical activity engagement (Nazari et al, 2021).

Three levels of physical activity are distinguished: low, moderate, and heavy/vigorous (Dhuli, Kristjana, 2022). Light physical activity, such as leisurely walking or household chores, uses less than 3 METs/Metabolic Equivalent Tasks (under 3.5 kcal/minute). Moderate physical activity, like fast walking or dancing, uses 3-6 METs (3.5-7 kcal/minute). Finally, vigorous physical activity, such as running or swimming, uses over 6 METs (more than 7 kcal/minute). To lower all-cause mortality, 150 minutes of moderate physical activity or 75 minutes of vigorous physical exercise each week is advised (Lopez et al., 2020; Shiroma et al, 2014).

Even though studies on physical activity in Indonesia have been conducted at the national level, much more has to be discovered about the specific factors impacting participation in physical activity at the provincial level, particularly in Riau Province. Another unique aspect of this study is the adaptation of Andersen's Behavioral Model to assess the variables influencing physical activity participation in Riau, a setting that has not received enough attention in the literature up until this point. The main novelty of this study lies in the application of a model that integrates individual, environmental, and systemic factors to understand health behavior at the provincial level, which accounts for local variations, such as culture, infrastructure, and socioeconomic conditions unique to Riau. Using this model, this study provides a new perspective on how these factors interact with each other and influence an individual's decision to participate in physical activity. The results from this study not only fill existing research gaps, but also provide useful insights for policymakers and health professionals in designing more relevant and effective interventions to increase physical activity in Riau Province.

## **Conceptual or Theoretical Framework: Andersen Behavioral Model**

This study applies the Andersen Behavioral Model (ABM) as the conceptual framework to analyze the factors influencing participation in physical activity. The ABM, originally developed to understand the use of health services, categorizes influencing factors into three domains: predisposing, enabling, and need factors (Andersen, 1995; Kim & Lee, 2016).

- Predisposing factors are personal traits that exist prior to the onset of health behaviors, such as age, gender, marital status, motivation, and knowledge about physical activity.
- Enabling factors refer to logistical and structural conditions that facilitate or hinder the behavior, such as availability of sports facilities, working hours, health insurance, and community participation.
- Need factors relate to the individual's perceived or evaluated health status, such as BMI and frequency of medical check-ups.

In this study, the ABM is adapted to understand how these multidimensional influences interact to determine whether individuals meet the WHO's recommended 150 minutes of moderate-intensity physical activity per week. This theoretical framework allows the integration of individual, environmental, and systemic aspects, offering a comprehensive view of behavioral engagement in a provincial context like Riau.

## **Methods**

### **Study Design**

The design used for this cross-sectional study was cluster random sampling, where districts within Riau Province were selected as clusters. Within each district, participants were chosen using simple random sampling, ensuring a representative sample of the population. All individuals within the selected clusters were not automatically included; instead, random selection was conducted to ensure diversity and reduce bias. Eligibility criteria for participants were established to ensure that only those meeting the study's inclusion criteria were selected. This sampling method provided a more accurate representation of the population across different districts, improving the generalizability of the findings. The Andersen Behavioral Model was used to evaluate participation in government-recommended health interventions aimed at risk behavior reduction, with openness in the sampling procedure improving the accuracy of the findings.

### **Sample/Participants**

The Design Effect was used to determine the sample size since the cluster random sampling method was applied to 12 districts in the province of Riau. To take into consideration the similarities between respondents in the same cluster, the Design Effect was taken into consideration. The projected total sample size needed was 1,437 using a design effect factor of 1.55, a type I error of 1.96, a margin of error of 3%, and an assumed behavior proportion of 31.9%. The overall sample size required, taking into account a 10% dropout rate, was calculated to be 1,577 people. To ensure that districts with bigger populations contributed more participants than those with smaller populations, the sample size per district was modified based on each district's population size. District-level population sizes were considered to ensure proportional representation. This approach also ensured geographical representation by selecting districts

from various regions within Riau, including urban, rural, and coastal areas, to capture the variation in physical activity levels and health behaviors across different locations. Furthermore, socioeconomic diversity was considered by including districts with varying economic conditions, ranging from more affluent urban areas to less-developed rural districts. This socioeconomic diversity provided a broader view of the factors influencing participation in physical activity. Participants in the study had to have been residents of Riau Province for at least six months and ranged in age from 15 to 59. The questionnaire had to be filled out in Indonesian, and there were no major obstacles, including trouble remembering previous information. Within each cluster, participants were selected using systematic random sampling to reduce selection bias and ensure representative coverage across various demographic groups.

