

Correlates of Physical Activity in Asian Adolescents: A Literature

Review

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Background: Physical activity is important to prevent several chronic diseases in adulthood. Nowadays, young people do not regularly perform physical activity. Several factors may influence their decision. Most of studies were conducted in western countries. However the findings might not be generalized regarding the differences in culture and social condition. Therefore, reviewing the correlates of physical activity among adolescents in Asian countries is essential.

Purpose: To update the state of knowledge on factors associated with adolescents' physical activity in Asian countries.

Methods: Literature review on existing articles retrieved from electronic databases was conducted. The review on factors of physical activity was set based on the setting of study, adolescents as participants of the study and the year of publication ranged from 2002-2011.

Result: The findings compiled the evidence of relationships between physical activity and several influencing factors. Intrapersonal factors (age, gender, socioeconomic status, parental education, and perceptions related to physical activity- perceived self efficacy, perceived benefits, and perceived barriers), interpersonal factors (family and peer influences) and extra-personal factors (school policy and living arrangement) were identified. Self efficacy was manifested as the strongest influencing factor in most studies. This review highlighted the cultural issues on physical activities of adolescents in Asian countries.

Conclusion: This paper provided comprehensive knowledge related to factors influencing physical activity in Asian adolescents. The issue of cultural sensitivity should be considered in the future intervention program designed to improve physical activity of adolescents.

Keyword: adolescent, physical activity, health Promotion, Asian countries

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Background

Chronic diseases become the major burden and serious threat to the health of population around the world (Nugent, 2008). Several chronic diseases including cardiovascular disease, diabetes and cancer affect approximately 59% of the 57 million deaths annually and reach 46% of the global burden of disease (WHO as cited in Lim et al., 2010). Indonesia is one of the developing countries that has the increasing number of chronic diseases. It was estimated around 1.1 million people died in Indonesia because of the impact of chronic disease and this number would increase 21 percent over the ten years later (The Partnership to Fight Chronic Disease [PFCD], 2011). The occurrence of chronic disease is strongly associated with the unhealthy lifestyle behaviors.

Physical activity has been proposed as one of the healthy lifestyles established in current years as a significant way to respond with the variety health problems of poor sedentary lifestyles (Schoppe, Bauman & Bull, 2004). It can prevent and control the variety of chronic illness such as coronary heart disease, hypertension, diabetes, colon cancer, and osteoporosis (Fletcher, Balady & Blair as cited in Delisle, Werch, Wong, Bian & Weiler, 2008). Pender, Murdaugh and Parson (2002) mentioned the regular physical activity has strong correlation with the physiologic stability, can gain high level of individual functioning while it is also able to diminish the risk of depression, and enhance individual self esteem and self concept. In the case of children and adolescents, physical activity not only can prevent the risky behaviors but also give the health advantages to this population (Pate, Trost, Levin & Dowda as cited in Wu, Robbins & Hsieh, 2011) particularly to build the normal skeletal development and achievement of peak bone of mass (Pender, Murdaugh & Parson, 2002), producing healthy bones, maintain the psychological well being (Boreham & Riddoch as cited in Lee, Loprinzi & Trost, 2010), and modify the cardiovascular risk factors (Insani, Putra & Firmansyah, 2010).

There are different influencing factors of physical activity. Since most of the studies were conducted in the western countries, thus, it is uncertain whether those factors can be generalized into the population of Asian countries (Lee, Loprinzi & Trost, 2010). Therefore, reviewing about the contributing factors of physical activity in Asian adolescents is essential.

Objectives

This study aimed to update the state of knowledge on factors associated to physical activity in Asian adolescents. The cultural issue and the recommendations for the future intervention program will be discussed.

Methods

To achieve the objectives of this study, the writer used CINAHL, Science Direct and PubMed databases as the main channel to search the existing studies about the related factors of physical activity in Asian adolescents. Several keywords used to find those articles are adolescent, physical activity, health promotion, and Asian countries. The review on factors of physical activity was set based on the setting of study, adolescents as participants of the study and the year of publication ranged from 2002-2011. Finally, the literature review on existing articles was retrieved.

