# Correlations between physical activity and well-being status in young adults

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#### Abstract

Introduction. The civilisation revolution caused by Society 5.0 has predisposed public health to reduced physical activity globally, from the developmental period of childhood to old age. The transition process of technological development, social change, and economic growth has altered population demographics, which significantly impacts public health and is the primary factor in the decline in physical activity levels in superpower countries such as the United States of America and developing countries such as China.

**Methods.** This non-experimental study used a descriptive quantitative research design with a cross-sectional approach. **Results.** Significant two-tailed correlations were found between physical activity and physical activity (r = 0.260, p < 0.001), health (r = 0.159, p < 0.001), occupational (r = 0.177, p < 0.001), emotional (r = 0.100, p = 0.046), and nutritional (r = 0.110, p < 0.027) well-

being dimensions. However, there was no correlation between physical activity and religion (r = 0.260, p < 0.080) and friends and family (r = 0.069, p < 0.172) well-being dimensions. **Conclusions.** Physical activity correlated significantly with the physical activity, health, occupational, emotional, and nutritional

well-being dimensions, while the religious and friends and family dimensions showed no significant correlation. Key words: young adults, well-being, physical activity

#### Introduction

The civilisation revolution caused by Society 5.0 has predisposed public health to reduced physical activity globally, from the developmental period of childhood to old age. The transition process of technological development, social change, and economic growth has altered population demographics, which significantly impacts public health and is the primary factor in the decline in physical activity levels in superpower countries such as the United States of America (USA) and developing countries such as China. Physical activity decreased by approximately 35% in men and 46% in women from 1991 to 2006 in China [1]. Insufficient physical activity, which tends to be passive, has a destructive impact on health [2], with a sedentary lifestyle significantly influencing the overall health of the global population. The current global target is to reduce the prevalence of sedentary lifestyles by 10% by the end of 2025 and 15% by 2030. The data shows that the risk of death from a sedentary lifestyle is 20-30% higher than in active individuals [3].

Based on a study by Hanifah et al. [4], the proportion of Indonesians aged 10–14 years engaging in passive activities decreased from 66.4% in 2007 to 64.4% in 2018. Furthermore, 28.2% of the Indonesian population undertake daily physical activity for less than three hours, 42.7% for 3–5.9 hours, and 29.1% for more than six hours. Paduano et al. [5] found that a sedentary lifestyle in adolescents with obesity was related to low physical activity, and they tended to do more passive activities such as playing video games, playing with gadgets, watching television, and lying down while listening to music. The many conveniences provided by technological advances are responsible for declining physical activity and increasing sedentary behaviour.

Lee et al. [6] demonstrated that a sedentary lifestyle increases the risk of various adverse health conditions, including non-communicable diseases that reduce life expectancy, such as type 2 diabetes, colon disease, coronary heart disease, and breast cancer. Non-communicable diseases account for two-thirds of deaths worldwide, with almost 80%, approaching 30 million per year, occurring in developing countries. Factors that influence non-communicable disease occurrence include diet, though around 9% of all deaths globally are associated with a sedentary lifestyle, the leading risk factor for non-communicable diseases [7]. The condition of individuals suffering from non-communicable diseases will tend to be passive, causing a lower quality of life. Indeed, those suffering from non-communicable diseases who have problems with their well-being status, such as stress and negative emotions, indicate that they experience a decline in their well-being [8].

Research shows an association between moderate and vigorous physical activity and a better quality of life. As such, Pengpid et al. [9] explained that young adults (aged 18–30) undertaking intense physical activity had better health and higher life satisfaction. In contrast, other studies show that healthy adults obtain high well-being from low-intensity physical activity [10]. Well-being status includes physical, intellectual, social, economic, emotional, environmental, and spiritual aspects [11]. The condition of an individual with a high well-being status, such as life satisfaction, optimism, and positive emotions, positively impacts their life and health status. Well-being status also correlates with stress levels, with high levels of stress causing low levels of happiness and lower stress levels resulting in high happiness levels. Therefore, those with a high level of well-being can easily regulate emotions, face problems, and find solutions well. On the other hand, individuals with a low level of well-being tend to feel more anxiety and anger and can be at risk of experiencing depression due to the emergence of negative feelings, complete thoughts, and a sense that there is no happiness in their lives [12].

