

Impact of After School Physical Classes, Nutritional Status and Socioeconomic Status on Psychosocial Behavior in Governmental Primary School Children in El-Minia City, Upper Egypt

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ABSTRACT

Background: A child's psychosocial behavior may be significantly impacted by elements such as nutrition, physical exercise, and socioeconomic issues since they are crucial for healthy growth, development, and conduct.

Objective: The aim of the current study is to assess the effect of after school physical activity, nutritional status and socioeconomic status on psychosocial behavior problems of primary school students.

Subjects and methods: Two schools in Minia city were chosen randomly. Apparently healthy male students of the primary 6th grade in both schools were included in the study. A structured questionnaire was applied to collect socio-demographic and nutritional data. Students from the first school (the active group) had 2 extra after-school physical classes for 6 months. Nutritional status assessment was carried out through measurements of weight and height.

/Results: The studied sample included 88 male students; the active group included 42 students and the control group included 46 students. Almost half of each group belonged to families with low-educated mothers (52.3% in the active group vs 45.6% in the control group). Low-income families were more in the active group than in the control group (61.9% vs. 45.6%). The active group got a higher score than the control group ($P < 0.001$), according to Physical Assessment Score. Students with psycho-social problems with a total score ≥ 15 according to PSC-17 were 16 (18.2%). Logistic regression analysis revealed that child order ($P = 0.02$) and maternal education ($P = 0.024$) were strong predictors of psychosocial behavior of children followed by physical fitness ($P = 0.03$) and number of meals per day ($P = 0.05$). **Conclusions:** Birth order, mother education, physical exercise and number of meals consumed per day are the most powerful predictors of psychosocial behavior of children.

Keywords: School physical classes, Psychosocial behavior, Social factors, Children.

INTRODUCTION

A balanced diet and regular exercise are essential for normal growth and development as well as the avoidance of chronic diseases. Therefore, encouraging young people to adopt healthy eating and exercise habits is an important public health measure ^[1]. Numerous research have demonstrated the beneficial effects of physical activity and good eating on conduct, mental health, and academic achievement ^[2,3,4].

Young people's everyday physical exercise has a positive impact on their health in several ways. Regular exercise increases muscular strength, strengthens bones and muscles, lowers the risk of acquiring chronic diseases, boosts self-esteem, and relieves stress and anxiety. Programs that promote physical exercise have been shown to have positive benefits on academic achievement, including higher test scores in arithmetic, reading, and writing as well as less disruptive conduct ^[2]. The inability to get food in a manner that is acceptable to society or the restricted or unpredictable availability of wholesome meals are both considered to be signs of food insecurity ^[5]. Many researches have been done to determine how children's nutritional, physical, and mental health is impacted by food hardship. According to this research, children who are food insecure have lower assessments of their mental and physical health as well as unfavorable emotional, behavioral, academic, and cognitive indicators ^[6,7,8].

Children who live in houses where there is a lack of food frequently display violent behavior,

misbehavior behaviors (such as lying and stealing), despair, and dysfunctional interpersonal relationships. Children also engage in activities including gambling, robbery, murder, school absences, inferiority complex, stigma, and prejudice ^[6]. Reid ^[9] discovered that there was a higher correlation between food insecurity and externalizing behaviors than internalizing behaviors. However, additional research found a link between persistent food insecurity and both internalizing and externalizing issues ^[10,11].

Children in Egypt make up one-fifth of the population. Regional differences in child poverty in Egypt may be seen; in rural and Upper Egypt, it is more prevalent (30.5% of children live in poor homes against 12.6% in urban regions) ^[12]. Poor sanitation and hygiene, as well as insufficient food, are all symptoms of poverty. Inadequate stimulation in the home, high levels of mother stress and depression, and low maternal education are all linked to poverty ^[13].

The aim of the current study is to assess the effect of after school physical activity, nutritional status and socioeconomic status on psychosocial behavior problems of primary school students.