Results

Target Population

Almost the target population in this study was adolescents with the aged range 12-18 years old. The average of participants enrolled in the grade 12th-16th in the junior and senior high school.

Methodology

Most of the study design that included in this review was cross sectional studies (Aniza & Fairoz, 2009; Chen, Haase & Fox, 2007; Haddad, 2011; Hwang & Kim, 2011; Kim & Cardinal, 2010; Lee, Loprinzi & Trost, 2010; Mak, et al, 2011; Taymoori, et al, 2009; Wu & Pender, 2002; Xu, et al, 2009) with the large sample size in the average. One study is the longitudinal study that conducted by Locke et al. (2006) and another one is quasi experimental study to identify the effectiveness of physical activity promotion program (Teerarungsikul, et al, 2009).

Conceptual framework

To determine the influencing factors in performing physical activity, the theoretical framework is essential to be considered. Several frameworks were used; Pender Health Promotion Model (HPM), Trans-theoretical model (TTM), Social Cognitive Theory (SCT), Theory of Reasoned Action (TRA) and the Conflict Model of Decision-Making Theory.

Table 1. Summary of Research Studies

No	Source	Country	Participants	Measurements of PA	Design	Theoretical framework	Outcomes	Cultural issue & Recommendation
1.	Kim & Cardinal (2010)	Korea	1347 students, 7 th to 12 th	The Weekly Leisure-Time Exercise Questionnaire	Cross sectional study	Social Cognitive Theory and The Conflict Model of Decision- Making Theory	<ul style="list-style-type: none"> - Self efficacy: positive → strongest direct effect to PA - Social support (friend and family): positive → friend support had stronger relationship than family support - Perceived barriers: opposite - Perceived benefits: positive 	<ul style="list-style-type: none"> - The influence of westernization makes the Korean's culture has been changed: family-centered have moved to friend- centered - Adolescents more interdependence to friends rather than family
2.	Chen, Haase & Fox (2007)	Taiwan	2235 adolescents, aged 12-18 years	Self reported: The personal Health Behavior and Adolescent Questionnaire	Cross sectional study	No specific explanation	<ul style="list-style-type: none"> - Age: PA declined with age - Gender: female less active - Residential location: urban students more active than rural students - Physical education lesson: positive - Smoking and drinking status: negative 	<ul style="list-style-type: none"> - The sedentary time reported more than 8 hours/ day → the high value of Chinese students to study more than 8 hours per day in school → limited opportunity to engage in recreational PA - Result recommended: higher time spent in positive sedentary behavior might lead

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No	Source	Country	Participants	Measurements of PA	Design	Theoretical framework	Outcomes	Cultural issue & Recommendation
							- Sedentary time: positive	higher participation in physical activity
3.	Lee, Loprinzi & Troost (2010)	Singapore	1814 adolescent, age 13 to 16 years	Three-Day Physical Activity Recall (3DPAR)	Cross sectional study	Social Cognitive Theory (SCT) and Theory of Reasoned Action (TRA)	- Gender: Boys more active than girls - Self efficacy: positive (M/F) - Enjoyment of PA: positive (M/F) - Parental support (M/F) - Participation in school sports: positive (M/F) - Access to facilities: positive (F)	- Intervention recommended: propose variety of physical activity in both traditional and nontraditional → meet the interests of students
4.	Haddad (2011)	Uni Arab Emirates (UAE)	258 female students, aged 12-15 years (grade 7 th -9 th)	Self reported questionnaire (24 items)-no specific name	Cross sectional study	No specific explanation	- Environmental factors (PA outside school hours): positive - Family support: positive - Perceived benefits: positive - Health status: positive - Perceived barriers: lack of information	- Several cultural barriers and perception have found include the students feel embarrassment to wear sports' dress, uncomfortable with body perspiration, perform the PA related to masculinity. - The recommendation for further research:

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No	Source	Country	Participants	Measurements of PA	Design	Theoretical framework	Outcomes	Cultural issue & Recommendation
							about the benefits of PA, lack of desire, transportation problems and cultural barriers	strengthen the physical education in school especially to overcome the barriers of PA, expand the contributing factors to PA and arrange the policy safety and private place for female to perform PA.
5.	Aniza & Fairoz (2009)	Malaysia	519 adolescents, aged 14-16 years	The International Physical Activity Questionnaire (IPAQ)	Cross sectional study	No specific explanation	<ul style="list-style-type: none"> - Gender: Female less active than male - Unemployed mother: opposite - Personal barriers: time constraint (e.g., burden of homework, tuition) and weather factors - Knowledge and attitudes of PA: positive - Environmental factors: positive →strongly influence 	- Further research: should be identifying other factors that influence physical activity by proactive measures in order to promote the health benefits of physical activity

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No	Source	Country	Participants	Measurements of PA	Design	Theoretical framework	Outcomes	Cultural issue & Recommendation
6.	Taymoori, et al (2009)	Iran	1073 students, aged range 12-17 years	The Child/ Adolescent Activity Log (CAAL)	Cross sectional study	Pender HPM and Trans Theoretical Model (TTM)	<ul style="list-style-type: none"> - Self efficacy: positive (M/F) → the best predictor of stage of change - Perceived benefits and barriers: significant predictors of stage of exercise change (M/F) - Enjoyment of PA (M) 	<ul style="list-style-type: none"> - The cultural barriers that found in the female students related to responsibility to housework, limited PA opportunity and low cultural expectation that female should perform exercise - Recommendation: important to provide convenience environment to increase PA and need understanding the level of PA to develop successful intervention program
7.	Xu, et al (2009)	China	2375 students aged 13-15 years (grade 7 th -9 th)	International Physical Activity Questionnaire (IPAQ)- the Chinese version	Cross sectional study	No specific explanation	<ul style="list-style-type: none"> - Gender: Boys more active than girls - Residential density: negative association (high density areas, less physically active) 	<ul style="list-style-type: none"> - The findings revealed that are the limited space of neighborhood areas or facilities (e.g., parks, sport fields) while in the other side this density areas also probably less recreational facility

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No	Source	Country	Participants	Measurements of PA	Design	Theoretical framework	Outcomes	Cultural issue & Recommendation
8.	Teerarungsikul, et al (2009)	Thailand	Female adolescents, 43 students in the experimental and 38 students in the control group (grade 7 th -8 th)	The Physical Activity Questionnaire (PAQ) and Physical fitness test	Quasi experimental study	Pender's HPM and Bandura's Self Efficacy Theory	<ul style="list-style-type: none"> - Self efficacy: positive - Physical activity in the experimental group were significantly higher than control group after the eight week - Physical fitness: no significant different between control and experiment group 	<ul style="list-style-type: none"> - The physical activity promotion program has beneficial effect to the adolescents' self efficacy and improvement of physical activity - The longitudinal study with follow-up is required for the future due to the successful of the program
9.	Hwang & Kim (2011)	Korea	851 students, aged 13 to 18 years	The self reported questionnaire consist of 5 items of regular physical activity in yes-and-no questions	Cross sectional study	Trans Theoretical Model (TTM)	<ul style="list-style-type: none"> - Gender: Females less active than males (Females likely in the inactive stage while males are inverse) - Overall 66% adolescents less physically active - Social support: positive 	<ul style="list-style-type: none"> - Probably the limited participation of Korean adolescents to PA related to the overload of homework-academic centered - Further research should consider the cognitive and behavioral strategy in order to encourage physical activity behavior