Physical activity can improve happiness and pleasure and effectively influences the quality of life for individuals, groups,

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and society. Individuals with high levels of physical activity have better well-being, allowing them to participate in physical activities and socialise more, while less stress improves their social status [13]. Previous research aligns with a quote from the ancient Roman poet Decimus Junius Juvenalis, "Mens sana in corpore sano," which means a healthy body has a healthy soul. A previous study by An et al. [14] did not investigate the correlation between physical activity and wellbeing status, though it prompted our interest in finding out if physical activity and well-being status correlate in young adults. The study also aimed to determine whether physical activity can significantly influence well-being. The results of this research can add to current scientific knowledge and provide a basis for future research.

#### Subjects and methods

This non-experimental study used a descriptive quantitative research method with a cross-sectional approach to determine the correlation between physical activity and wellbeing. The study took place at the Faculty of Health Sciences, University of Muhammadiyah Surakarta, from September 2023 to January 2024, which included subject recruitment, data collection, and follow-up.

The inclusion criteria were carefully designed to ensure a diverse and representative sample. Participants aged 18– 30 who engaged in sitting activities for at least 4–5 hours a day were included. Exclusion criteria were participants taking medication during the research and those with fatal diseases. The OpenEpi application determined sample size, accounting for the population of 2704 and 399 participants, using simple random sampling with stratification, considering the proportion of male and female participants based on the total population. The number of participants was increased by 18% to avoid a significant number of rejections, ensuring a comprehensive and unbiased study.

The dependent variable in this study was well-being, characterised by a sense of happiness, satisfaction, low stress, physical and mental health, and good quality of life, including spiritual, physical activity, health service access, employment, emotional, nutritional, and social dimensions. The measurement instrument used was a multidimensional questionnaire of healthy beings. The independent variable in the study was physical activity, defined as a body movement carried out by burning energy – assessed using the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ). Data collection was meticulously structured, with every ethical consideration accounted for. Participants were given a comprehensive explanation of the study's purpose, and their anonymity and confidentiality were rigorously maintained. Informed consent was obtained from all participants, signifying their agreement to participate. The research team was present during data completion to ensure accuracy and integrity. The local research ethics committee approved the study, further underscoring its reliability.

To reduce potential bias, the research team tested the instrument's validity and reliability according to the Indonesian people's characteristics and culture. The GLSTPAQ questionnaire obtained an intraclass correlation coefficient (ICC) of 0.943. Meanwhile, the multidimensional questionnaire of well-being construct validity was  $r \ge 0.6$  for all dimensions, and test-retest reliability was r = 0.891. After completing data collection, all data was tabulated for grouping to facilitate statistical analysis of dependent and independent variables and demographic characteristics.

Univariate and bivariate data analysis employed SPSS ver. 26.0 (IBM Corp., NY, USA). The univariate analysis described the independent variable, physical activity, and the dependent variable, well-being status, with outputs including mean values, percentages, and standard deviations. Bivariate data analysis used the Spearman-rho test to determine the direction and strength of the correlation between the two variables.

#### Results

The flowchart below (Figure 1) provides a visual representation of the assessment of respondents' eligibility and acts as a guide for conducting statistical analysis of subjects who completed the research stages.



## Univariate analysis

Table 1 presents the data for age ( $19.2626 \pm 1.16627$ ), gender, including 61 males and 338 females, and physical activity ( $49.43 \pm 23.399$ ). The data for the seven well-being domains included results for religion ( $7.99 \pm 1.947$ ), physical activity ( $6.61 \pm 2.027$ ), health ( $6.80 \pm 2.114$ ), occupational ( $6.57 \pm 2.092$ ), emotional ( $6.86 \pm 2.024$ ), nutrition ( $7.27 \pm 1.909$ ), and friends and family ( $8.15 \pm 1.746$ ).

Item	n	Mean ± <i>SD</i>	
Gender (male/female)	61/338		
Age	399	19.2626 ± 1.16627	
Physical activity	399	49.43 ± 23.399	
Religion well-being domain	399	7.99 ± 1.947	
Physical activity well-being domain	399	6.61 ± 2.027	
Health well-being domain	399	6.80 ± 2.114	
Occupational well-being domain	399	6.57 ± 2.092	
Emotional well-being domain	399	6.86 ± 2.024	
Nutrition well-being domain	399	7.27 ± 1.909	
Friends and family well-being domain	399	8.15 ± 1.746	

## **Bivariate analysis**

Table 2 provides the data normality results for physical activity (18.3500 ± 6.60363) and the well-being religion (7.1500 ± 1.13671), physical activity (5.6500 ± 1.26803), health (6.7500 ± 144641), occupational (7.6500 ± 0.67082), emotional (7.7500 ± 0.78640), nutritional (8.5000 ± 0.51299), and friends and family (8.4000 ± 0.50262) dimensions. A significance value of p < 0.001 indicates a non-normal data distribution.

