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Physical Activity Levels and Social Cognitive Processes among Adolescents

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Abstract

This study aimed to study the correlation between physical activity level and social-cognitive process based on gender among adolescents. This study carried out a cross-sectional survey involving 94 adolescents in the Special Region of Yogyakarta, Indonesia (54.3% male, average 14±3 years). Physical activity level was assessed using the Physical Activity Questionnaire-Adolescent Questionnaire (PAQ-A). Social cognitive processes (including self-efficacy, outcome expectation, and self-regulation) were assessed using the Self-Efficacy for Exercise, the Multidimensional Outcome Expectations for Exercise, and the Self-Regulation Scales. Mann-Whitney test was used to compare physical activity levels and social-cognitive processes between males and females. Spearman correlation test was used to assess the association between physical activity level and social-cognitive process based on gender. The results of the study indicated no differences in the physical activity levels between male and female adolescents. Self-efficacy and outcome expectation did not correlate with physical activity level. In contrast, self-regulation was correlated with physical activity in male ($r=0.279$, $p=0.048$) and female ($r=0.444$, $p=0.003$) adolescents. The results indicate that self-regulation is the most important social-cognitive process determining physical activity level. For this reason, improving self-regulation skills is vital to promote physical activity levels among adolescents.

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INTRODUCTION

Decreased physical activity levels often occur during adolescence, leading to energy imbalances and rapid weight gain (Alberga AS et al., 2012). This condition is concerning, considering that physical inactivity increases the risk of noncommunicable diseases (NCDs) (Flodgren GM et al., 2020; WHO, 2019). Moreover, regular physical activity has been confirmed to prevent and manage NCDs (WHO, 2020; Longo M et al., 2019; Geidl W et al., 2020; Murri MB et al., 2020; Pereira MA et al., 2020). Therefore, the global goals in Sustainable Development Goals (SDGs) also contain an Action Plan on Physical Activity 2018–2030 for reducing the prevalence of physical inactivity in adults and adolescents by 15% in 2030 (WHO, 2020).

Nevertheless, physical inactivity is still increasing among children and adolescents in the World, as reported in studies in Italia (Censi L et al., 2022), Canada (Guthold R et al., 2020), China (Qiu C and Hou M, 2020), United State (Cornelius C, Fedewa A and Toland M, 2020), and Ukraina (Andrieieva O et al., 2019). In addition, World Health Organization (WHO) in 2018 and 2020 showed an increasing trend in the proportion of adolescents with physical activity levels below the recommended levels, which was 70% in 2018 to 81% in 2020 (WHO, 2020; WHO, 2019). The results of basic health research (RISKESDAS) in Indonesia also showed that adolescents who did not achieve 150 minutes of physical activity per week increased from 26.1% in 2013 to 33.5% in 2018. The RISKESDAS also indicated that in the Special Region of Yogyakarta, from 2013 to 2018, there was an increase in physical inactivity of 38.9%.

There is also a need to study the correlates of physical activity levels among adolescents to understand aspects that many influence physical activity levels. Social Cognitive Theory (SCT) is one of the recommended theories to be applied, including efforts to increase physical activity in adolescents SCT focuses on the reciprocal relationship between humans and their environment. The SCT concepts include self-efficacy, outcome expectations, and self-regulation. Self-efficacy in this context refers to adolescents' confidence in maintaining physical activity despite barriers. Outcome expectations in this context are defined as the benefits expected by adolescents when conducting the physical activity. Lastly, self-regulation refers to the capability of adolescents to maintain physical activity (e.g., by planning, scheduling, and goal setting) (Keeler HJ and Kaiser MM, 2010; Bagherniya M et al., 2018; (Naami Nazari et al., 2020).