PATIENTS AND METHODS

Primary schools in Minia city are 53 schools, 18 of them are private schools that were excluded from the study. Two schools were chosen randomly, "El Lamaty" school and "Shalaby" school. Only apparently healthy male students of grade 6 in both schools were included in the study. These were 122 students.

Excluded students were shown to have a mental illness, a chronic condition, or hearing or vision impairment, those whose parents refused to allow the children to have after-school physical education classes and those who attended less than 75% of the classes of physical education.

Female students were excluded in this study because physical education required time after school for training and this is not accepted in the local culture of Upper Egypt that put more limitations for females.

The final number was 88 students: 42 from "El Lamaty" school and 46 from "Shalaby" school [school (age = 11.6 ± 0.45 and 11.3 ± 0.31 , respectively, with no significant difference between the 2 groups). The study was carried out between November 2021 and April 2022.

Each student was given a well-structured questionnaire during an interview in order to gather socio-demographic and nutritional information. Age, sex, number of family members, birth order, and parental education level were among the data gathered, parental occupation, family income, and nutritional data including: eating during school day, number of meals per day and skipping breakfast.

Parental education was categorized into: "low parental education" those who did not finish the secondary school, while who finished the secondary school or higher degree were considered as "high parental education".

Family income was estimated by the researcher and the teachers for each student depending on the father job. Roughly, low family income is less than 2500LE per month and the high income is ≥ 2500 LE per month.

Weight and height measurements were used to determine the nutritional status of the subject. The Anthropometric Standardization Manual's methodologies were used for all measurements [14]. Based on growth charts created by the National Center for Health Statistics in conjunction with the National Center for Chronic Disease Prevention and Health Promotion in 2000, weight-for-age and height-for-age scores were computed for each student [15].

Both groups received regular 2 classes of physical education every week according to the school time table. Students from the first school (El Lamaty) had 2 extra after-school physical education classes. Each class lasted 45 minutes. Therefore, the students from the first school were considered as "active group" and the students from the second school were considered as "control group". The study continued for 6 months.

At the end of the study, the researchers studied 6 exercises that used to test the physical fitness according to the guidelines of the Physical Education Department, Ministry of Health and Population:

1. 10 meters running test: to evaluate the reaction speed (measured by seconds).

2. Test of right-left trunk curl around vertical axis: to evaluate spinal column flexibility (measured by inches).
3. Test of numbered circles: to evaluate "leg-eye" coordination (measured by seconds).
4. Test of throwing a ball of 1 kilogram for a remote distance: to evaluate the muscular ability of the arm and shoulder (measured by meter).
5. Test of high jump and rotating around vertical axis: to evaluate muscular ability of the legs (measured by angle degrees).
6. Test of passing the ball on a wall 3 meters distance and then evaluate "leg-eye" coordination (measured by correct numbers).

According to a table, prepared by physical Education Department, Ministry of Health and Population, the results of the 6 tests were transformed into degrees and the total scores were calculated for each student as the total the physical fitness score [16].

The Pediatric Symptom Checklist-17 (PSC-17), a psychosocial screen created to make it easier to identify emotional and behavioral disorders in children, was used to conduct behavioral assessments of kids in both groups at the conclusion of the study. The teachers completed the assessment. It is a very reliable and accurate technique for assessing behavioral issues in kids between the ages of 4 and 16. There are three main categories into which it may be scored: Attention, Internalizing, and Externalizing. There are 17 items on the PSC-17, each of which is given a rating of "Never," "Sometimes," or "Often." For "Never," "Sometimes," and "Often," respective values of 0 and 1 and 2 are used. The sum of the scores for the 17 elements is used to determine the final score. The percentage of children with psychosocial issues was estimated using the following cutoffs: overall Score of 15, attention subscale of 7, internalizing subscale of 5, and externalizing subscale of 7 [17].

Ethical Approval:

The Minia Faculty of Medicine's Ethical Committees gave their approval to the study. The Minia Governorate's Educational Department granted permission for the research to be conducted at the chosen schools. This study was conducted in compliance with the code of ethics of the world medical association (Declaration of Helsinki) for human subjects.