### **Instrument**

As required by the 2017 Presidential Instruction, the questionnaire was created in Indonesian and was based on the Healthy Living Community Movement (Germas). It followed the WHO's recommendation of at least 150 minutes of physical activity each week. To assess content validity, the Item-Objective Congruence (IOC) method was applied, with scores of 0.5 or higher considered acceptable. To ensure cultural appropriateness, the questionnaire was pilot-tested with 30 respondents in Riau Province. This pre-test helped assess content validity and adapt the instrument by incorporating local language and culturally relevant examples of physical activity. Participants' frequency and duration of physical exercise during the preceding week were evaluated by the questionnaire. People who reported exercising for 150 minutes or more were considered to be meeting the recommended guidelines, while those who reported exercising for less time were considered to be falling short of the benchmark. The questionnaire also took into account cultural and regional factors to ensure its validity and relevance for the target population. Local terms for physical activities were incorporated to reflect the regional context of Riau, considering variations in activity types and cultural preferences in the province. Additionally, examples of physical activity were adapted to reflect common practices in Riau, such as community gatherings or traditional physical labor, to make the questionnaire more relatable. These adjustments helped ensure that the questions were not only understandable but also culturally appropriate, improving the accuracy of responses and enhancing the cultural sensitivity of the study design.

### **Data Collection**

The data collection was conducted between February and September 2024 by a team of trained field enumerators and supervised public health professionals. Enumerators were assigned in each district to facilitate both online and paper-based questionnaire distribution. In rural and less digitally connected areas, data were gathered through collaboration with village health workers and community leaders. Each session lasted approximately 15–20 minutes per respondent. Data collection faced several logistical challenges, particularly in remote areas with limited internet access, which were mitigated through mobile data collection using tablets.

Participants were gathered for the study from 12 districts in Indonesia's Riau Province. It was carried out utilizing an online self-reported questionnaire between February and September of 2024. It gathered elements like:

- 1. Demographic Factors:** sex, age, marital status, religion, education, occupation, income, BMI, and district of residence.
- 2. Enabling Factors:** The standard of public health services, the availability of facilities,

medical personnel, health insurance, and health policies that encourage physical activity.

**3. Predisposing Factors:** understanding of physical exercise, encouragement of healthy habits, and support from family.

**4. External Factors:** environmental factors including government or private support for public facilities, involvement in health-related activities, and health promotion. Participation in the above-mentioned suggested physical exercise was the main result. Binary responses were collected, indicating whether or not the individuals had reached the standard in the previous month. To address potential bias due to the online format, the questionnaire was distributed in accessible locations such as community centers and through village health workers to reach less digitally connected populations.

**5. Missing Data Handling:** Incomplete responses were addressed using multiple imputation techniques to minimize bias, ensuring that missing data were estimated based on available information. This process was particularly important due to the large sample size across multiple districts. Non-respondents or participants with irretrievable data were excluded from specific analyses to maintain the integrity of the results. The imputation process helped to preserve statistical power and reduce the risk of bias that could distort findings, especially in a study of this scale where missing data could otherwise impact the representativeness and generalizability of the sample.

### **Data Analysis**

A comprehensive statistical analysis was conducted using SPSS version 28. Descriptive statistics were generated for all variables, and normality assessments were applied to continuous data. To examine initial relationships between predictor variables and physical activity levels, bivariate analyses were carried out logistic regression was used for categorical variables, while independent t-tests or their nonparametric counterparts were applied to continuous variables. Variables with p-values less than 0.2, as well as those deemed conceptually relevant, were included in a binary logistic regression to identify key predictors. The analysis reported adjusted odds ratios along with 95% confidence intervals. Before constructing the final model, preliminary diagnostics were conducted to ensure methodological robustness. Correlation tests assessed associations between continuous variables, and the Variance Inflation Factor (VIF) was used to identify and address multicollinearity. Variables with high VIF values were excluded to maintain the accuracy and reliability of the model.

### **Ethical Consideration**

After being informed of the study's objectives, benefits, and confidentiality protocols, including de-identification, each participant provided their informed consent. At any moment, participants are free to go. The Riau province government provided a local recommendation letter (number 503/DPMPPTSP/NON IZIN-RISSET/62694 on February 7, 2024) prior to data collection, and the University of Pekanbaru, Indonesia's ethics committee approved the study (approval number 016/KEPK/UHTP/II/2024).

### **Results**

This study had 1,577 participants in all. The majority of participants were drawn from Pekanbaru city, the capital city of Riau province, accounting for 22% of total participants, while the remaining of respondents were recruited from other districts. Regarding the demography, the average age of participants was 36.5 years old, with the largest age group being 35 to 39 years

old (18.3%). The sample was predominantly female (59.73%), with 52% holding a bachelor's degree. In terms of religion, 95% of participants identified as Muslim. Furthermore, 73.43% were in a marital position. Nevertheless, 1,047 individuals, or 66.4% of the population, did not participate in the recommended 150 minutes of moderate exercise each week. Table 1 provides more information.