To date, information regarding physical activity levels and social cognitive processes such as self-efficacy, outcome expectations, and self-regulation in Indonesia, including in Yogyakarta, is still limited. The assessment of physical activity among adolescents in RISKESDAS was based on the physical activity standard for adults (i.e., 150 minutes of physical activity per week), in contrast to the WHO recommendation of physical activity in children and adolescents (60 minutes of physical activity daily) (WHO, 2020). The RISKESDAS survey also has not used a specific instrument for assessing adolescent physical activity, such as the Physical Activity Questionnaire-Adolescent Questionnaire (PAQ-A) (Kowalsk KC, 2004). The levels of physical activity difference in boys and girls have also not been adequately explored in the RISKESDAS. Moreover, the current physical distancing policy due to the COVID-19 pandemic may also have influenced adolescents' physical activity levels (Arovah NI & Heesch KC, 2022). Therefore, an appropriate instrument is required to assess physical activity levels among adolescents in the pandemic era. Also, social cognitive predictors have been assessed in older adults (Zar'in & Arovah, 2021) and younger adults in Indonesia (Arovah NI, 2022). However, social cognitive predictors among Indonesian school children have not yet been explored. Therefore, this study aimed to determine the level of physical activity with social cognitive processes (self-efficacy, outcome expectations, and self-regulation) among adolescents and compare boys and girls in Yogyakarta, Indonesia. The results of this study are expected to be used as the basis for developing an intervention to increase social-cognitive-based physical activity in adolescents.

METHODS

The study design was a cross-sectional study that assessed physical activity levels between boys and girls and their potential correlations (self-efficacy, outcome

expectations, and self-regulation).

Participants and Ethical Consideration

The data was collected from April to June 2022 in junior high school students in Yogyakarta aged 13 to 16 years old recruited using purposive sampling with inclusion criteria for junior high school students, and exclusion criteria were the non-completion of the instrument. The total population of junior high school students in Yogyakarta Province was 156 thousand students. Applying a confidence level of 95% and a confidence interval of 10%, a total sample of 94 was required (MacCallum RC, Browne MW and Sugawara HM, 1996). Participants were given written consent and parental consent. The Human Ethics Committee approved the Gadjah Mada University research protocol (Agreement No. KE /FK/1052/EC/2021).

Instrument and Procedure

The Participants completed a paper-based survey consisting of the Indonesian version of the Activity Questionnaire (PAQ-A) (Rahayu, Sumaryanti and Arovah, 2022), and the Self-Efficacy for Exercise, the Multidimensional Outcome Expectations for Exercise, and the Physical Activity Self-Regulation Scale which were also in Indonesian. The social demographic survey included age, type of schooling (private or public), learning method (online or offline) and parental education. Based on the stage of adolescence, we categorized the junior high school students intocategorisedly adolescence) and 15-16 years (middle adolescence) (O'Loughlin J et al., 2017). Parental education was assessed as it is found to be associated with adolescent physical activity (Olivares PR et al., 2015). Body weight and height were also assessed using calibrated instruments following evaluated practice.

Physical Activity Questionnaire-Adolescent/PAQ-A

Physical activity for adolescents was assessed using the PAQ-A instrument. It includes nine questions about physical activity in the past week. The first question includes sixteen physical activities that adolescents usually conduct. The second to the seventh questions asked about their physical activity during free time, physical education, lunch, after school, evenings, and weekends. Item eight asks about the frequency of physical activity every day in the last week, while the ninth question compares the physical activity levels to the previous week.

For the first eight items, ratings ranged from 1-5, with the higher number indicating a higher level of physical activity. The ratings for item #1 and item #8 are the average responses. The final score of PAQ-A is the average of items #1 to #8. A total score of '1' indicates low physical activity levels, while '5' indicates high physical activity.