Table 3 shows hypothesis testing of data assumptions using the Spearman-rho test and two-tailed significance values for physical activity (r = 0.260, p < 0.001), health (r = 0.159, p > 0.001), occupational (r = 0.177, p < 0.001), emotional (r = 0.100, p = 0.046), and nutritional (r = 0.110, p = 0.027) domains. The religion (r = 0.260, p = 0.080) and friends and family (r = 0.069, p = 0.172) dimensions had no significant relationship with physical activity.

## Discussion

The contribution of this study is rather significant because it is expected to be a foundation for policymakers to improve promotive and preventive aspects of physical activity to better the quality of life and well-being of the community, especially young adults. Well-being is essential because it is a primary aspect of individual survival, including being healthy and productive throughout the life cycle.

Physical activity correlated with the well-being dimensions of physical activity, health, work, emotions, and nutrition. In contrast, other dimensions of well-being (religion and friends/ family) showed no correlation. However, the results of this research need to be reviewed based on gender disparities due to the imbalance in the proportion of male (n = 61) and female (n = 338) respondents since gender can affect the motivation to perform physical activity [15]. Indeed, men are more motivated by internal factors (power, competition, and challenge), while women are more motivated by external factors (weight management and appearance).

Granero-Jiménez et al. [16] found that intrinsic motivation factors are important in physical activity and emphasised the need for intrinsic motivation to increase physical activity. The study also showed that men were more physically active (57.6%) than women (42.4%). This was influenced by several factors, such as men tending to do physical activity because of self-image motivation, achieving specific goals such as improving physical condition, losing weight, or losing body fat, or considering physical activity a challenge. Meanwhile, women tend to consider external motivational elements to feel they have an excellent well-being. People with higher physical activity have greater intrinsic motivation than sedentary people, who are more dominant in extrinsic motivation.

Research by Butt et al. [17] explored why physical activity decreases as girls age. Their findings highlighted the differences in activity structure to maintain the interest of adolescent boys and girls and emphasised healthy physical motivation and making physical activity fun to increase further participation. In addition, other work by Guthold et al. [18] showed that the prevalence of sedentary lifestyles varied from 1.6% (Comoros) to 51.7% (Mauritania) in males and from 3.8% (Comoros) to 71.2% (Mauritania) in females. Furthermore, sedentary lifestyles were generally higher in older age groups and lower in rural areas than in urban areas.

Widiantoro et al. [19] found that sedentary lifestyle prevalence was 1.4 times greater in women (35.5%) than men, which was influenced by socio-cultural factors. Muslim wom-

Variable items	Physical activity	Religion well-being domain	Physical activity well-being domain	Health well-being domain	Occupational well-being domain	Emotional well-being domain	Nutrition well-being domain	Friends and family well-being domain
Mean ± <i>SD</i>	18.3500 ± 6.60363	7.1500 ± 1.13671	5.6500 ± 1.26803	6.7500 ± 144641	7.6500 ± 0.67082	7.7500 ± 0.78640	8.5000 ± 0.51299	8.4000 ± 0.50262
(sig. <i>p</i> )	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

Table 2. Normality test results of physical activity variables with well-being status

Table 3.	Spearman-rho	analysis
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Variable items		Religious dimension	Physical activity dimension	Health dimension	Occupational dimension	Emotional dimension	Nutrition dimension	Friends and family dimension
Physical	(sig. <i>p</i> )	0.080	< 0.001	0.001	< 0.001	0.046	0.027	0.172
activity	r	0.088	0.260	0.159	0.177	0.100	0.110	0.069

en's religious beliefs and values influence perspectives on life, especially in daily activities, that require them to wear modest clothing and remain separate from men. Restrictions on physical activity for Muslim women can be attributed to cultural norms, including gender roles and religious beliefs that impact physical activity participation.

The current study took a comprehensive approach, considering not only the individual aspects of physical activity and well-being but also the significant influence of cultural differences, traditions, and the unique characteristics of physical activity in different countries. This perspective is supported by the research of Rio et al. [20], which used Leininger's Sunrise Model. The model provides a theoretical foundation for understanding the role of cultural beliefs and practices in shaping physical activity patterns, along with other factors such as technology, religion and philosophy, social structure, politics, economics, and education.