Variables		Frequency	%
Sex	Female	942	59.73
	Male	635	40.27
Age	15-19	174	11.00
	20-24	105	6.70
	25-29	126	8.00
	30-34	211	13.40
	35-39	289	18.30
	40-44	265	16.80
	45-49	208	13.20
	50-54	126	8.00
Marital status	55-59	73	4.60
	Married	1158	73.43
	Single	376	23.84
Religion	Divorced/widowed	43	2.73
	Others	78	4.95
	Islam	1499	95.05
Education	No formal education	4	0.25
	Primary school	56	3.55
	Junior High School	97	6.15
	Senior High School	371	23.53
	Diploma/Bachelor	820	52.00
	Postgraduate	229	14.52
Working hours	Fix Hours Working	910	57.70
	Non-Fix Hours Working	207	13.13
	Student	220	13.95
	Unemployed	240	15.22
Income per month (Provincial Minimum Wage)	< Rp. 3,300,000	734	46.54
	≥ Rp. 3,300,000	843	53.46
BMI Range	Normal	133	8.43
	Underweight	443	28.09
	Overweight	315	19.97

Variables		Frequency	%
	Obesities 1	482	30.56
	Obesities 2	204	12.94
Have you ever undergone routine medical examinations?	Never	325	20.61
	Yes, once a year	1039	65.88
	Yes, once 3 years	138	8.75
	Yes, once 5 years	75	4.76
Have you ever had trouble getting access to medical care?	Never	1087	68.93
	Yes, I have	490	31.07
Do you believe that the medical facilities in your neighborhood are adequate?	Incomplete	585	37.10
	Complete	992	62.90
Are you covered by any government health insurance?	No	203	12.87
	Yes	1374	87.13
As far as you are aware, are there any national or municipal laws that carry out the Healthy Living Community Movement?	No	730	46.29
	Yes	847	53.71
Did you know that regular physical activity, or exercise, can help prevent illness and enhance health?	No	15	0.95
	Yes	1562	99.05
Do you have the drive to work out or do physical activities on a regular basis?	No	54	3.42
	Yes	1523	96.58
Do you have the drive to consume wholesome, nourishing food?	No	20	1.27
	Yes	1557	98.73
Are you motivated to eat healthy, nutritious food?	No	42	2.66
	Yes	1535	97.34
Are you motivated to abstain from alcohol?	No	18	1.14
	Yes	1559	98.86
Are you an alcoholic?	No drinking alcohol	1557	98.73
	Yes	20	1.27
Are you a cigarette smoker?	Not smoking	1397	88.59
	Yes	180	11.41
Do you consume all five types of fruits and vegetables in a single day in accordance with health standards?	Not Standard	1424	90.30
	standard	153	9.70
Physical activity ( $\geq 150$ minutes a week for standard)	Not Standard	1047	66.40
	standard	530	33.60
Are you familiar with the physical activity-related Germas program?	No	1053	66.77
	Yes	524	33.23
Do you take part in or are you involved in local sporting activities?	No	976	61.89
	Yes	601	38.11
Does your school or place of employment have any sports facilities?	No	686	43.50
	Yes	891	56.50

Variables		Frequency	%
Do you commute to work or school more frequently by taking public transit like buses or trains than by driving your own car, hailing a cab, or using the internet?	No	1210	76.73
	Yes	367	23.27
Do you prefer walking or cycling to driving your own car to work or school?	No	1021	64.74
	Yes	556	35.26
Does your neighborhood have public spaces for sports or physical activities, such playgrounds?	No	789	50.03
	Yes	788	49.97
Have you ever heard or seen any advertisements in your neighborhood on maintaining a clean and healthy lifestyle?	Never	509	32.28
	Yes, I have	1068	67.72
Have you ever heard or seen a social media or application marketing for a clean and healthy lifestyle?	Never	372	23.59
	Yes, I have	1205	76.41
Has your neighborhood ever hosted health education events that you participated in?	Never	748	47.43
	Yes, I have	829	52.57

Table 1. Percentage of Participants Characteristics

The elements influencing physical activity can be separated into three groups according to the Anderson Behavior Model: need factors, enabling factors, and predisposing factors. These categories help to explain how various socio-demographic characteristics, external resources, and health needs contribute to physical activity behaviour.