Kowalski et al. (1997) have stated the validity of the PAQ-A by showing a substantial correlation of PAQ-A with different measures of the physical form, including physical activity scores (r =0.73), motion sensor caltrac (r=0,33), 7-day physical activity rating (r=0,59). Previous studies also have confirmed the validity and reliability of the PAQ-A instrument in other countries such as Canada (Kowalsk KC, 2004), England (Aggio D et al., 2016), Poland (Wyszyńska J et al., 2019), Malaysia (Koh D, Zainudin NH and Zawi MK, 2020), Turkey (Polat EA, Guzel NA and Kafa N, 2021), Ethiopia (Andarge E, Trevethan R and Fikadu T, 2021) and Indonesia C22).

Self-Efficacy for Exercise

Self-Efficacy was assessed using the Self-Efficacy for Exercise Scale. This instrument consists of nine statements. The statements describe barriers they may encounter with ten response options ranging from 1-10, in which the higher number represents the higher confidence in overcoming the barriers. The score was the average response from these nine statements.

The validity and reliability of the instrument have been demonstrated in several countries such as Hong Kong (Liang Y et al., 2014), Australia (Hamilton K, Warner LM and Schwarzer R, 2017), China (Ren Z et al., 2020), Greece (Efthymiou V et al., 2022) and Indonesia (Arovah NI and Heesch KC, 2022).

Multidimensional Outcome Expectations for Exercise

The outcome expectation was assessed using the Multidimensional Outcome Expectations for Exercise. This instrument consists of fifteen statements illustrat-

ing the benefits (physical, social and self-evaluation) they may expect from the exercise. There were five response options ranging from 1 strongly disagree to 5 strongly agree. The score was the average of the responses from the 15 items.

The instrument has been validated in America (Wójcicki TR, White SM and McAuley E, 2009), Iran (Abasi MH, Eslami AA and Rakhshani F, 2015), Iran (Ardestani MS et al., 2016), and Malaysia (Majeed NA, Jabbar MA and Jun XC, 2017) and Indonesia (Arovah NI and KC Heesch, 2022)

Physical Activity Self-Regulation Scale

Self-regulation was assessed using the Physical Activity Self-Regulation Scale. This instrument consists of twelve statements that include self-monitoring, goal setting, mobilizing social support, time management, and planning (Watanabe et al., 2017. There were five response options ranging from 1 "never' to 5 'often'. The score then was averaged from these 12 responses.

The instrument has been validated in studies in New York (Umstattd MRet al., 2009), Spain (Campos-Uscanga et al., 2016), Japan (Watanabe et al., 2017 and Indonesia (Arovah NI and Heesch KC, 2022).

Data Analysis

Mann Whitneys were used to compare sociodemography, anthropometry, physical activity levels and social cognitive processes between boys and girls. Spearman correlation was used to assess the relationship between physical activity and social cognitive processes, in total and stratified by sex (MacCallum RC, Browne MW and Sugawara HM, 1996). Data were analyzed using SPSS® version 21.0 (IBM Corp., Armonk, NY, USA) with a significance level of 0.05.

RESULT

Table 1 shows no differences in sociodemographic characteristics. However, as expected, boys were significantly taller and heavier than girls. Table 2 further compares physical activity levels in boys and girls. No significant difference in overall physical activity levels was found between boys and girls. Boys, however, were more active during their spare time (p=0.015) and school recess than girls (p=0.018).

Table 3 further illustrates the comparison between self-efficacy, outcome expectation and self-regulation between boys and girls. For self-efficacy, no difference was found between boys and girls except for the first item, "the weather was not pleasant", in which girls scored higher (p=0.002). For outcome expectations, boys have a higher score in three items ("Exercise will make it easier for me to get along with other people", "Sports will give me the opportunity to be with other people (friends) and "Exercise will increase other people's acceptance of me"). However, no difference was found in the overall outcome expectation and self-regulation score. Finally, Table 4 shows physical activity only correlates with self-regulation in boys (r=0.279, p=0.048) and girls (r=0.444, p=0.003).