According to a website [21], cultural aspects influence individuals' attitudes and involvement in physical activity. Most Canadians living in Alberta, a multicultural province that has existed for multiple generations, continue to perform traditional rituals and cultural practices consistently. Regarding attitudes in North America, few people walk to get things done, and residents prioritise family and group responsibilities over leisure activities. Furthermore, in terms of culture, individuals are more comfortable interacting with others who share a common identity, ethnicity, race, or cultural heritage background, and the presence of cultural similarities can be an incentive to be more active in physical activity participation.

Sigmundová et al. [22] found that the proportion of men who, based on the family affluence scale (FAS), met the recommendations for vigorous activity varied by country. The lowest rate was in the United Kingdom in 2014 (29.2%) and the highest in Slovakia in 2006 (68.0%). In contrast, physical activity increased significantly in low-FAS women between 2006 and 2014 in Austria, Czech Republic, Finland, Hungary, Macedonia, Norway, Romania, Slovenia, Spain, and Sweden. However, there were significant decreases in Slovakia, England, and Wales. The prevalence of FAS-related physical activity was lowest in Macedonia in 2010 (8.5%) and highest in Finland in 2014 (51.8%).

The physical activity dimension of well-being, which correlated significantly with physical activity in the current study, relates to individuals finding ways to enjoy physical activities. Based on the findings of Hoare et al. [23], elements that can support individuals to be more motivated to do physical activity include psychological, environmental, and social factors, as well as infrastructure facilities. In terms of individual psychology, influencing factors include self-confidence, competence, interests, talents, hobbies, aspects of a supportive and social home environment, including emotional support and support from friends and family, and aspects of a supportive infrastructure such as a comfortable, clean environment, and a good level of security. As such, the government must maintain access to public facilities, such as parks, fields, sports halls, and stadiums, so that individuals are encouraged to be more motivated to do daily physical activity.

Scheerman et al. [24] found that physical activity programmes support and facilitate factors that influence physical activity levels in individuals and encourage behaviour changes that increase physical activity, which requires motivation during implementation. Motivation consists of intrinsic and extrinsic motivation. Intrinsic motivation stems from an individual's inner beliefs that emerge from their behaviour, while extrinsic motivation comes from outside, including religion, beliefs, social support, and environmental factors. There was a significant correlation between physical activity and the health dimension of well-being, which aligns with previous research from Miko et al. [25] on the vital role physical activity plays in the development of the global population. Recommendations for physical activity in improving health include endurance-oriented movements, regular muscle strengthening, and coordination, which have implications for maintaining and improving functionality and health.

McQuilliam et al. [26] showed that regular guideline-based physical activity positively impacts the physiological health of bones and joints, especially strenuous exercise such as weight lifting, which involves the use of external weights (dumbbells, barbells or weight machines) to train muscles, stimulate bone growth, and increase bone density. Strength training helps stimulate osteogenesis, while physical activities involving weight-bearing movements provide bone-strengthening mechanical stimulation. Meanwhile, regular and diverse movements through exercise such as yoga and Pilates can help improve flexibility and joint mobility, which increases joint range of motion, strengthens muscles, and maintains joint health.

Maeseneer et al. [27] found that physical activity can stimulate the production of synovial fluid, a natural joint lubricant, which helps maintain joint health by ensuring they move smoothly to reduce the risk of excessive friction between bones. Physical activities, such as balance and coordination exercises, help strengthen stabiliser muscles and improve body awareness, which can help reduce the risk of joint injuries by improving posture and movement. Furthermore, regular physical activity can increase the absorption of nutrients essential for bone health, such as calcium and vitamin D.

The current study found a correlation between physical activity and occupational well-being, which aligns with previous findings by Junita et al. [28] that implementing individualised physical activity programmes is critical in supporting work productivity optimisation. Such programmes use appropriate and proportional exercise to improve working conditions and quality of life. Exercise programmes can include mobility, strengthening, and stretching exercises tailored to work-related physical activities, which can reduce fatigue and optimise productivity and job satisfaction. Furthermore, daily physical activity can improve cognitive function, enhance work efficiency performance, and hone individual problem-solving skills, which builds a cycle of accountability and creates individual motivation to be more productive at work.

Consistent with previous research by Grant and Shandell et al. [29], individual motivation in work productivity is an essential component that affects behaviour and performance. Motivation is a driving force that can influence individuals to work hard and be more enthusiastic in increasing work productivity so that high motivation and high satisfaction will contribute to better work productivity. Conversely, low motivation hinders performance and productivity.

Statistical analysis showed a significant correlation between physical activity and the emotional dimension of wellbeing. This finding is relevant to individuals who engage in regular physical activity, which is known to increase the secretion of antidepressant hormones, temporarily alter central norepinephrine activity, reduce the hypothalamic-pituitaryadrenocortical axis, and increase beta-endorphin secretion [30]. These mechanisms imply that continuous physical activity can reduce depression, which is manifested by a negative mood that affects the emotional state.