Statistical Analysis

The collected data were introduced and statistically analyzed by utilizing the Statistical Package for Social Sciences (SPSS, IBM Inc., Chicago, Illinois, USA) version 20 for windows. Qualitative data were defined as numbers and percentages. Chi-Square test, Fisher's exact test and Z-test were used for comparison between categorical variables as appropriate. Quantitative data were tested for normality by Kolmogorov-Smirnov test. Normal distribution of

variables was described as mean and standard deviation (SD), and independent sample t-test was used for comparison between groups. To determine how each independent variable (socioeconomic status, breakfast eating behavior, nutritional status, and physical activity) contributed to understanding the variance in the dependent variable (total social score), multiple linear regression analysis was carried out. P value ≤ 0.05 was considered to be statistically significant.

RESULTS

The studied sample included 88 male students from grade 6; active group included 42 students and control group included 46 students. Socio-demographic variables of the active and control groups, are shown in table (1), and revealed that the two groups were matched regarding mother and father education, family income and birth order. The majority of the active group children were belonging to large -sized families (61.9% vs. 39.1%, $P=0.05$).

Table (1): Socio-demographic variables in the control and active groups.

Variable	Active group n=42	Control group n=46	χ^2	p-value
Mother education				
<2ry school	22 (52.3%)	21 (45.6%)	0.17	0.68
≥ 2 ry school	20 (47.6%)	25 (54.4%)		
Father education				
<2ry school	29 (69.0%)	23 (50%)	2.55	0.11
≥ 2 ry school	13 (21.0%)	23 (50%)		
Family income				
<2500 LE	26 (61.9%)	21 (45.6%)	1.72	0.18
≥ 2500 LE	16 (38.1%)	25 (54.4%)		
Family size				
Large >5	26 (61.9%)	18 (39.1%)	3.69	0.05
Small ≤ 5	16 (38.1%)	28 (60.9%)		
Birth order				
3 rd or more	19 (45.2%)	18 (39.1%)	0.13	0.72
1 st or 2 nd	23 (54.8%)	28 (60.9%)		

*= p value <0.05= Significant.

Behavioral Assessment for both groups was done using The Pediatric Symptom Checklist-17 (PSC-17). Psychosocial problems among children were considered if the total score is 15 or more. It was found that students with psycho-social problems with total score ≥ 15 among all students were 16 students (18.2%); 6 of them had externalizing score ≥ 7 & 4 had internalizing score ≥ 5 and 6 students had attention

deficient with score ≥ 7 . Active group had less total score than the control group, but this difference was not statistically significant. At the end of the study, assessment of physical fitness was done for both active and control groups, and revealed that active group got a higher score than the control group ($P<0.001$) (Table 2).

Table (2): Comparison between active and control groups regarding the total physical fitness score and total PSC-17 scores.

Variable	Active group n=42	Control group n=46	T test	P-value
Total physical fitness score	402.3 \pm 20.73	365.75 \pm 21.33	9.85	0.001**
Total PSC-17 score	11.3 \pm 2.62	12.1 \pm 3.01	0.90	0.31

**= highly significant

Effect of maternal and paternal education on behavioral scores was clear, where 75% of the children with psychosocial problems (score 15 or more) belonged to low educated mother ($P=0.04$) and 62.5% of them belonged to low educated fathers ($P>0.05$).

In addition, 75% of these children had low family income ($P=0.02$). The majority of the children with psychosocial problems were belonging to large-sized families 87.5% vs. 51.4% in the group with low psychosocial score ($PSC < 15$, $P=0.02$). The birth order of the child with psychosocial problems being the 3rd or more was high if compared to the group with low social problems but this difference was not statistically significant (Table 3).