Table 1. Sociodemographic and anthropometric comparisons

Characteristics of participants	Totals * (n=94)	Boys (n=51)	Girls (n=43)	p-value#
Age (years)	14.11 ± 3	14.22 ± 3	13.98 ± 3	0.204
13-14 (young teens)	66 (70.2%)	33 (64.7%)	33 (76.7%)	
15-16 (middle teens)	28 (29.8%)	18 (35.3%)	10 (23.3%)	
Height	157.7±8.1	161.9±6.8	152.8±6.6	<0.001
Weight	65.7±11.8	70.6±9.8	59.9±11.4	<0.001
School type				0.542
Public	61 (64.9%)	35 (69.8%)	26 (60.6%)	
Private	33 (35.1%)	16 (31.4%)	16 (31.4%)	
Father's Education Level				0.528
<High School	13 (13.8%)	6 (11.8%)	7 (16.3%)	
≥Highschool	81 (86.2%)	45 (88.2%)	36 (83.7%)	
Mother's Education Level				0.528
<High School	24 (25.5%)	11 (21.6%)	13 (30.2%)	
≥Highschool	70 (74.5%)	40 (78.4%)	30 (69.8%)	

Table 2. Comparison of activity levels between boys and girls

PAQ-A Item Items	Totals (n=94)	Boys (n=51)	Girls (n=43)	P-value#
PAQ-A#1 Physical activity in your spare time: Have you done any of the following activities inthe last 7 days (last week)? If yes, how many times?	1.44±0.29	1.51±0.31	1.36±0.24	0.015*
PAQ-A#2 Do you do physical activities/sportssuch as running, jumping, and throwing during Physical Education lessons?				0.770
a. I did not take Physical Education lessons = score 1.00	3 (3.2%)	2 (3.9%)	1 (2.3%)	
b. Never = score 2.00	8 (8.5%)	6 (11.8%)	2 (4.7%)	
c. Sometimes = score 3.00	39 (41.5%)	20 (39.2%)	19 (44.2%)	
d. Often = score 4.00	33 (35.1%)	17 (33.3%)	16 (37.2%)	
e. Always = score 5.00	11 (11.7%)	5 (11.8%)	5 (11.6%)	
PAQ-A #3 What activities do you often do atlunchtime during school lessons				0.018*
a. Sitting (talking, reading, studying) = score 1.00	41 (43.6%)	15 (29.4%)	26 (60.5%)	
b. Standing or walking around the study area =score 2.00	37 (39.4%)	23 (45.1%)	14 (32.6%)	
c. Run/play a little = score 3.00	8 (8.5%)	6 (11.8%)	2 (4.7%)	
d. Running/playing a bit = score 4.00	3 (3.2%)	2 (3.9%)	1 (2.3%)	
e. Running/playing a lot = score 5.00	5 (5.3%)	5 (9.8%)	0 (0%)	
PAQ-A #4 How many times a week do you dophysical activity/sports when you finish school?				0.346
a. None = score 1.00	6 (6.4%)	5 (9.8%)	1 (2.3%)	
b. 1 time a week = score 2.00	43 (45.7%)	21 (41.2%)	22 (51.2%)	
c. 2 or 3 times a week = score 3.00	40 (42.6%)	21 (41.2%)	19 (44.2%)	
d. 4 times a week = score 4.00	2 (2.1%)	2 (3.9%)	0 (0%)	
e. 5 times a week = score 5.00	3 (3.2%)	2 (3.9%)	1 (2.3%)	
PAQ-A #5 How many times a week do you dophysical activity/exercise in the afternoon or evening?				0.662
a. None = score 1.00	30 (32.0%)	18 (35.3%)	12 (27.9%)	
b. 1 time a week = score 2.00	22 (23.4%)	13 (25.5%)	9 (20.9%)	
c. 2 or 3 times a week = score 3.00	33 (35.1%)	17 (33.3%)	16 (37.2%)	
d. 4 or 5 times a week = score 4.00	7 (7.4%)	2 (2.9%)	5 (11.6%)	
e. 6 or 7 times a week = score 5.00	2 (2.1%)	1 (2.0%)	1 (2.3%)	
PAQ-A #6 How many times do you do physical activity/exercise at the end of the weekend?				0.061
a. None = score 1.00	25 (26.6%)	17 (33.3%)	8 (18.6%)	
b. 1 time = score 2.00	34 (36.2%)	13 (25.5%)	21 (48.8%)	
c. 2-3 times = score 3.00	27 (28.7%)	17 (33.3%)	10 (23.3%)	
d. 4-5 times = score 4.00	6 (6.4%)	2 (3.9%)	4 (9.3%)	
e. 6 = score 5.00	2 (2.1%)	2 (3.9%)	0 (0%)	
PAQ-A #7 Choose the most sentence describe your physical activity in the past week				0.500
a. I rarely/almost never exercise = score 1.00	23 (24.5%)	14 (27.5%)	9 (20.9%)	
b. I exercise 1-2x/week = score 2.00	52 (55.3%)	28 (54.9%)	24 (55.8%)	
c. I exercise 3-4x/week = score 3.00	14 (14.9%)	6 (11.8%)	8 (18.6%)	
d. I exercise 5-6x/week = score 4.00	3 (3.2%)	1 (2.0%)	2 (4.7%)	
e. I exercise 7x/week = score 5.00	2 (2.1%)	2 (3.9%)	0 (0%)	
PAQ #8 Mark how often you did physical activity (such as exercising, playing, dancing,or other physical activity) for each day of thepast week.	2.32±0.76	2.35±0.82	2.28±0.70	0.655
PAQ-A total score	**2.23 ±0.48**	**2.24±0.53**	**2.21±0.42**	**0.788***

