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How Smoking Affects Quality of Life in Physically Active Individuals: A Study on Moderate-to-High Activity Levels

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Abstract

Introduction: Quality of life (QoL) is influenced by physical health, psychological well-being, environmental factors, and healthy lifestyle choices. Smoking has been shown to reduce QoL, while physical activity generally enhances it. Given the high prevalence of tobacco and varying levels of physical activity, it is essential to investigate whether the adverse effects of smoking persist even among individuals who engage in moderate to high levels of physical activity.
Method: This cross-sectional study was conducted in November-December 2024 in Sukoharjo Regency, involving 303 respondents selected based on specific inclusion criteria. Data were collected using the Global Physical Activity Questionnaire (GPAQ), the Glover-Nilsson Smoking Behavioral Questionnaire (GNSBQ), and the World Health Organization Quality of Life-BREF (WHOQoL-BREF). Statistical analysis included chi-square tests and regression analysis to determine the association between smoking habits and QoL.
Result: The results indicated a significant association between smoking habits and QoL ($p<0.05$). Notably, heavy smokers reported lower QoL scores (31.7% good quality of life and 32.7% fair quality of life) compared to non-smokers or light smokers. This finding emphasizes that despite high physical activity levels, heavy smoking significantly detracts from QoL.
Conclusion: Heavy smoking adversely impacts QoL, even in individuals with high levels of physical activity. Thus, it is crucial to implement targeted smoking reduction strategies and promote physical activity to enhance QoL. Public health policies and intervention programs should prioritize these aspects to foster healthier lifestyles among at-risk populations.

Keywords: Smoking Habit, Physical Activity, Quality of Life

Introduction

Chinese culture originally defined quality of life as the highest value in life, the essence of life, and well-being.[1] This concept became a key indicator in assessing healthcare outcomes over time.[2] The World Health Organization (WHO) explains that quality of life is an individual's perception of their position in life, influenced by their surrounding cultural environment and value system. This perception also relates to achieving each individual's personal goals and expectations.[3]

Quality of life can be assessed based on physical and psychological factors, including living environment, social relationships, and health.[4] Various factors, such as age, gender, education, complications, depression, stress, and family support, can also influence quality of life.[5] In Indonesia, the quality of life is relatively low, significantly influenced by community behaviors that do not support a clean and healthy lifestyle.[6] Poor lifestyles, including unhealthy eating, lack of physical activity, smoking, and alcohol consumption, pose significant health risks.[7]

Physical activity refers to any bodily movement produced by skeletal muscles that requires energy and encompasses a wide range of activities in daily life.[8] It includes various body movements such as work, recreation, and sports, categorized into light, moderate, and vigorous.[9] Physical activity offers numerous benefits for physical health, such as increasing body capacity, lowering disease risk, improving body composition, and aiding weight loss. Additionally, it provides psychological benefits, such as enhancing mood and reducing depression and anxiety.[10] Physical activity significantly influences a person's quality of life.[11] A sedentary lifestyle or low levels of physical activity contribute to 1 in 10 cases of death and disability, resulting in over 2 million deaths annually.[12]

Smoking is a harmful habit that remains difficult to quit.[13] According to Sudoyo (2009), smokers are individuals who consume at least one cigarette per day. A person who stops smoking for a month is termed to have a smoking history, while those who quit for five years are considered former smokers.[14] Indonesia ranks third globally for the highest number of smokers, following China and India.[15] In 2023, the Indonesian Health Survey (IHS) conducted by the Ministry of Health (MOH) reported an estimated 70 million active smokers in Indonesia.[16] Smoking poses significant health risks, affecting both smokers and those around them.[17] It can lead to severe diseases, including impotence, cancer, and respiratory disorders such as shortness of breath.[18] Furthermore, smoking is a significant risk factor for chronic obstructive pulmonary disease (COPD) and increases exposure to harmful particles, toxic gases, and air pollution.[19]

This study aims to assess the relationship between smoking habits and moderate to high levels of physical activity and their effects on an individual's quality of life. Specifically, this research aims to identify and analyze the

influence of smoking habits on the quality of life among individuals engaged in moderate to high physical activity. The hypothesis proposed is that smoking habits have a significant negative impact on quality of life, even among individuals involved in moderate to high levels of physical activity.

Method

This observational study uses a cross-sectional design to identify the relationship between smoking habits, moderate to high physical activity levels, and quality of life. It was conducted in Sukoharjo Regency, Central Java, from January 1 to January 31, 2024. The study population included all active smokers in Sukoharjo Regency. The inclusion criteria consisted of individuals aged 18-40 years, active smokers who had consumed tobacco cigarettes for at least 6 months, and those with moderate to high levels of physical activity as measured using specific instruments. Exclusion criteria included individuals with mental disorders affecting participation, a history of chronic lung diseases such as asthma or COPD, a history of heart disease, and disability conditions.