Predisposing factors refer to personal characteristics and motivations that influence individuals' likelihood to engage in physical activity. In this study, demographic factors play a key role. In addition, we also noted a high proportion of participants demonstrated motivation for healthy living, with 96.58% expressing motivation to exercise regularly, 98.73% motivated to eat nutritious food, and 97.34% motivated to avoid smoking. Moreover, 98.86% were motivated to abstain from alcohol.

Enabling factors are outside resources and opportunities that can help or hurt people's capacity to exercise. Income was one of these factors in this study, since 53.46% of individuals made more than the Rp 3,300,000 provincial minimum wage. Employment also had an impact, as most participants (57.70%) were employed in fixed-hour jobs, while smaller groups were students (13.95%) or unemployed (15.22%). Access to healthcare played a role, as 87.13% of participants had government health insurance, but 31.07% still reported difficulties in accessing health services, which may have limited their engagement in physical activity. Another important enabling factor was the availability of health services; 62.90% of participants said that their local health facilities were fully operational. However, just over half (56.50%) had access to sports facilities at work or school, while just 49.97% had access to public sports or physical activity facilities in their neighborhood. With just 38.11% of the population taking part in community sports, sports participation was comparatively low. Furthermore, transportation patterns showed that 23.27% of individuals took public transportation to work or school, compared to just 35.26% who walked or rode a bike.

Need factors encompass participants' perceived health needs and their awareness of health

interventions. Body Mass Index (BMI) results showed that most participants were either overweight (19.97%), obese (30.56% at Obesity 1, and 12.94% at Obesity 2), or underweight (28.09%), with only 8.43% falling within the normal range. Regular medical check-ups were somewhat common, as 65.88% of participants reported undergoing yearly check-ups, though 20.61% had never had one, highlighting potential gaps in health monitoring. Public health initiatives may not have reached all parts of the population, as evidenced by the mixed awareness of health policies, with 53.71% of respondents knowing of Germas and 46.29% not. Despite this, 99.05% of participants knew that regular exercise promotes health and prevents disease, demonstrating a high degree of awareness of the advantages of physical activity. Furthermore, 52.57% of participants reported having participated in neighborhood health education events, indicating a modest degree of involvement in community health programs.

Numerous significant and non-significant relationships between different parameters and the likelihood of participating in recommended physical exercise are shown by the logistic regression analysis's findings. Table 2 provides more information.

		B	Sig.	Exp(B)	95% C.I.for EXP(B)	
					Lower	Upper
Sex	Female (ref)					
	Male	-0.315	0.025	0.730	0.553	0.962
Age	Age (year)	0.029	0.000	1.030	1.013	1.047
Marital status	Married (ref)		0.164			
	Single	0.406	0.070	1.501	0.967	2.330
	Divorced/widowed	0.234	0.501	1.264	0.638	2.505
Religion	Others (ref)					
	Muslim	-0.671	0.016	0.511	0.296	0.883
District	Pekanbaru (ref)		0.371			
	Dumai	-0.064	0.830	0.938	0.524	1.680
	Kampar	0.335	0.136	1.398	0.900	2.173
	Pelalawan	0.174	0.529	1.190	0.692	2.046
	Siak	0.326	0.191	1.385	0.850	2.257
	Kuansing	-0.092	0.758	0.912	0.508	1.637

		B	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
	Bengkalis	0.417	0.078	1.517	0.955	2.412
	Kepulauan Meranti	0.307	0.374	1.359	0.691	2.672
	Indragiri Hulu	0.455	0.074	1.576	0.957	2.597
	Indragiri Hilir	-0.075	0.753	0.928	0.582	1.478
	Rokan Hulu	0.068	0.780	1.071	0.663	1.728
	Rokan Hilir	-0.143	0.565	0.866	0.531	1.412
Education	No formal education (ref)		0.177			
	Primary School	20.236	0.999	614525751.128	0.000	
	Junior High School	20.645	0.999	924823547.824	0.000	
	Senior High School	20.180	0.999	580595827.643	0.000	
	Diploma/Bachelor	20.571	0.999	858588106.107	0.000	
	Postgraduate	20.335	0.999	678426808.523	0.000	
Encouragement to regularly work out or do physical activities	No (ref)					
	Yes	1.296	0.009	3.653	1.382	9.656
Encouragement to consume wholesome and nourishing food	No (ref)					
	Yes	0.366	0.634	1.442	0.320	6.494
Encouragement to abstain from smoking	No (ref)					
	Yes	0.126	0.787	1.134	0.455	2.826
Reasons to abstain from alcohol following	No (ref)					
	Yes	-0.974	0.143	0.378	0.103	1.388
	Not Standard (ref)					