Table 3. Comparison of self-efficacy, outcome expectations, and self-regulation of physical activity

Physical Activity Self-Efficacy Items	Totals * (n=94)	Boys (n=51)	Girls (n=43)	p-value#
Self-Efficacy				
The weather is not pleasant	2.91±1.85	2.39±1.65	3.53±1.91	0.002*
You feel bored with sports programs or activities	3.00±2.06	2.98±2.29	3.02±1.79	0.921
You feel pain while exercising	3.40±2.51	3.61±2.77	3.16±2.16	0.394
You have to exercise alone	4.23±2.96	4.27±3.20	4.19±2.69	0.886
You don't enjoy the sport	2.98±2.27	3.16±2.50	2.77±1.97	0.411
You are too busy with other activities	3.50±2.58	3.37±2.57	3.65±2.61	0.604
You feel tired	3.81±2.68	3.84±2.93	3.77±2.38	0.892
You feel stressed	2.98±2.13	3.06±2.17	2.88±2.11	0.694
you feel so sad (depressed)	**2.85±2.33**	**2.92±2.63**	**2.77±1.95**	**0.751**
Self-Efficacy total score	**3.30 ±1.57**	**3.29 ±1.62**	**3.30 ±1.53**	**0.963**
Outcome Expectations				
Sports will improve my ability to do daily work	3.74±0.93	3.82±0.91	3.65±0.95	0.372
Sports will improve my social standing	3.22±0.94	3.24±0.95	3.21±0.94	0.895
Exercise will help improve body function	4.05±0.92	4.10±0.96	4.00±0.87	0.609
Exercise will manage stress	3.36±1.23	3.27±1.22	3.47±1.24	0.456
Exercise will strengthen my bones	4.12±1.04	4.20±1.08	4.02±0.99	0.423
Exercise will improve mood	3.54±1.04	3.55±1.06	3.53±1.03	0.948
Exercise will increase my muscle strength	4.12±0.93	4.25±0.99	3.95±0.82	0.116
Exercise will make it easier for me to get along with other people	3.50±1.13	3.76±1.14	3.19±1.05	0.013*
Exercise helps me control my weight	4.07±0.99	4.20±0.98	3.93±0.98	0.195
Exercise will help psychological state	3.60±1.04	3.78±1.08	3.37±0.95	0.055
Sports will give me the opportunity to be with other people (friends)	3.73±1.09	4.00±1.02	3.42±1.09	0.009*
Exercise will improve the function of my heart and blood ves-sels	4.05±0.99	4.18±1.01	3.91±0.95	0.189
Exercise will increase my mental alertness	3.73±1.04	3.88±1.05	3.56±1.01	0.132
Exercise will increase other people's acceptance of me	3.67±1.11	3.88±1.09	3.42±1.09	0.043*
Sport will give me the feeling (satisfied) that I can achievesomething (what I want)	3.86±1.00	3.98±1.01	3.72±0.98	0.212
Outcome Expectation total score	**3.76 ±0.79**	**3.87 ±0.81**	**3.62±0.76**	**0.129**
Self-Regulation				
I monitor my own physical activity	2.8 ±1.04	2.75±1.09	3.00±0.98	0.240
I know things that help me to be active	2.96±0.97	2.82±0.97	3.12±0.96	0.147
