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The association between family structure and physical activity among medical students

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Original article

Abstract

Introduction: Lack of physical activity has become a tremendous health problem in young people, notably in the digital communication era. Due to burdensome academic tasks, the situation may be more rigorous for medical students. The family structure is supposed to influence children's physical activity patterns.

Aim of the study: This study aimed to investigate the effect of family structure on physical activity levels in medical students.

Methods: This cross-sectional study was followed by 109 students; 75 (68.8%) were female. Gender, family structure, parents' level of physical activity, number of families, and the presence of grandparents were included as independent variables. In contrast, students' level of physical activity was a dependent variable. Data on independent variables were obtained through a guided interview. The International Physical Activity Questionnaire (IPAQ) was applied to assess students' level of physical activity. Variables were dichotomously categorized to simplify statistical testing. Chi-square was applied to reveal the relationship between the dependent and independent variables. A *p*-value of less than 0.05 was considered significant.

Results: 39 (35.8%) students had low IPAQ score, 47 (43.1%) moderate, and 23 (21.1%) high. Most students (61.4%) lived in a nuclear family. There were 55 students (50.5%) who lived with family members less than 5; only 31 (28.4%) reported the presence of grandparents in their homes. Most students' parents reported doing sufficient regular exercise (73.1%). Students' IPAQ score was associated with the family type (OR 3.56, 95% CI 1.53–8.20, $p = 0.002$) and the presence of grandparents (OR 3.76, 95% CI 1.57–9.00, $p = 0.002$).

Conclusion: Medical students who lived in a nuclear family and lived without their grandparents had higher physical activity levels.

Keywords

- physical activity
- college students
- family structure
- family support

Contribution

A – the preparation of the research project
B – the assembly of data for the research undertaken
C – the conducting of statistical analysis
D – interpretation of results
E – manuscript preparation
F – literature review
G – revising the manuscript

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Introduction

Prevalence of non-communicable diseases (NCDs) in young has been increasing dramatically and has become a concern and problem worldwide. Obesity is thought to be the culprit for the increased prevalence of NCDs. Increased obesity in the US is associated with increasing the prevalence of metabolic syndrome (MS) in children and adolescents.1 Metabolic syndrome in children and adolescents will become adult MS and raises the possibility of developing type 2 diabetes mellitus (T2DM) and cardiovascular diseases.[2,3]

Physical inactivity and insufficient physical activity can increase MS and NCDs prevalence in youth. World Health Organization (WHO) has recommended that children and adolescents do moderate to vigorous aerobic exercise or other physical activity for at least 60 minutes daily.[4] It was estimated that 81% of adolescents aged 11–17 years do not meet the recommendation, with 77.6% among boys and 84.7% among girls.[5] On the other, 57% of adolescents were identified as spending after school-period in sedentary time.[6]

Physical activity pattern is affected by several factors. Family is one factor that influences physical activity behavior, especially in adolescents. The family has a very important role in children and adolescents' lives because it could be a social agent that positively affects the initiation and maintenance of children's physical activity patterns.[7,8] However, the extent to which family influence depends on the family structure in which the children grow up because each family member has an important role and impact in shaping adolescent physical activity patterns.[8-10]

Different cultures may alter family structures in the household and the relationship between family members, leading to distinct physical activity behavior. Medical students spend much time studying and very limited time for leisure. There is no study on the association between family structure and physical activity behavior in Indonesia. Therefore, this study aimed to investigate the influence of family structure among medical students in Indonesia.

Methods

This study was a cross-sectional study followed by 109 eligible medical students of the School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia. Participants gave their written informed consent. Dean permitted our study to conduct. Ethical approval was issued by Atma Jaya Ethics Committee (08/02/KEP-FKIKUAJ/2021). This study was performed January–March 2021.

All medical students were invited to participate in the study. Students who lived in boarding houses had limited physical activity (having a fever or other illness, hospitalized, physical disability due to various things, etc.), and incomplete questionnaires filling were excluded.

A guided interview was conducted to acquire data on family structure and parents' physical activity. Due to the pandemic situation, the interview was administered online. Family structure was categorized as a nuclear family, single-parent family, and extended family. A nuclear family was a husband and a wife with their child / children, whereas a single-parent family was a husband or a wife with at least one child. The extended family was a parent with their child / children and other relatives who lived with them. The number of family members was grouped into 'less than 5' and '5 or more members.' The presence of grandparents or one of them was also recorded. Sufficient regular exercise was defined if the family exercising for a minimum of thirty minutes at least three times a week. Adequate regular exercise of father, mother, and other family members was recorded.