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No	Source	Country	Participants	Measurements of PA	Design	Theoretical framework	Outcomes	Cultural issue & Recommendation
10.	Locke, et al (2006)	Philippines and Chinese	- Filipino: 760 males and 872 females, aged 14-16 years - China: 202 males and 197 females	The self reported PA about type, frequency, duration of PA, PA during school and outside, and selected secondary activities.	Longitudinal study	No explicit theory	- Active commuting (high prevalence in both countries) - Pattern of school sport participation: differ by gender. The male higher participate rather than female in Filipino while in China contrarily. - Sports/ exercise outside school: low in both countries	
11.	Mak, et al (2011)	China	32,005 adolescents, aged 13-18 years	The self reported questionnaires to define the duration of exercise (e.g., jogging, swimming, hiking) and NEPA (e.g., walking, climbing stairs) per day after school time and holiday	Cross sectional study	No explicit theory	- Gender: boys achieve higher exercise than girls Age: Exercise and NEPA (Non- exercise physical activity) declined rapidly with age - The prevalence of adolescents performing exercise was lower than NEPA regarding age and gender	The natural atmospheres in Hongkong with hot weather and high density population is one of factor that decrease the desire to perform PA - The behavior of youth in this area: highly academic concern and typically digital entertainment

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No	Source	Country	Participants	Measurements of PA	Design	Theoretical framework	Outcomes	Cultural issue & Recommendation
12.	Wu & Pender (2002)	Taiwan	832 adolescents in junior high school	The Child/ Adolescent Activity Log (CAAL)	Cross sectional study	Health Promotion Model	<ul style="list-style-type: none"> - Self efficacy: positive → strongest factor - Perceived benefit: positive - Perceived barriers: opposite - Social support: positive - Modelling: positive - Norm: positive - Competing demand: no significant relationship 	<ul style="list-style-type: none"> - The Taiwanese adolescents were less obedient to their parent - Peer influence are stronger than parental influence → cultural alter in Taiwan that mothers spend more time outside than with their children. - Further research should explore the other contributed factors in the HPM model with longitudinal data to provide the appropriate ways increasing physical activity in adolescents.

Instruments

The measurement of physical activity varied across the study. The International Physical Activity Questionnaire (IPAQ) was used in two studies (Aniza & Fairoz, 2009; Xu, et al, 2009). Kim and Cardinal (2010) used The Weekly Leisure-Time Exercise Questionnaire to assess the regular physical activity behavior by asking the frequency and duration of performing physical activity during the typical week. Another study that conducted by Chen, Haase and Fox (2007) used the Personal Health Behavior and Adolescent Questionnaire, while two studies of Taymoori et al. (2009) and Wu et al. (2002) used The Child/ Adolescent Activity Log (CAAL) to ask the participants recall their physical activity including the duration of time in the previous days. Lee, Loprinzi and Trost (2010) assessed the physical activity using Three-Day Physical Activity Recall (3DPAR) that required the participants to recall their activities in previous three days. This kind of instrument grouped the activities into several categories including sleep/ bathing, eating, work, interschool/ spare time/ hobbies, transportation, and physical activities/ sports. Teerarungsikul, et al (2009) used the Physical Activity Questionnaire (PAQ) to evaluate the frequently of participants in performing physical activity within the previous seven days. Since this study was experimental study, the physical fitness test was also conducted to assess the four fitness assessments including sit-ups, push-ups, sit-reach and run. In addition, other studies (Haddad, 2010; Hwang & Kim, 2011; Locke, et al, 2006; Mak, et al, 2011) used the self reported questionnaire to assess the physical activity however did not mentioned specific name of the instruments.

Contributing factors

To direct in reviewing the influencing factors of physical activity in this study, the factors were classified into intrapersonal factors (age, gender, socioeconomic status, parental education, and perceptions related to physical activity- perceived self-efficacy, perceived benefits, and perceived barriers), interpersonal factors (family and peer influences) and extra-personal factors (school policy and living arrangement).

Intrapersonal factors

All of the studies reported that age was reversely associated with adolescents' inactivity while there was a decrease in performing physical activity in both male and females as they aged. Similarly for the gender, most of studies stated that gender has significant correlates of physical activity while boys more active in performing physical activity than the girls (Chen, Haase & Fox, 2007; Lee, Loprinzi & Trost, 2010; Aniza & Fairoz, 2009; Hwang & Kim, 2011; Locke, et al, 2006; Mak, et al, 2011). However in one study that compare between Philippines and Chinese adolescents, it was found that pattern of school sport participation are differ by gender. Although in Philippines the male students higher participate rather than female, in China vice versa (Locke, et al. 2006).