		B	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
health guidelines when consuming fruits and veggies. Five varieties in a single day	Standard	-0.022	0.915	0.978	0.657	1.457
Taking a cigarette	Not smoking (ref)					
	Yes	-0.362	0.103	0.696	0.450	1.076
Consuming alcoholic beverages	No drinking alcohol (ref)					
	Yes	-1.150	0.063	0.317	0.094	1.063
Understanding how physical activity is tied to Germas program	No (ref)					
	Yes	0.371	0.003	1.450	1.135	1.852
Working Type	Fix hours working (ref)		0.125			
	Non fix/Flexible hours	-0.040	0.838	0.961	0.654	1.412
	Student	0.626	0.036	1.869	1.042	3.354
	Unemployed	0.305	0.186	1.356	0.864	2.129
Monthly income	< Rp. 3.300.000 (ref)					
	≥ Rp. 3.300.000	-0.053	0.705	0.949	0.722	1.246
Encouragement from family members to engage in exercise or physical activity	(Never. Sometimes. Often)	0.025	0.832	1.026	0.810	1.298
The standard of primary healthcare or	(Very bad. Not Good. Quite good. Good. Very good)	-0.120	0.251	0.887	0.723	1.089

		B	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
public health center services						
Accessing health services might be challenging.	Never (ref)					
	Yes. I have	-0.174	0.219	0.840	0.636	1.109
The sufficiency of medical facilities in your neighborhood	Incomplete (ref)					
	Complete	-0.297	0.034	0.743	0.565	0.978
The caliber of medical personnel during therapy	(Very bad. Not satisfied. Quite satisfied. Satisfied. Very satisfied)	0.099	0.337	1.104	0.902	1.351
Having government-provided health insurance	No (ref)					
	Yes	-0.175	0.339	0.840	0.587	1.201
Playgrounds and other public sports and physical activity facilities are located near residential areas.	No (ref)					
	Yes	0.287	0.019	1.333	1.048	1.695
Walking or riding a bike to work or school is more common than driving a personal vehicle.	No (ref)					
	Yes	-0.145	0.271	0.865	0.669	1.120
utilizing buses,	No (ref)					

		B	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
trains, and other forms of mass public transit. to commute more frequently to work or school than to drive your own car. cab. or transportation over the internet	Yes	-0.184	0.213	0.832	0.623	1.111
	No (ref)					
Sports facilities in the office or school	Yes	-0.085	0.498	0.919	0.719	1.174
	No (ref)					
Participated in or remained active in neighborhood sports activities	Yes	0.491	0.000	1.634	1.271	2.101
	No (ref)					
Having heard or watched a commercial promoting healthy and clean living in a neighborhood	Yes. I have	0.169	0.292	1.185	0.864	1.624
	Never (ref)					
Having heard or seen a clean and healthy lifestyle commercial on social media or applications	Yes. I have	0.283	0.111	1.328	0.937	1.882
	Never (ref)					
BMI	Normal (ref)		0.366			
	Underweight	0.310	0.220	1.364	0.831	2.239
	Overweight	0.390	0.15	1.477	0.867	2.515

		B	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
			1			
	Obesities 1	0.201	0.453	1.222	0.724	2.064
	Obesities 2	0.068	0.817	1.070	0.604	1.895
The routine medical examination	Never (ref)		0.653			
	Yes. once a year	0.191	0.303	1.211	0.841	1.742
	Yes. once 3 years	0.026	0.921	1.026	0.620	1.697
	Yes. once 5 years	0.052	0.869	1.054	0.566	1.960
Participating in health education events in the neighborhood	Never (ref)					
	Yes. I have	-0.140	0.284	0.869	0.673	1.123
Being aware that frequent physical activity, or exercise, can help prevent illness and enhance health	No (ref)					
	Yes	-0.314	0.600	0.731	0.227	2.357
People's awareness of whether local or national governments have policies in place to promote the Healthy Living Community Movement	No (ref)					
	Yes	0.032	0.811	1.032	0.796	1.339
The kind of medical examination	(Never health check-up. Basic health check-up. Comprehensive health check-up)	0.088	0.472	1.092	0.859	1.388

Table 2. Logistic Regression Model of Related to Physical Activity

Males are 27 percent less likely than females to be physically active, making sex a key determinant. Age and physical activity are positively correlated, with an increase in age being associated with a 3% higher likelihood of physical activity. One trend of importance is marital status. Although the odds of being physically active are 50% higher for single people than for married people, this difference is not statistically significant. However, there is no discernible difference in physical activity levels between being divorced or bereaved.

There is a correlation between religion and physical exercise, with Muslims being 49% less likely to participate than those of other religions. In terms of geographic considerations, living in different districts has varying effects; nevertheless, none of them are statistically significant, with the exception of Bengkalis and Indragiri Hulu, which may indicate a higher possibility of physical activity than living in Pekanbaru.