Participants' weight (kg) and height (cm) were measured according to the standard equipment and procedure. The common formula calculated the body mass index (kg/m^2). Body mass index (BMI) score was classified into: normal (18.5–22.9 kg/m^2), overweight (23–27.4 kg/m^2), and obesity (≥27.5 kg/m^2).[11] Physical activity level was obtained through International Physical Activity Questionnaire (IPAQ). IPAQ consists of 27 questions to measure the intensity of physical activity during the last seven days and estimate calorie requirement in MET (metabolic equivalents of task). The result was denoted as 'low' if total MET/daily <600, 'mild' if 600–2999 MET/daily, and 'high' if ≥3000 MET/daily.

Numerical data were presented as mean ± standard deviation while categorical data as numbers with percentages. The correlation between variables was analyzed using the Chi-square test. For statistical purposes, some categorical data were transformed into two groups. IPAQ groups were reclassified as 'insufficient' for the 'low' group, while 'moderate' and 'high' groups into 'sufficient' group. For family type, 'single parent' was merged into 'nuclear family.' Statistical analysis was completed using SPSS version 22. Significance was set at $p < 0.05$.

Results

Characteristics of the participants are presented in Table 1. Most participants were female (68.8%). Mean BMI indicated normal weight; however, forty six participants (42.2%) were confirmed overweight and obese. There were only 39 (35.8%) participants with low IPAQ scores, while 47 (43.1%) had moderate, and 23 (21.1%) had high IPAQ scores.

Table 1. Characteristics of the participants

Variables	n (%) or mean ± SD
Sex	
Female	75 (68.8%)
Male	34 (31.2%)
Age (years)	19.2 ± 1.0
Height (cm)	164.5 ± 7.8
Weight (kg)	61.4 ± 13.0
BMI* (kg/m^2)	22.5 ± 3.7
BMI classification	
Normal	63 (57.8%)
Overweight/obesity	46 (42.2%)
IPAQ** classification	
Low	39 (35.8%)
Moderate	47 (43.1%)
High	23 (21.1%)

*BMI – Body Mass Index.
**IPAQ – International Physical Activity Questionnaire.

Table 2 describes the characteristics of the family. Most participants lived in a nuclear family (61.4%), while only six participants (5.5%) were in a single-parent family. Less than five family members were found in 55 participants (50.5%). Most participants (71.6%) had no grandparents in their families. Most students' fathers (71.3%) or mothers (73.1%) engaged insufficient regular exercise whereas only 15 other family members (41.7%) did.

Table 2. Characteristics of the families

Family chracteristic	n (%)
Family type	
Nuclear	67 (61.4%)
Single parent	6 (5.5%)
Extended	36 (33.0%)
Family members	
less than 5	55 (50.5%)
5 or more	54 (49.5%)
Existence of grandfather / grandmother	
Yes	31 (28.4%)
No	78 (71.6%)
Doing sufficient regular exercise	
Father (n = 104)	76 (73.1%)
Mother (n = 108)	79 (73.1%)
Other member (n = 36)	15 (41.7%)

The association between IPAQ and variables were analyzed using Chi (illustrated in Table 3). Odds ratio, 95% confident interval, and p-value were shown. IPAQ score correlated with the family type (OR 3.56, 95%CI 1.53–8.20, $p = 0.002$) and the presence of grandparents or one of them (OR 3.76, 95%CI 1.57-9.00, $p = 0.002$). Participants in the extended family had a 3.56 times greater risk of having a low IPAQ score, whereas the presence of grandparents increased the risk by 3.76 times having a low IPAQ score.

Table 3. The association between IPAQ and variables

IPAQ*	Gender	Sufficient regular exercise			Family type	Number of family	Presence of grandfather / grandmother
		Father	Mother	Other			
OR	1.25	1.09	1.70	3.00	3.56	0.47	3.76
95% CI	0.53–2.94	0.41–2.91	0.68–4.26	0.62–14.62	1.53–8.20	0.21–1.04	1.57–9.00
p	0.615	0.866	0.258	0.168	0.002	0.061	0.002

*IPAQ – International Physical Activity Questionnaire.
Note: Chi square test was applied.

Discussion

Decreased physical activity raises concerns about an increase in metabolic disease in adolescents. Several efforts have been made to encourage adolescents to be more physically active. One of the efforts is to increase physical activity through a family approach. The association between physical activity patterns and family structure has been investigated. Although there were some variations in the results, the previous studies indicated that family structure impacted physical activity in adolescents.[7-10] Our findings seemed to confirm the conclusions of that studies. This study found that physical activity was related to family structure in adolescents. Further, adolescents' physical activity in the nuclear family had a higher IPAQ score than those in the extended family. Also, the presence of grandparents or one of them was linked with a lower IPAQ score.

