International Journal of Social Science and Education Research Studies

ISSN(print): 2770-2782, ISSN(online): 2770-2790

Volume 03 Issue 07 July 2023

DOI: https://doi.org/10.55677/ijssers/V03I7Y2023-39, Impact Factor: 5.574

Page No : 1493-1498

Examining the Role of Physical Fitness and Perceived Autonomy Support in Academic Performance of Medical Students in Guangzhou China

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ABSTRACT

Recent researchers found that undergraduate medical students experience academic pressure due to less support from teachers and little recreation time. Therefore, the current study aimed at examining the important relationship between perceived autonomy support, physical fitness, and academic performance among medical students. Since, numerous researches raised the concern of poor academic performance of undergraduate medical students. A total of 503 data was collected using stratified random sampling from 4 medical university. Data was gathered using standardized measures. Descriptive statistics and Pearson Product Moment Analysis were run using SPSS software. Results revealed that there is a significant positive relationship between perceived autonomy support, physical fitness, and academic performance. Studies present useful insight for policy makers, stakeholders, and teachers.

Published Online: July 31, 2023

KEYWORDS:

Perceived autonomy support, physical fitness, academic performance, and medical students.

1. INTRODUCTION

For the development of a country higher education plays a very significant role (Tekle & Fesshaye, 2017). China's higher education has experienced development in leaps and bounds in the past few decades. The enrolment of various types of higher education in China was 40.02 million, and the higher education total enrolments rate was 51.6% in 2019. By 2020, the gross enrolment rate of higher education in China would reach 40% (Shi et al., 2017), and China has now become the largest country in terms of the scale of higher education (Shi et al., 2017). Meanwhile the scale expansion, the Ministry of Education has implemented an assessment of the undergraduate teaching level, which has played a certain role in guaranteeing the infrastructure and teaching levels of colleges and universities. However, this measure is only the basic work or primary stage to determine the credibility of higher education and does not touch core lifeline of the quality of higher education (Zhang et al., 2022).

China has a large population (1.37 billion by 2014) (National Bureau of Statistics of China, 2015) with relatively limited educational resources gives rise to intense academic competition and pressure (Martin et al., 2010). Reports of a surveys conducted in four different countries i.e., Japan, US, Korea and China revealed that the length of the typical school day is longest in China as compared to the other three countries (Li, 2017). A single week day of high school in China contains more than 12 hours of study for a student, leaving less than half of a day for non-curricular activities (Butrymowicz, 2011). Further, exam oriented educational approaches are used by the teachers which are excessively concerned with their achievement.

Such kind of academic environment leads toward the development of school exhausted emotions and lack of interest in learning, results in lack of commitment (Kirkpatrick & Zang, 2011) hence, leading to poor academic performance. In line with this, it has been reported that 20%-60% of students from middle and high school have low dedication for the school (Xueyou Education Network, 2010). Furthermore, the National Juvenile Internet Use survey (2007) conducted in ten provinces of China found 'too much academic pressure' (66.7%), 'having too little recreation' (30.3%), and 'too few people understand me' (27.6%) among primary and secondary schools' participants Hence, the 'most preferred option' was reported by participants as 'to improve academic achievement' 83.5% (Chen et al., 2014; Gong et al., 2017; Sun et al., 2012). The statistics of high graduation are not true representative of academic performance. Therefore,

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****Cite this Article: Liu Yanjun, Siti Maziha Mustapha, Shariffah Bahyan Binti Syed Ahmad (2023). Examining the Role of Physical Fitness and Perceived Autonomy Support in Academic Performance of Medical Students in Guangzhou China. International Journal of Social Science and Education Research Studies, 3(7), 1493-1498***

the current study would like to understand the academic performance of undergraduates since very few studies have been conducted (Hu, 2018; Aziz & Traiq, 2019).

Academic performance of the students is contingent on their academic success. Students' academic performance makes them more competitive in the job pool and highlighting their future social and occupational success (Santana et al., 2017). However, persistent study pressure can lead towards poor performance and health (Lin et al., 2020). A recent study on 347 Chinese undergraduate students reported stress as a predictor of lower GPA (Lin et al., 2020) which is often due to the fact that these students think overthink about things to accomplish (Nguyen et al., 2018). Furthermore, the recent statistics of Guangzhou University of Chinese Medicine revealed a decline in the academic performance of undergraduate students in the past four years where in year 2017 (40 out of 119), 2018 (32 out of 138), 2019 (64 out of 139), and 2020 (89 out of 135) students scored less than 3.00 GPA which is of a great concern.