Regular physical activity motivation is a powerful and important predictor. Motivation increases the likelihood of physical exercise by more than 3.5 times. However, motivation to avoid smoking, consuming alcohol, and eating a diet rich in nutrients do not significantly predict physical activity. Interestingly, alcohol consumption is associated with a 68% lower likelihood of physical activity, but this difference is not statistically significant.

Those who are aware of the Healthy Living Community Movement (Germas) are 45% more likely to be physically active, making knowledge of the program a substantial enabler. People who have access to public sports facilities or other physical activity spaces, including playgrounds, are much more likely to engage in physical activity. Furthermore, there is a considerable increase in the likelihood of physical activity among individuals who play community sports.

Physical activity is significantly correlated with some health service-related criteria, such as the quality of healthcare facilities; fully equipped facilities lower the likelihood of engaging in physical exercise by 26%. Finally, BMI, income, and having health insurance do not appear to significantly affect engagement in physical activity, nor does having regular medical check-ups. The presence of sports facilities at the workplace or school is also not a significant predictor of physical activity levels.

## **Discussion**

There are many factors in implementing the standard of physical activity among people. Based on Anderson's Behaviour Model (Kim, H.-K., & Lee, 2016), there are three factors of health services utilization, including predisposing factors, enabling factors, and needs factors. Regarding carrying out physical activity, some factors from Anderson's Behaviour Model can affect people's engagement to do physical activity.

### **1. Predisposing Factors**

Men and women engage in physical activity in different ways, according to a number of studies. This survey also revealed that men were 27% less likely than women to be physically active to the recommended level. According to a different study, women are more likely than males to engage in physical activity for fitness, health, and appearance-related reasons (Su et al., 2022). This result implies that gender-specific approaches, such as tailored campaigns targeting men's unique barriers to physical activity, may help bridge this gap.

Many research suggestions advocate for physical exercise among those who are already sedentary. Specifically, persons aged 18 to 65 should get at least 20 minutes of vigorous-intensity physical activity three days a week or at least 30 minutes of moderate-intensity aerobic physical activity five days a week (Seo, Yoo Bin, Yun Hwan Oh, 2022). This is linked to a reduction of at least 30% in the risk of illness, death, and loss of functional independence when compared to an inactive lifestyle (McPhee et al, 2016).

This study found that older participants had a 3% higher engaged standard of physical activity. As evidenced by past studies showing that today's children are less physically active than previous generations, older individuals understood the value of sports and physical activity in lowering the effects of aging and creating a social support network (Ihle, Andreas, 2022). People assumed that commuting to work, particularly among youth persons, was considered as an exercise, leading them to believe that additional daily exercise is unnecessary. On the other hand, elderly people tended to have fewer routine activities and more spare time, allowing them to engage in regular exercise.

Furthermore, marital status also influences physical activity. According to one of the studies, the highest prevalence of physical activity engagement was found among individuals who were divorced/widowed/separated (Jee, Y., & Cho, 2019). The reduced activity among married individuals may be attributed to family obligations and time constraints, which should be addressed by designing family-friendly physical activity initiatives or community-based interventions. The study's conclusion that singles with marital status participate in activities 50% more than married people, however, appears to run counter to this finding. However, there is no discernible difference in the amount of physical activity between divorced or widowed individuals and those who are married. In line with findings from (Hull et al, 2010) study, married people's levels of physical activity did not differ significantly from those of unmarried people. Those who are single are more likely than those who are married to be physically active because they have greater time flexibility and fewer family obligations that prevent them from exercising. Without the demands of household responsibilities or childcare, single individuals can more easily set aside time to participate in physical activities (Peng et al, 2023). In addition, they may be more inclined to pursue social or recreational activities that involve physical activity as a form of entertainment or relaxation. This contradicts some previous studies which suggest that marriage can increase social and economic stability, which should motivate individuals to be more active. However, in this context, this study suggests that family obligations, such as childcare or managing a household, further limit time for physical activity in married individuals.

Religion is another demographic. Compared to persons of other religions, Muslims tended to reduce their carrying, according to this survey. While Muslim prayer involves physical movements akin to stretching or isometric exercises, this perception may lead some to substitute structured physical activity with prayer. Educational programs highlighting the complementary nature of structured physical activity to religious practices could mitigate this issue. Outside of its religious significance, some Muslims think that the movements made during prayer provide health benefits for the respiratory, digestive, neurological, hormonal, and circulatory systems (İmamoğlu, 2016). This is because 40 *rakats* (40 repetitions) of prayer at least five times a day. These motions can be categorized as an isometric contraction and stretching exercise.