Several researchers have investigated the effect of family structure on physical activity by comparing two types of families, single-parent families versus intact or two-parents (nuclear families). A contradicting result was reported in their studies. On the one side, the result indicated that single-parent families encouraged children to be more physically active,[8,12,13] whereas, on the other side, children in intact families were more physically active than those in single-parent families.[9,10,14-16] The higher level of physical activity of children in single-parent families was associated with several things. Children of single parents were less supervised by their parents, where they were and what they were doing.[17] Also, for young people, going to the gym to work out or a sports club to play sports games may be a way of escaping the lonely conditions at home. However, these hypotheses still need further investigation.

On the other hand, more physically active children in two-parent families seem to be supported by more scientific reasons. Strong family support is considered to upsurge children's self-efficacy to overcome obstacles to expressing their physical capability and skills.[18] Intact families give their children more support through important ways; encouragement, involvement, and facilitation.[19,20] For children who engage in organized sports, parents can play a role by providing transportation to training or competition facilities.[21] It is suggested that the most significant improvement in children's level of physical activities will be obtained when parents involve themselves in their children's activities.[22] From another perspective, children in single-parent families receive less parental support and heavier household responsibilities and workload, causing them to have very limited time for leisure activities.[9] Our findings were distinct from the previous studies. Due to a very small amount, single-parent families were merged into nuclear families and were not analyzed separately. The results indicated that nuclear family participants had higher IPAQ scores than those living in extended families. The probability of children in large families having a low IPAQ was 3.56.

The presence of grandparents affects physical activity behavior. A study in China demonstrated that children not living with their grandparents were more physically active than those who lived with grandparents.[8] Our findings were following that study. Children living with grandparents were almost 3.8 times more likely to have low IPAQ scores. The influence of grandparents' presence on children's physical activities may be related to family customs and the culture in which they live. Grandparents who tend to be protective will prevent the children from participating in risky activities.[23] However, this should not apply to young people who can make decisions independently, as in this study. Additional obligations related to caring for their grandparents and spending time to chat with grandparents might be relevant explanations for our findings.

There has not been a study on the association between the number of family members and physical activity. Our study attempted to analyze the influence of family amount on physical activity. No association was found between the number of family members on the IPAQ score. Amount of family members might not have a specific role in physical activity compared to family structure and the presence of grandparents or other family members, so the influence is ignorable. Also, increasing individualization and privatization and neglect of traditional norms in modern society's development will reduce young people's dependence on their family background.[24] A study by Scharf et al. indicated that as children get older, the activities with other family members will diminish.[25] In our study, parents and other family members' physical activity did not affect participants' IPAQ scores. Even though parents or family involvement is considered a major influence on children's physical activity behavior, the effect may be less pronounced in young people.

Many studies have shown that gender is linked with physical activity. It is suggested that women are less physically active than men and have longer sedentary time.[26-28] Several arguments have been proposed to explain these findings, including sociocultural factors, self-perception of the body image, and self-confidence in physical skills and ability.[29] Kuzmik et al. attributed

the lack of physical activity during the COVID-19 pandemic to women using social media, i.e., Facebook.[27] It was thought that women were more likely to maintain and build friendship,[30,31] and had more friends on Facebook than men.[32] However, a different result was found by Liao et al., which reported that older women had higher physical activity than men.[33] Motivation may also be a driving factor for involvement in physical activity. It was reported by van Uffelen et al. that women were more likely to improve their appearance, lose weight, and meet friends than men,[34] which could encourage women to engage in physical activity. Unfortunately, the recent study is not aligned with those previous studies. No association was found between gender and physical activity. We argue that relatively homogenous participants in terms of occupation, age, and circumstance may cause the effect of gender to be less significant.

We encountered several limitations in the recent study. First, the sample was relatively small to include as many types of structure as possible. For example, the amount of single-parent families was too small to be analyzed separately, so it had to be merged with the nuclear families. At the same time, the previous studies indicated that single parents and nuclear families had contradictive effects on physical activity. Second, this study was conducted only in one metropolitan city, which may differ from non-metropolitan cities, including the relationships between family members. Third, some specific factors affecting the level of physical activity have not been included, i.e., socio-economic status (education, economic level). Finally, it is considered that the amount and the age of siblings are related to physical activity level. Therefore, these two factors should be included as variables in the study.

Conclusion

The recent study concluded that students living in the nuclear family and without the presence of grandparents had higher physical activity than medical students. Students who lived in nuclear families and single-parent families possessed higher IPAQ scores. Also, students who lived with grandparents had lower IPAQ scores. Based on these results, a strategy to improve physical activity should target students living with extended family and grandparents. However, these findings should be interpreted with caution due to several limitations. Further studies were recommended to include as many family types as possible and involve various race and ethnicity.

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