According to research by Marques et al. [31], continuous physical activity, by portion, can change the structure and function of the brain. Indeed, physical activity can improve emotions by increasing the concentration of dopamine, serotonin, and norepinephrine in the brain. In addition, physiological explanations suggest that participation in physical activity increases the synaptic transmission of monoamines and activates the secretion of endorphins. These substances have an inhibitory effect on the central nervous system, which reduces pain and increases the active state of the brain to improve mood.

The nutritional dimension of well-being correlated significantly with physical activity, which is in line with the results of previous research showing that physical activity plays a vital role in the diet and health of a population [32]. Regular physical activity has positive psychological effects and can lead to changes in dietary behaviour towards consuming balanced and good food and drinks, which minimises the risk of obesity, cardiovascular disease, diabetes, and cancer.

The current study is relevant to the research of Romieu et al. [33] on energy balance and its determinants that affect the development of obesity. Energy intake that exceeds energy expenditure is the main factor behind weight gain, and individuals with higher levels of physical activity have been shown to reduce the impact of increased energy intake on weight gain. In contrast, those with low levels of physical activity will experience a decrease in appetite, resulting in a disturbed energy balance. Fonseca et al. [34] also showed that the body's energy balance is determined by the amount of energy entering and leaving the body. Total daily energy expenditure accounts for 60 to 75% of resting energy expenditure, 15 to 30% of energy expenditure during physical activity, and 10% of food-induced thermogenesis.

In this study, the religious dimension of well-being showed no significant correlation with physical activity, which aligns with previous research by Silfee et al. [35]. The study found no significant correlation between physical activity and spirituality in Latino men and women in Massachusetts.

The current study findings are consistent with other research explaining that physical activity is not the only determinant of spiritual aspects but consists of other multidimensional factors, including age and cognitive function, that can support and influence the social aspects [36]. Another study on religion provided a comprehensive view of human orientation in the world [37]. Religiosity is conceptualised as an aspect of belief that is implemented in the form of religious activities, which is a fundamental element in motivating and encouraging individuals to carry out physical activity because actions carried out against the background of religious beliefs are considered to have elements of faith and divinity. This correlation will impact an individual's participation in religious activities so that they will tend to have lower stress levels and be more optimistic. Further research findings by Weele et al. [38] showed that religious aspects maintain, improve, and balance the health of a person's physical and spiritual systems and increase the sense of community, humanity, and competitiveness among individuals and society.

Similar to the findings of Liu and Sun [39], the current study found no correlation between physical activity and the friends and family well-being dimension. Physical activity is not the only indicator that drives interpersonal relationships for individuals to contribute more to society, though it does encourage the development of good interpersonal relationships and the ability to adapt to the social environment. However, nonphysical aspects are also critical elements in deepening friendships and bonds between individuals, including open communication, mutual understanding, and building trust gradually.

Golaszewski et al. [40] stated that physical activity combines several components, including emotional and instrumental support from friends and family, into an indicator of overall social support. It is essential to understand social correlates because they become invaluable when individuals face problems. Indeed, social correlates strengthen coping and problem-solving abilities and minimise or alter affective, physiological, and maladaptive responses to stressful situations, improving stress prevention efforts.

# **Research contribution**

The research is expected to provide information that will encourage policymakers and researchers to develop and optimise strategies for physical activity participation to improve the well-being of Indonesian people, especially young adults.

# Limitations

A limitation of this study was the lack of assistance provided by the researchers to the respondents during data collection. Due to this, the information provided by the respondents was not always an accurate reflection of the question asked. The heterogeneity among respondents likely caused a difference in the perception and understanding of statements conveyed by researchers in the research questionnaire.

# Conclusions

Physical activity showed a significant correlation with wellbeing domains, including physical activity, health, occupational, emotional, and nutritional. However, there was no significant correlation between physical activity and the religious or friends and family dimensions.

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# **Ethical approval**

The research related to human use has complied with all the relevant national regulations and institutional policies, has followed the tenets of the Declaration of Helsinki, and has been approved by the Faculty of Health Sciences Ethics Commission, Surakarta Muhammadiyah University (approval No.: 019/KEPK-FIK/IX/2023).

## Informed consent

Informed consent has been obtained from all individuals included in this study.

## **Disclosure statement**

No author has any financial interest or received any financial benefit from this research.

# **Conflict of interest**

The authors state no conflict of interest.

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