One of the ways to overcome these problems is by changing students' lifestyle as Physical Fitness (PF) is found as an important health marker with important effects physical and mental health (Rodriguez-Ayllon et al., 2019) that results in enhanced psychological well-being (Tan et al., 2021) and academic performance among Chinese students (Zhai et al., 2020). However, in China, only 30% of adolescents those between the ages of 9-17 years encounter the Moderate-Vigorous Intensity Physical activity (MVPA) recommendations (Fan & Cao, 2017).

Physical Fitness enhances cognitive performance and academic performance (Ruiz-Hermosa et al., 2019) by improving cognitive control, inhibition, and flexibility and working memory (Ruiz-Hermosa et al., 2019). Many studies have focussed on the pre-primary (Zhai et al., 2020), elementary (Álvarez-Bueno et al., 2017) middle (Wang et al., 2017), or high school-age students (Huang, Zeng, & Ye, 2019). Limited research has been done on undergraduates medical students. Medical education is challenging, demanding, and stressful fields of study as students are expected to acquire diverse academic, clinical competencies, and interpersonal skills (Hou, Mei, Liu, & Xu, 2020). Medical students have heavier academic pressure and less leisure time compared to students in other fields. Therefore, understanding the phenomena among medical students is of great importance. Hence, the current study will be investigating the phenomena understudy among undergraduate medical students at Guangzhou University students.

Social environment of students of which teacher is an essential component plays a significant role in developing students' motivation and enhancing classroom engagement, hence, promoting academic performance (Haakma, Janssen & Minnaert, 2017). A person perceives that his/her views are reinforced by the teacher and are provided him/her prospects to get knowledge and make choices (Cho, & Baek, 2020) is known as autonomy support. When teachers demonstrate supportive behaviours, such as giving them autonomy, setting the expectation standards, providing uninterrupted and strong view, and giving various stimulating, exciting, and significant chores (Fredricks et al., 2016), motivating students to study effectively has led to improved performance.

Most of the studies on autonomy support are conducted in Western countries such as Spain (Huéscar Hernández et al., 2020), Estonia (Tilga et al., 2021), US (Simonton, Solmon, & Garn, 2021) with individualistic cultures. Hence, this study will shed light on non-western collectivistic culture. Furthermore, in China the studies on physical fitness are conducted with pre-primary, elementary, middle (Huang, Zeng, & Ye, 2019), or high-school-age students (Zhai et al., 2020; Wang, 2019) whereas, limited literature in the context of medical undergraduate is available. In this way the study will significantly contribute to the body of literature. Therefore, this research aims to examine the relationship between perceived autonomy support, physical fitness and academic performance among undergraduate Chinese medical students at Guangdong Province.

2. LITERATURE REVIEW

Higher education students' motivation plays a critical role in achieving educational success. During their university or college life, they can behave at their own discretion to a certain degree. They can select lessons and occasionally set their own academic tasks. In addition, they are expected to be self-motivated and self-directed by the teachers (Seli & Dembo, 2019). Therefore, the autonomy perceived from the lecturer can have critical effects on their educational success. Many studies have revealed that positive impacts and educational outcomes, including academic performance, among higher education students (Robbins et al., 2004). Accordingly, it is essential for higher education teachers to support their students for academic learning. So, based on past studies, the first hypothesis of the study is:

H1. There a significant relationship between perceived autonomy support and academic performance of undergraduates.

Physical Fitness and Academic Performance

Numerous researches have reported the relationship between physical fitness and academic performance. Since, physical fitness was associated with academic achievement in an elementary setting (Castelli, Hillman, Buck, & Erwin, 2007). Higher levels of physical fitness have been associated with higher academic achievement (California Department of Education, 2001). Similarly, another research finds out the positive relationship between vigorous physical activity and classroom grades (Coe, Pivarnik, Womack, Reeves, & Malina, 2006). These findings suggest the fact that students who utilize greater amount of time being physically fitness

have a greater working memory. Hence, these studies confirm the phenomena that physical fitness is beneficial to children's mental health and academic performance.

CONCEPTUAL FRAMEWORK

According to a WHO report (2018), more than 80% of adolescents worldwide do not do enough physical activity, despite its numerous benefits to physical, mental and emotional well-being (Vansteenkiste & Ryan, 2013). Physical Education (PE) classes should be aimed at solving this problem as the basic objectives of PF include teaching students to adopt regular physical activity habits in their free time. Thus, teachers play a key role given their influence, not only on the dynamics within PE classes, but also through the interaction they establish with students. Furthermore, teachers could directly impact student involvement in PE classes and whether students adopt active habits outside of the s school setting and/or if those habits last throughout their lives (Trigueros-Ramos et al., 2017)

Self-Determination Theory (SDT; Deci & Ryan, 2016).) suggests that social context can exert an influence on individuals through interpersonal approaches such as autonomy support among students (Ricard, & Pelletier, 2016). Autonomy support involves fostering self-initiative and mental and physical self-development. Hence, the role adopted by the teacher can significantly influence the development of students' basic psychological needs (BPN) (Standage, Duda, & Ntoumanis, 2005). According to SDT, these BPN are defined as essential nutrients for personal development and well-being (Vansteenkiste & Ryan, 2013). Hence, the students who feel more autonomous when making decisions and are competent in their actions, supported and welcomed by the social group at hand, and who find different activities appealing, will experience a satisfaction of their BPN.