I set a short-term goal of how often I am active	2.63±0.96	2.57±0.94	2.70±0.99	0.520
I set physical activity goals that focus on my health	3.07±0.91	3.02±0.88	3.14±0.94	0.526
I ask others for suggestions or examples of physical activity	2.64±1.14	2.51±1.12	2.79±1.15	0.234
I m and examples of physical activity to experts or profession-als	2.47±1.16	2.57±1.15	2.35±1.17	0.363
I feel comfortable after physical activity	3.16±1.09	3.02±1.16	3.33±0.99	0.177
I remind myself the benefits of physical activity for health	3.13±1.09	3.10±1.08	3.16±1.11	0.776
I schedule a specific time for physical activity	2.78±1.13	2.63±1.11	2.95±1.13	0.164
I organize my schedule so that I have time for physical activity	2.73±1.15	2.63±1.17	2.86±1.13	0.329
I plan ways to do physical activity while travelling away from home	2.30±1.14	2.39±1.23	2.19±1.03	0.387
I plan ways to do physical activity in unfavourable situations	2.23±1.10	2.31±1.16	2.14±1.04	0.448
Self-regulation total score	**2.75±=0.72**	**2.69 ±0.70**	**2.81±0.75**	**0.434**

Table 4. Correlation between physical activity, self-efficacy, outcome expectations, and self-regulation in boys and girls by (n=94)

Variable	Physical activity	Self-efficacy	Outcome expectations	Self-Regulation
Total				
Physical activity	1			
Self-efficacy	0.156	1		
Outcome expectations	0.179	0.196	1	
Self-Regulation	0.373*	0.096	0.382*	1
Boys				
Physical activity	1			
Self-efficacy	0.165	1		
Outcome expectations	0.228	0.316*	1	
Self-Regulation	0.279*	0.047	0.504*	1
Girls				
Physical activity	1			
Self-efficacy	0.178	1		
Outcome expectations	0.182	0.079	1	
Self-Regulation	0.444*	0.157	0.230	1

DISCUSSION

The results of this study indicated that the physical activity levels between boys and girls in Yogyakarta were similar. The findings, however, disagree with several findings from other settings that indicated boys are usually more physically active than girls. As reported by Allafi A et al. (2013), in Kuwaiti, boys spent 3.8 hours per week, and girls spent 2.9 hours per week on average in moderate-intensity physical activity (Allafi A et al., 2014). Similarly, Qiu & Hou (2020) reports that in China, boys spent 1 hour longer per week than girls in being physically active (Qiu C and Hou M, 2020). They report that girls spend more time in sedentary activities such as reading and studying (Qiu C and Hou M, 2020).