Additionally, individuals' knowledge and motivation contribute significantly to reaching the suggested amount of time spent exercising. Awareness of Germas program was associated with a 45% increase in physical activity levels. This suggests that government initiatives to promote

public awareness have been highly effective. Study by (Orrow et al., 2012) discovered that primary care interventions that promoted physical activity among sedentary individuals greatly raised their activity levels over a 12-month period. Up to 283 minutes of weekly physical activity was achieved with just 2.6 extra minutes of physical activity education each session, demonstrating the efficacy of such tactics.

Furthermore, a person's desire to participate in physical exercise during their free time was found to be strongly predicted by their level of self-determined motivation (Pasi, Heidi, 2021). Individuals with higher motivation levels were more likely to meet recommended physical activity standards. Health behavior interventions, particularly those based on the Health Belief Model, may be effective in enhancing self-motivation and should be considered by policymakers and healthcare professionals.

Conversely, other factors such as education level, district of residence, motivation to consume fruits and vegetables, smoking status, and alcohol consumption were not substantially linked to participation in physical exercise. Previous studies have similarly reported no significant link between education and physical exercise in men. These studies noted that men with lower educational attainment often have more physically demanding jobs, resulting in comparable total activity levels to those of more educated men. Conversely, women with less education are more likely to engage in sedentary jobs, which results in comparable levels of physical activity within educational groups.

In Riau Province, residents of different districts and those residing in Pekanbaru, the provincial capital, did not significantly differ in their levels of physical activity engagement in Riau Province. Nonetheless, residents of Bengkalis and Indragiri Hulu demonstrated a virtually substantial 50% increased propensity for physical exercise. The rural character of these places, which provides easier access to open spaces and natural settings, could be the reason for this. Indragiri Hulu has a lake that serves as a common outdoor area, whereas Bengkalis is made up of three sizable islands and contains coastline areas. On the other hand, Pekanbaru is a crowded city with little green space, a lot of traffic, and contemporary amenities like food delivery services, ride-hailing applications, and elevators that can limit possibilities for physical activity.

This result is in contrast to earlier studies that found rural dwellers were less likely to engage in the required amounts of physical activity. Significant disparities were noted based on income and urban versus rural settings, especially among individuals who used local streets, parks, or shopping malls for physical activity. Additionally, this study's findings regarding motivational factors also diverge from earlier research, such as that by (Moreno-Gómez et al, 2012), which found associations between non-smoking behavior, healthy diets, and increased physical activity engagement.

## **2. Enabling Factors**

In this study, it was discovered that a number of enabling factors pertaining to personal resources, accessible facilities, and environmental support influenced physical activity involvement. One important aspect that influences how much free time a person has for physical activity is the type of their career, particularly the amount of hours they work. Students with flexible work schedules were 87% more likely to be physically active than those with set schedules, despite the fact that there was no discernible correlation between the two. This may be due to greater schedule flexibility or better access to sports facilities within educational institutions. According to (Rhodes, Ryan E., 2011), regardless of their sedentary habits, people

who work longer hours frequently feel better capable of exercising if they have flexible or extended spare time. Better time management and an easier integration of physical exercise are made possible by this flexibility.

Supportive infrastructure provided by both government and private entities also plays a vital role in encouraging physical activity. The possibility of involvement is greatly increased when public sports or recreational facilities are located in residential communities. It was discovered that those who lived in places with access to these amenities were 33% more likely to be physically active. This highlights the importance of accessible public spaces in promoting active lifestyles. Additionally, the study found that women aged 25–34 and 45–55 were significantly more likely to utilize local facilities than those aged 35–44. In these age groups, higher physical activity levels were strongly linked to the use of nearby facilities.

Furthermore, mentor assistance, free or subsidized memberships, and community involvement of any size or ability have all had a significant effect on people's physical exercise levels as well as their mental and physical health (Garner-Purkis et al, 2020). Additionally, the lifestyles of their families have improved as a result of these beneficial adjustments. This is further corroborated by the study's findings, which show that participation in neighborhood sports is substantially linked to a 63% increase in reaching the suggested level of physical exercise engagement.

According to this study, those who resided in places with a lot of healthcare services had a 26% lower likelihood of being physically active. This conclusion suggests that people may rely more on healthcare services than on exercise because there are ample healthcare facilities, suggesting a preference for curative care over preventive measures like exercise. This could suggest that individuals feel safer and more protected in terms of their health because they know there are medical facilities ready to help when needed, so they are less motivated to participate in physical activities that can prevent disease. This finding contradicts other studies that show that the presence of good health facilities actually encourages individuals to maintain health proactively, including through physical activity. However, it is possible that a sense of dependence on medical services may reduce awareness and desire to maintain health through active prevention, such as regular exercise (Bantham et al, 2021).