A study that conducted by Aniza and Fairoz (2009) found that unemployed mother was negatively associated with physical activity while the students who have unemployed mother tended to be less active. Other factors that have negative association with physical activity are smoking and drinking. According to Chen, Haase & Fox (2007), the adolescents who smoked and drank alcohol were less physically active.

Several studies revealed that self efficacy is the strongest influencing factors in performing physical activity (Kim & Cardinal, 2010; Lee, Loprinzi & Trost, 2010; Taymoori et al, 2009; Teerarungsikul et al, 2009; Wu & Pender, 2002). Lee et al (2010) in their study found that self efficacy was positively correlated with physical activity in both female and male adolescents (Wu, et al, 2002). Similarly, Kim, et al (2010) and Wu, et al (2002) stated that adolescents with high self efficacy will more likely contribute to physical activity rather than those who have low self efficacy. In another way, Teerarungsikul, et al. used self efficacy as the strategy to promote physical activity program in Thai adolescent girl.

Perceived barriers and perceived benefits are stated as the determinants of physical activity (Wu & Pender, 2002). In the study that conducted by Taymoori, et al (2009), it found that the perceived barriers and perceived benefits were the significant predictors of level of exercise change in female and male adolescents. Haddad (2011) in the study initiated that the participants who perceived the benefits

of physical activity will 8.14 times more likely to engage in physical activity. This is also supported by the statement in the decision theory that revealed the individual will be difficult to change his/ her behavior until they perceive the benefits of the activity and overcome the barriers (Prochaska & Marcus as cited in Kim & Cardinal, 2010).

Interpersonal factors

Social support is an important factor that influences the performance of physical activity. According to Park and Kim (2008), the parental support and friend support have significant correlates with adolescent's physical activity. In this reviewing study, several research articles identified that social support has a positive relationship with the physical activity (Haddad, 2011; Hwang & Kim, 2011; Kim & Cardinal, 2010; Lee, Loprinzi & Trost, 2010; Wu & Pender, 2002).

Extra-personal factors

Residential location is stated to be a correlate in participation of physical activity. It was reported that the urban students are more active than the rural students (Chen, Haase & Fox, 2007). However, in the high density areas, the finding was contrary while it was mentioned that the higher density areas have lower participation of adolescents in physical activity (Xu, et al, 2009).

Discussion

The initial reviewing study purposes to identify the correlates of physical activity in Asian adolescents. Several variables have been reported to be significantly associated with the physical activity that was quite similar. However, the cultural issues varied and differ from the western studies.

Several cultural issues that emerged in several countries regarding the performance of physical activity should be considered. The issues regarding influence of westernization, high academic value in several countries, hot weather and limited area for performing physical activity should be emphasized for conducting appropriate intervention. Further, the cultural barriers also have been found in some studies especially in female students. Related to the hot weather, most of them assumed the hot weather can make them get dark skin, meanwhile they really love white skin. Thus, they prefer to avoid performing any outdoor physical activities. The

situation is different from the western countries in which most of the adolescents put their effort for getting the dark skin. Since in Asian countries the numbers of Muslims were high, thus finding appropriate strategy is essential or the decreasing number of physical activity among Muslim female students will be continuously prolonged. This issue should be obtained more attention from all the related stakeholders to strengthen the physical education in the school and organize the policy safety along with the private place for Muslim females to perform physical activity.

Limitations

This study has some limitations. Firstly, since this review only limited to the existing study in Asian countries, there are limited studies found. Secondly, overall the studies in this review using self-reported questionnaires as the instrument to assess the physical activity. This kind of measurement is appropriate for the survey especially in the big number of sample size, however potentially leads to recall bias of the participants. Thus, the accuracy of self report might contribute to the findings.

Conclusions

This study provided the update knowledge related to correlates of physical activity in Asian adolescents. The emerging cultural issues of some countries should be considered in the future intervention program designed to encourage the participation of physical activity in Asian adolescents.

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