The absence of this difference may be due to the difference in the instrument used in these studies. This current study used PAQ-A, which did not specify an exact time (hour and minute), but the level of physical activity ranges from 1 to 5, with a higher score indicating a higher physical activity level. The difference may also be due to the fact that the research was conducted during the COVID-19 pandemic and that some schools were implementing blended and online learning that may limit both boys' and girls' opportunities to be physically active, thus, may blunt the possible differences. The limited opportunities to be physically active during the COVID-19 pandemic have also been suggested by studies in Canada (Andrieieva O et al., 2019), Ukraine and Hungary (Berki T and Pikó BF, 2021). Similarly, decreased physical activity levels were also reported among adolescents in Indonesia during the pandemic (Arovah NI and Heesch KC, 2022). However, with the gradual opening of schooling in Indonesia and many parts of the world, a follow-up study is required to confirm the findings of this current study.

The results of the study show that there were no differences in overall self-efficacy, outcome expectation and self-regulation between boys and girls. Girls, however, reported higher self-efficacy scores in an item related to weather. To some extent, the results of this study are in line with the research in the United States, indicating that girls reported higher self-efficacy and fewer barriers to physical activity (Dishman RK et al., 2005).

In this study, there were also no differences between male and female adolescents for the overall outcome expectations except for the items related to social standing. It appears that boys perceived the social benefits of being physically active more than girls. This is in line with a study by Moore et al. (2020) in Canada, suggesting a higher outcome expectation in boys than girls (Moore et al., 2020). (Roshita A et al., 2021) indicate that boys are motivated to be physically active to increase interaction with other people (Roshita A et al., 2021). This current study also did not find a difference in self-regulation in physical activity between boys and girls. The results of this research align with a study by

Gellert P et al. (2012) in Germany that indicated the same levels of self-regulation between boys and girls (Gellert P et al., 2012).

This study indicated that physical activity was positively correlated with self-regulation but not with outcome expectations and self-efficacy. To some extent, it is in line with the research by Watanabe et al. (2017) in Japan and research by Ross SET et al. (2013) and Gaylis et al. (2020) in the United States (Watanabe et al., 2017; Ross SET et al., 2013; Gaylis JB, Levy SS and Hong MY, 2020). In addition, Gaylis et al. (2020) reported that adolescents with good self-regulation report greater physical activity (Gaylis JB, Levy SS and Hong MY, 2020). However, the findings of this current study may need to be confirmed.

According to Lee & Yoo (2018) and Harbowo et al. (2018), lack of physical activity in adolescents needs to be addressed immediately (Lee EY and Yoon KH, 2018); (Harbuwono DS et al., 2018). efforts that can be made to increase physical activity have not reached the recommendations and improve their behaviour, including by promoting health education in schools (Gråstén, 2016). To increase its effectiveness, health education programs in schools need to be developed based on behavioural change theories, including SCT, particularly by increasing self-regulation skills such as goal setting, planning and scheduling and self-monitoring (Keeler HJ and Kaiser MM, 2010; Kassie AM et al., 2020).

The main strength of our study is that we have used a validated instrument for assessing the outcome of interests (i.e., physical activity level and social cognitive processes). However, several limitations need to be acknowledged. First, we conducted the survey during the COVID-19 pandemic, in which some schools still employed online or blended learning modes. Therefore, students or adolescents may not have adequate opportunities to become physically active. Secondly, this study was conducted in modest sample size, constrained by limited resources. Further research, therefore, is required to confirm this finding, particularly with the adolescents and school transition into full offline learning mode.

CONCLUSION

Based There is no difference in the overall level of physical activity, self-efficacy, outcome expectation and self-regulation between boys and girls. Furthermore, there is no relationship between the level of physical activity with self-efficacy and outcome experience. On the other hand, adolescents with higher self-regulation tend to have higher physical activity levels. Therefore, improving social regulation skills such as self-monitoring, goal setting, mobilizing social support and time management and planning is essential to promote physical activity levels among adolescents (girls and boys). The results of this study can be used as a basis for developing the level of physical activity in adolescents.

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CONFLICT OF INTEREST

The authors declared no conflict of interest.

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