Primary data were collected after obtaining ethical approval from the KEP-K Faculty of Health Sciences, University of Muhammadiyah Surakarta, under approval number 785. Data collection involved an accidental sampling technique through a questionnaire that incorporated instruments to measure physical activity levels using the Global Physical Activity Questionnaire (GPAQ), smoking habits through the Glover-Nilsson Smoking Behavioral Questionnaire (GNSBQ), and quality of life utilizing the World Health Organization Quality of Life-BREF (WHOQoL-BREF).

To ensure a diverse representation, efforts were made to recruit participants from various demographics within the target population. Data were analyzed using univariate tests to describe each variable and bivariate tests to evaluate the relationship between variables. The independent variables in this study were smoking habits and moderate to high levels of physical activity, while the dependent variable was quality of life. Potential confounding variables, such as sociodemographic factors (age, gender, and education) and mental health status, were identified and considered in the analysis.

The GPAQ, GNSBQ, and WHOQoL-BREF instruments have been validated and shown to have reliable results in previous studies, ensuring the credibility of the collected data. The analysis included controlling for confounding variables through appropriate statistical methods, such as chi-square tests and regression analysis, to understand the variables' relationships better. Classifying physical activity levels into moderate and high was based on established criteria to facilitate comparison and analysis.

Training sessions were conducted for data collectors to address potential biases in participant selection and data collection to ensure consistency in questionnaire administration. The sample size of 303 participants was determined based on calculations to achieve adequate statistical power to detect significant relationships, considering the population's expected smoking and physical activity levels prevalence rates.

Depending on the extent and nature of the missing information, data were addressed using appropriate methods, such as multiple imputations or complete case analyses. This approach aimed to minimize bias and enhance the robustness of the study findings.

Results

Three hundred fifty-seven respondents were recruited for the study; only 303 met the predetermined inclusion and exclusion criteria. A flowchart illustrating the participant selection process is provided in Figure 1. The flowchart details the number of total respondents, the application of inclusion and exclusion criteria, and the final number of participants analyzed.

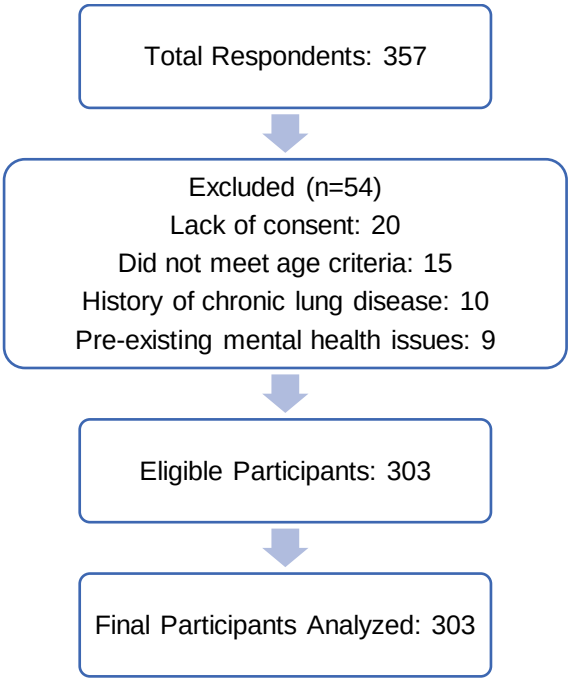

Figure 1. Flowchart details the number of total respondents

Among the 54 individuals who did not meet the inclusion criteria, reasons for non-participation included lack of consent (n=20), failure to meet age requirements (n=15), history of chronic lung diseases (n=10), and pre-existing mental health issues (n=9). This information is essential for understanding potential biases and generalizing findings.

Characteristics of Respondents

The characteristics of respondents based on gender, physical activity level, smoking habit level, and quality of life level are presented in Table 1.

Table 1. Characteristics of Respondents

Variables	Frequency (n)	n%
Gender		
Male	239	78.9%
Female	64	21.1%
Physical Activity Level		
High	168	55.4%
Medium	135	44.6%
Smoking Habit		
Very Heavy	142	46.9%
Heavy	77	25.4%
Moderate	53	17.5%
Light	31	10.2%
Quality of Life		
Good	96	31.7%
Good Enough	99	32.7%
Bad Enough	54	17.8%
Bad	54	17.8%

Based on Table 1, most respondents were male (239 people, 78.9%), while only 64 were female (21.1%). This indicates a significant gender imbalance in the population studied. A substantial proportion of respondents reported cumbersome smoking habits (142 people, 46.9%), followed by heavy (77 people, 25.4%), moderate (53 people, 17.5%), and light (31 people, 10.2%). Most respondents exhibited a high level of physical activity (168 people, 55.4%), while 135 (44.6%) reported moderate activity. Regarding quality of life, 99 individuals (32.7%) were categorized as having a good quality of life, while 96 individuals (31.7%) were classified as good enough; both the bad enough and bad categories had 54 individuals (17.8%).