Furthermore, such students tend to experience self-determined motivation, which is related to the learning of new habits, the commitment to learning, the improvement of interpersonal relationships and the manifestation of adaptive behaviours (Deci & Ryan, 2016) and enhanced academic performance. Hence, we propose that there will be a significant relationship between perceived autonomy support, physical fitness and academic performance.

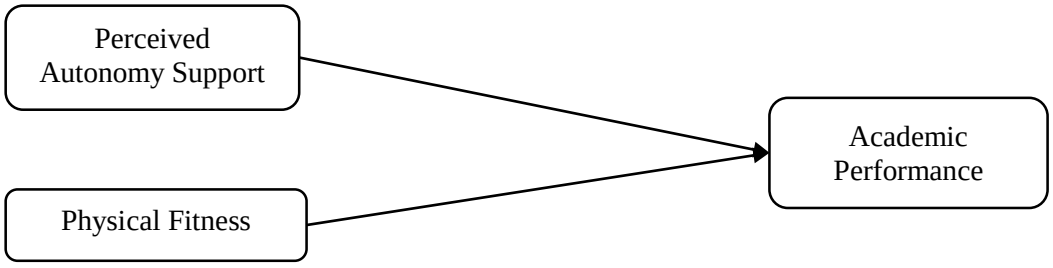

Figure 1. Conceptual Framework of the study

3. METHODOLOGY

Research design

Correlational survey design was used to collect the required information from medical students at one point in time (Edmonds & Kennedy, 2016). This technique is chosen as survey is suitable (Fowler, 2013) due to their structured formats, help researcher to collect large amount of data in a short period of time, and statistical hypothesis can be more objectively analysed (Harwell, 2011).

Sampling

Stratified random sampling technique was used to select a suitable sample of students in the 4 local medicine universities due to the large population. Krejcie and Morgan (1970) defined the sample size as the number of subjects decided to represent the population. Therefore, sample size for the study was made according to the Table for Determining Sample Size from a Given Population made by Krejcie and Morgan (1970). Because the population of this study is over one hundred thousand, the minimum sample size of the field study is 384. However, usually, the number of questionnaires distributed is larger than the minimum sample size because of the response rate and valid rate. According to Hao (2019), an extra 30% of questionnaires will be added and this makes up the number of questionnaires in the field test to 384*(1+30%) =499.

Instruments

Personally administered questionnaire has been used as a research tool in the current study. It is a self-explanatory survey where reading the instructions is necessary, and the respondent fills it in on his own, away from the researcher (Fowler, 2009). There were two sections in the questionnaire Section A includes the demographic questions about the respondents. Section B consisted of standardized tool to measure PAS and PE.

Perceived Autonomy Support

Multidimensional Perceived Autonomy Support Scale (Tilga et al., 2017) was used. The instrument is preceded by the statement "My PE teacher...." It is composed of 15 items grouped into five items per factor to measure cognitive, procedural, and organizational autonomy support. The response for each item is collected through a 7-point Likert-

type scale, ranging from 1 (strongly disagree) to 7 (strongly agree). A high average score in each dimension would, respectively, indicate a high perception in terms of cognitive, procedural, and organizational autonomy support from PE teachers.

Academic Performance

The academic performance was measured by using the Grade Point Average (GPA) from the first semester of the academic year 2020-2021.

Physical Fitness

As per the revised 2014 version of the Chinese National Student Physical Fitness Standard (CNSPFS), eight components of PF were assessed: vital capacity, 50-m sprint, sit and-reach test, standing long jump, timed sit-ups, pull-ups, and 1000-m and 800-m run. PF was calculated by summarizing the scores recorded across the various PF indicators.

Data Collection

Official permission was be sought before collecting data from the university. University administration were personally contacted, and objectives of the study were explained. An informed consent was attached that explained the purpose of the study and confidentiality of the participants were assured. Questionnaires distributed to the students through Wenjuanxing. Researcher provided its contact details so that if the participants have any queries they can ask.