Exercise has been demonstrated to be a successful strategy for enhancing health, both in terms of prevention and treatment (Börjesson, 2013). It has been shown that Physical Activity Prescription (PAP) increases activity levels, enhances quality of life, and improves disease risk factors. Exercise should therefore be an essential part of care in comprehensive medical facilities and services.

It was discovered that a number of additional enabling characteristics had no significant correlation with achieving the suggested levels of physical activity. These included income, family support, access to healthcare services, and possession of health insurance. One possible explanation for the lack of association with health insurance is that individuals may feel secure knowing that, should they become ill, their insurance will cover the necessary medical expenses reducing the perceived urgency to engage in preventive behaviors like physical activity.

Similarly, income level did not show a significant influence on physical activity participation, suggesting that economic status may not be a determining factor for engaging in physical activity in this context. This indicates that, in Riau Province, physical activity levels appear to be relatively independent of personal income. Furthermore, a greater proportion of residents in the

province earn above the Provincial Minimum Wage compared to those earning below it.

### **3. Need Factors**

Medical evaluation or personal opinion affect these factors. Physical activity engagement was not significantly impacted by a number of needs factors found in this study, such as BMI, frequent medical check-ups, involvement in health-related activities, awareness of government policies supporting the healthy living community movement, the type of health check-up, and knowledge that physical activity can help prevent diseases.

This study highlights the critical role of nurses and healthcare professionals in promoting physical activity. As educators, they can raise awareness about the benefits of regular exercise. As advocates, they can push for better infrastructure and policies supporting physical activity. Lastly, as role models, they can inspire behavior change by integrating physical activity into their professional and personal lives. These roles are crucial for addressing the growing burden of NCDs in Riau Province and beyond. Strengthening collaboration between healthcare providers and policymakers, along with targeted public health campaigns, could ensure more effective and sustainable promotion of physical activity.

### **Conclusion**

This study used the Andersen Behavioral Model as a framework and discovered that two key categories—enabling and predisposing factors—significantly influenced physical activity participation in Riau Province, Indonesia. A person's age, sex, religion, motivation, and awareness of the need of physical activity were all risk variables. The availability of public spaces that promote physical activity, participation in community sports, student status, and access to high-quality healthcare services were all positively connected with increased physical activity. The need criteria, on the other hand, had no appreciable impact on physical activity participation.

A critical takeaway is that physical activity serves both preventive and therapeutic roles in improving health outcomes. Beyond its preventive benefits, it can be prescribed as a Physical Activity Prescription (PAP) to support patient treatment. As such, there is a growing need for standardized guidelines and reimbursement models for physical activity-based interventions in clinical settings. Moreover, fostering national and international collaboration through health networks can help strengthen efforts to integrate physical activity promotion within healthcare systems.

These findings provide valuable guidance for policymakers aiming to develop targeted and effective strategies to boost physical activity at the community level. They emphasize the importance of designing interventions that consider demographic diversity and individual health profiles, in line with the principles of the Andersen Behavioral Model.

Implications for healthcare professionals, nurses, and policymakers include the need to integrate physical activity into routine healthcare practices as both a preventive and curative measure. Healthcare providers should encourage patients, particularly those with predisposing factors such as age or limited motivation, to engage in regular physical activity. Nurses and other professionals can also offer guidance on Physical Activity Prescriptions (PAP). Policymakers should focus on improving access to public spaces and healthcare facilities that promote physical activity, and develop community-based interventions that encourage engagement in exercise programs. These strategies can help create a supportive environment for physical activity and

## Limitation

This study's portrayal of the region is strengthened by the fact that it encompasses a wide geographic area with a population of over 6 million people, integrating different topographies and unique lifestyle traits. We also used a strong model that takes into account the health system as a major component that makes it possible to engage in the prescribed level of physical activity. Nonetheless, a number of restrictions need to be taken into consideration. One major drawback is that, because this study is cross-sectional in nature, it is unable to capture the predictors' long-term effects on physical activity engagement. It is not possible to record long-term patterns or the long-term impacts of the variables affecting physical activity, which could offer important information on how these variables change over time. Moreover, the use of an online questionnaire, while efficient, may have introduced selection bias. Individuals with low technology literacy, limited internet access, or those in more rural areas may have been underrepresented, potentially skewing the results and limiting the generalisability of the findings. These challenges highlight the need for caution when interpreting the study's conclusions, particularly in terms of applying them to populations that may not be well-represented in the sample, and the importance of incorporating diverse data collection methods to ensure broader inclusion and capture long-term trends in future research.

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