Table 2. Characteristics of Smoking Habits with Physical Activity Level of Respondents

	PhysicalActivity		
	Medium	High	Total
Smoking Habit			
Very Heavy	69	73	142
Heavy	25	52	77
Moderate	23	30	53
Light	18	13	31
Total	135	168	303

Based on Table 2, smoking habits were dominated by the very heavy category (142 people, 46.9%), followed by heavy (77 people, 25.4%), moderate (53 people, 17.5%), and light (31 people, 10.2%). The majority had a high physical activity level (168 people, 55.4%), while 135 people (44.6%) had moderate activity. The quality of life of respondents was mainly classified as fair, with 99 individuals (32.7%) reporting this, and 96 individuals (31.7%) classified as good, while both the fair and poor categories had 54 individuals (17.8%).

Table 3. Chi-Square Correlation Test Results

Variables	Value	Sig. (p-value)
Smoking Habit with Quality of Life	3477.235	0.000

Table 3 shows the results of data analysis using the chi-square test: a Pearson chi-square value of 3477.235 with degrees of freedom (df) 3034 and a p-value of 0.000. This indicates a statistically significant relationship between smoking and quality of life, as the significance level is less than 0.05.

A total of 10 respondents had missing data in the quality-of-life assessment. Missing data were handled using multiple imputations to preserve sample size and minimize bias in the analysis. Unadjusted and adjusted estimates will be reported for any multivariate analyses conducted. Adjustments will include potential confounding factors such as age, gender, and socioeconomic status. Further study may consist of relative risk estimates and subgroup analyses to explore variability in results among different demographic groups.

Discussion

This study explores the relationship between smoking habits, moderate to high physical activity levels, and quality of life. The primary objective of this research is to examine how these factors interact among individuals aged 18-40 years. Based on the analysis, most respondents were men (78.9%), while women only accounted for 21.1%. This

proportion indicates that smoking is more dominant in men, which could be due to population distribution factors, behavioral patterns, or specific social habits related to gender. These results are consistent with previous research by Dora Maric and colleagues (2021), which found that men tend to smoke more often than women, reinforcing the view that smoking prevalence is higher in men than women.[9]

In this study, heavy smoking was found among respondents with moderate and high levels of physical activity, suggesting that physical activity does not always reduce smoking. Most respondents reported a fair (32.7%) or good (31.7%) quality of life, indicating that despite the high prevalence of heavy smoking, quality of life was maintained. This may be attributed to the high level of physical activity among most respondents, which benefits their physical and mental health, ultimately improving their quality of life. Support for this is found in a study by Saudah et al. (2020), which stated that physical activity can significantly impact quality of life. [19] Additionally, prior studies have demonstrated that individuals with high levels of physical activity tend to experience better physical and mental health conditions. [20]

The chi-square test analysis revealed a significant relationship between smoking and quality of life. Smoking habits, particularly in the very heavy category, negatively affect quality of life—physically, psychologically, and socially. This finding aligns with research conducted by Tatu Indira Khairunnisa Fazmi (2023), who also identified a relationship between smoking behavior and quality of life, particularly in patients with Chronic Obstructive Pulmonary Disease (COPD). [21]

Despite the informative findings, there are several limitations to this study. One limitation includes the non-random sampling method used, which may impact the generalizability of the results. While sufficient for preliminary analysis, the sample size could be considered relatively small for broader conclusions. Furthermore, potential bias may arise from self-reporting in questionnaire responses, as respondents may not accurately disclose their smoking habits. For example, bias in reporting smoking habits could occur if respondents are not truthful about their smoking frequency, leading to an underestimation of smoking prevalence.

In interpreting the results, it is essential to consider that while high physical activity may enhance quality of life, persistent smoking habits may still have a significant negative impact, particularly in the long term. This highlights the need for targeted interventions that address smoking cessation alongside promoting physical activity.

Regarding the generalizability of the results, it is essential to note that the findings may not fully apply to broader populations, especially in regions with different smoking cultures or among older or younger age groups. Comparing the characteristics of participants in this study with other populations in existing literature could further elucidate how these differences may affect the generalizability of the findings.

Conclusion

This study reveals a significant relationship between smoking habits, physical activity levels, and quality of life among individuals aged 18-40 years. The majority of respondents were male, indicating a dominance of smoking habits among men compared to women. Although many respondents reported heavy smoking, their quality of life remained relatively preserved, likely due to the high levels of physical activity they engaged in. These findings underscore the importance of raising awareness about the negative impact of smoking on quality of life, especially among physically active individuals.

While physical activity can enhance quality of life, strong smoking habits continue to have significant adverse effects on physical, psychological, and social well-being. Therefore, more focused efforts are needed to address smoking habits, mainly through interventions that combine smoking cessation programs with physical activity promotion. This study has limitations, including a non-random sampling approach and a relatively small sample size, which may affect the generalizability of the results. The findings provide valuable insights into the relationship between smoking, physical activity, and quality of life and are expected to serve as a foundation for further research in this field.to reduce smoking and increase awareness of the importance of a healthy lifestyle to achieve optimal quality of life.

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