Table (3): Effect of socio-demographic variables on psychosocial behavior

Variable	PSC-17 score <15 n=72	PSC-17 score ≥ 15 n=16	Z	P-value
Low Mother education	31 (43%)	12 (75%)	4.2	0.04*
Low Father education	34 (47.2%)	10 (62.5%)	0.69	0.05*
Low Family income	28 (38.9%)	12 (75%)	5.5	0.02*
Large family size	37 (51.4%)	14 (87.5%)	5.59	0.02*
Birth order 3 rd or more	27 (37.5%)	10 (62.5%)	2.4	0.12

*= Statistically significant

Children with psychosocial problems had bad nutritional habits more than the group with low PSC-17 score. Majority of them used to skip breakfast and/or eat less than 3 meals per day (75% for both variables) compared to 34.7% and 13.9% of the group

with low PSC-17 score ($P < 0.008$ and $P < 0.01$, respectively). Half of them do not eat at school as compared to 16.7% of the children with low PSC-17 score ($P = 0.01$). Examining the weight and height of the children revealed that those with psychosocial problems showed stunting growth (12.5%) and underweight (25%) more than group with low PSC-17 score (4.2% and 8.3%, respectively), but the difference between the two groups was not statistically significant. Moreover, it was found that the group with low psychosocial score achieved a significantly higher fitness score compared to those with psychosocial problems (Table 4).

Table (4): Effect of Nutrition and Physical Fitness on psychosocial behavior.

Variable	PSC-17 score <15 n=72	PSC-17 score ≥15 n=16	Z	P-value
Skip breakfast	25 (34.7%)	12 (75%)	7.21	0.008*
Number of meals <3	10 (13.9%)	12 (75%)	6.47	0.01*
Do not eat at school	12 (16.7%)	8 (50%)	22.9	0.001***
Height/Age: Stunted	3 (4.2%)	2 (12.5%)	0.49	0.48
Weight/Age: Underweight	6 (8.3%)	4 (25%)	2.16	0.14
Total physical fitness score	412.1 ± 22.7	366.4 ± 22.8	5.41	0.002**

*= statistically significant ** = highly significant

Table 5 discusses the factors that predict the total psychosocial score; it revealed that child-birth order ($P = 0.02$) and maternal education ($P = 0.02$) are strong predictors of psychosocial behavior of children followed by physical fitness ($P = 0.03$) and number of meals consumption /day ($P = 0.05$).

Table (5): Linear Regression Analysis of Factors Predicting Psychosocial Behavior.

Variable	β	P-value
Child-birth order	0.452	0.02*
Mother education	0.567	0.02*
Physical fitness	0.535	0.03*
Number of meals/day	-1.650	0.05
Breakfast	-0.581	0.08

Dependent factor: Total PSC-17 score. *= statistically significant.

DISCUSSION

Physical activity (PA) and nutrition are two significant factors affecting physiological health, psychological wellbeing and behavior [1,2].

By fostering self-expression, social connection, and integration, physical exercise, according to the World Health Organization, helps young people's social development [18]. Physical activity has a good influence on several aspects of mental health, including self-esteem, emotional stability, spirituality, and expectations for the future, all of which can affect academic performance. Similar to this, exercise has a good effect on anxiety, sadness, and mood, all of which may have an influence on academic performance [19].

For many weeks, consistent exercise modifies the brain processes that underpin cognition and behavior. Numerous biological reactions that physical exercise causes in muscles and organs affect and control the structure and operations of the brain [20,21]. Exercise experiences would have significant educational effects on kids since kids react to exercise similarly to adults do [22].

In the present study, children in active group got higher scores in physical fitness than the control group ($P < 0.001$). Also, it was found that the group with low psychosocial problems score ($PSC-17 < 15$) achieved a significantly higher fitness score compared to those with higher psychosocial problems score ($PSC-17 \geq 15$) ($P = 0.002$).

This is consistent with earlier research, which found that adolescents who engage in more physical exercise throughout the school day often exhibit improved conduct, self-esteem, and brain function [23,24]. Taras [24] showed that it can aid in the growth of social skills, enhance mental health, and lessen risk-taking behaviors in school-aged children. Additionally, research on using after-school physical activities as a way to increase physical activity found that both academic performance and social and emotional behaviors had improved [25,26].