4. RESULTS

Preliminary Analysis

Before proceeding to hypothesis testing some preliminary analysis were administered. For example, missing data occurrence is one of the most unavoidable problems in data analysis, and can have a significant effect on the conclusions that can be drawn from the data. Therefore, to prevent the missing data problem in the current study, all the respondents were given ample time to respond to the questionnaire, and the researcher checked each questionnaire carefully while collection. Therefore, there were the least possibility of missing data at the item-level during the field data collection procedure.

The Mahalanobis Distance (D2) was used to identify multivariate outliers. The value of the Mahalanobis Distance of the 503 samples was conducted using SPSS software and compared against the baseline value established in the Chi-square table (Tabachnick & Fidell, 2019). As totally 53 items were adapted in the three variables of this study, it stands for the degree of freedom in the $\chi 2$ table with $p < 0.001$, so the reference point was 106.22. Upon checking the analysis result, none of the cases in the field study data set had a value larger than 106.22.

Normality of data was measured normality which skewness and kurtosis. Skewness values falling within the range of -1 to +1 indicate that thedata do not depart from normality thus are feasible for parametric tests. In the present study Skewness and Kurtosis values of the variables with normal distribution. Skewness of four variables ranged between -0.39 and -1.42, and kurtosis was within the range between 1.12 and 3.39.

Hypothesis Testing

Demographics aims to furnish information of a population. In this study, the descriptions of the university students from local application-oriented universities collected are: gender and age.

Table 1. Demographic Characteristics of the Respondents (N=503)

Profile	Frequency	Percent (%)
Gender		
Male	277	55.1
Female	226	44.9
Age		
18 and below	210	41.7
19-22	213	42.3
23 and above	80	15.9

Of all the respondents, 55.1 % were male and 44.9% were female. The most common levels of age were 18 and below (41.7%), 19-22 (42.3%) and 23 and above (15.9%).

Pearson correlation was used to measure the existence (given by a p-value) and the strength (given by the coefficient r between -1 and +1) of a linear relationship between two variables. According to Cohen (1988), an absolute value of r of 0.1 is classified as small, an absolute value of 0.3 is classified as medium and of 0.5 is classified as large. In another word, the effect size of absolute r value between 0.1-0.3 is small, between 0.31 and 0.5 is medium, and greater than 0.5 is large.

Variables		PA	PF	AP
Perceived Autonomy (PA)	Pearson Correlation	1	.47**	.21**
Physical Fitness (PF)	Pearson Correlation		1	.64**
Academic Performance (AP)	Pearson Correlation			1

**Correlation is significant at the 0.01 level (2-tailed).

The results of the present study revealed significant positive relationship among all study variables.

DISCUSSION

Perceived autonomy support was found significantly and positively correlated with academic performance. Some previous findings also have shown that perceived autonomy support was strongly correlated with academic performance (Martinek et al. 2022; Wang & Hu, 2022; Okada, 2022). Using different instruments of perceived autonomy support and academic performance, Martinek et al. (2022) did a study among 812 students. They discovered a significant link between perceived autonomy support and academic performance. In a study involving 12058 students, Wang and Hu (2022) looked into the relationship between reading proficiency and felt autonomy support. According to the findings, when students believe their teachers promote their autonomy, internal control, value assessments, and academic satisfaction are all considerably positively related to students' reading proficiency.

Furthermore, this study proved a link between academic performance and physical fitness. Similar findings revealed by Mahenderan (2013) in his research on the relationships between characteristics related to physical fitness and health and school performance. A Pearson's product-moment correlation found a strong relationship between academic performance and physical fitness.

5. SIGNIFICANCE AND FUTURE DIRECTION

Findings of the present study will be helpful for teachers since they can observe from the study findings the important role autonomy in fostering self-initiative and mental and physical self-development among students which significantly influence the academic performance. Teachers will be able to plan suitable strategies to enhance students' autonomy, PF in improving academic performance. Furthermore, findings from this study will help students to understand the importance of PF and teacher autonomy support in enhancing their physical and cognitive abilities. Thus, students will be more aware of the benefits and focus more on these aspects as to enhance their academic performance.

Even though the present study is significantly important however, there are certain limitations of the study. The data for the current study was gathered from Medicine universities which is one of the largest and oldest universities in the province. However, gathering data from other province might provide different findings. Moreover, data will be collected using self-administered questionnaire which may reduce the insight into the study. Due to time and cost limitation, using observation and interviews are not possible although they will provide a deeper insight into the study. Finally, the data will be gathered from undergraduate students using cross sectional research design which will limit the understanding of the phenomenon over the period of time. Since, using longitudinal research design more predictors of academic performance could be found.

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