Nutritional status, parents' education and family income could be modifiable factors to improve academic performance or cognitive function or both of school children [27].

Parental education is a significant indicator of socioeconomic status (SES), and it forecasts the academic and behavioral results for children. In the current study, 75% of the children with psychosocial problems ($PSC-17 \geq 15$) belonged to low educated mother ($P = 0.04$) and 62.5% of them belonged to low educated father ($p = 0.05$). This is consistent with Duncan and Brooks-Gunn findings from 1997 [28], who found that mother education was still strongly associated with the intellectual outcomes of children even after adjusting for other SES markers like household wealth. The child's ability to succeed academically and to acquire achievement-oriented

attitudes may be more closely correlated with parental education and family interaction patterns during childhood. As a result, it's probable that poor socioeconomic position will result in dysfunctional family interactions, which in turn may affect children's behavior issues and eventually decrease academic attainment^[29].

In addition, 75% of the children with psychosocial problems had low family income ($P=0.02$) and belonged to large –sized families (87.5% vs. 55% in the group with low social score, $P=0.04$). The order of the child with psychosocial problems being the 3rd or more was high if compared to the group with low psychosocial score (62.5% vs. 37.5%, $P=0.12$). This is consistent with **Dalmaijer et al.**^[30] who documented that socio-economic variables and poverty have direct detrimental relations to educational outcomes, cognition and mental health Also, **Cooper and Stewart**^[31] in their systematic review of evidence, discovered substantial evidence to support the idea that household income has a beneficial causal impact on children's outcomes, including their health and cognitive and social-behavioral development.

In our study, children with high psychosocial problems had bad nutritional habits more than the group with low psychosocial score. Majority of those students used to skip breakfast and/or eat less than 3 meals per day. Half of them do not eat at school. **López-Gil et al.**^[32] found that children who skipped breakfast regularly, have psychosocial behavioral problems, at least 3 times those of children who ate breakfast regularly.

In children and young people, skipping breakfast has been linked to negative impacts on cognitive function, academic achievement, school attendance, psychosocial function, and mood. On the other hand, eating breakfast is linked to a number of advantages, such as increased school attendance, academic achievement, nutritional intake, fitness, and a healthy body weight^[33]. Participation in a breakfast programme has also enhanced the environment in the classroom. It results in less hyperactivity, better emotional control, and better conduct. Additionally, it contributes to better conduct, fewer absenteeism, and higher math scores^[34]. For both low-income youngsters and kids who don't get much attention at home, school breakfast should be taken into consideration.

The current study revealed that birth order, mother education, physical exercise and number of meals consumed per day are the most powerful predictors of psychosocial behavior of children. This is in agreement with **Monir et al.**^[34] who discovered that diet, family income, and mother's education all significantly influence children's psychosocial behavior.

LIMITATIONS OF THE STUDY

1. Because of the small sample size, the findings cannot be generalized.
2. The program of physical activity was applied for male students only because of cultural limitations in Upper Egypt which exert more restriction for females to spend extra time after school.

CONCLUSIONS

1. Most children with psychosocial problems ($PSC-17 \geq 15$) were belonged to low educated mothers and fathers, low income families and large – sized families.
2. Children with psychosocial problems ($PSC-17 \geq 15$) did not suffer from stunted growth and underweight more than the other children.
3. Most children with psychosocial problems ($PSC-17 \geq 15$) used to skip breakfast, eat <3 meals/day and do not eat at school.
4. Children with psychosocial problems ($PSC-7 \geq 15$) had less physical fitness than others.
5. Birth order, mother education, physical fitness and number of meals consumed per day are the most powerful predictors of psychosocial behavior of children.

RECOMMENDATIONS

1. There should be more possibilities for physical education in schools.
2. Studying the influence of culture especially in Upper Egypt on psychosocial development of children.
3. Applying program for announcing parents about the importance of good nutrition and physical activity.

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