IMPACT OF STUDENTS’ HEALTH ON THEIR ACADEMIC PERFORMANCE

ABSTRACT
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INTRODUCTION:

Health care is a major issue for a country’s welfare status in all levels, either economically and socially, or demographically. We live in an age that the health care sector demands on reducing costs and simultaneously on improving its quality and access to all. The influence of information technology into society, and consequently in the healthcare, has led to the fact that the term health is increasingly used. In the last years, a number of pressures in the traditional National Health Systems are emphasizing the need, even if their nature and scale vary significantly between industrialized and developing countries.

The human being is the most studied object of science, yet every year we learn even more about its most detail structures, functions and behavior pattern regarding health. In recent years we have learned about the genes which are interactions or ‘blueprints’ for making the body. The body’s main parts like the brain, heart, lungs and stomach are called organs. Different groups of organs work together as systems. Each system has a vital job to keep the whole body alive and healthy.

Physical exercise is an important daily activity equivalent to taking of once meals by individual. The national policy on education (1986) demands that physical education, sports and health education should be an integral part of education because physical activity has a positive effect on children’s health. It is also believed that regular physical activity is linked to enhancement of brain function and cognition and academic performance due to increased blood and oxygen flow to the brain, increased levels of nor-epinephrine and endorphins with reduction of stress and an improvement of mood, and increased growth factors that help to create new nerve cells and support synaptic plasticity (Yeung, 1996; Van Praag et al., 1999; Schinder, et al., 2000; Flesher, 2000; Jorgensen et al., 2000; Winter et al., 2007). The time a student devotes to his physical activity is inversely proportional to his Body Mass Index (BMI). BMI is a reliable indicator to classify an individual as healthy. In the current environment, due to the increased syllabus and academic pressure, supplemented by pressure from parents, many students now prefer to study in their play time hours. This trend is fraught with the risk of increasing obesity. It shows that physical activity is variably correlated with scholastic performance and has a beneficial effect on maintaining BMI that ultimately affects
the educational outcomes (Trudeau et al., 2008; Groth et al., 2011; Singh et al., 2012; Peralta et al., 2013).

Nutrition may be defined as the science of food and its relationship to health. It is concerned primarily with the part played by nutrients in body growth, development and maintenance. The word Nutrient or “food factor” is used for specific dietary constituents such as proteins, vitamins and minerals. Dietetics is the practical application of the principles of nutrition; it includes the planning of meals for the well and the sick. Good nutrition means “maintaining a nutritional status that enables us to grow well and enjoy good health”. Every pupil especially the students of any nation is important part of a country. The constructive phase of students proceeds through the educational institution where one pupil can act properly by the total development of the body and mind. Health is an important criterion to maintain sound body and mind of every pupil and students.

The purpose of this study is to determine the relationship that exists between physical activity and Body Mass Index (BMI) and academic performance in school students. Both physical activity and BMI have shown to impact on academic performance in younger students, especially in school students. Physical activity reflects those who met and those who did not meet under the Centers for Disease Control and Prevention (CDC, 2011). Students of the normal body mass index and physical fitness category have significantly shown positive results.

REVIEW OF RELATED STUDIES:

A research project begins with a thesis, usually consisting of a statement or an equation, which then needs to be analyzed through the research. Even before a thesis can take shape, one needs to undertake a lot of reading and go through a lot of past work already available. Those works that remain significantly relevant for the research are usually included as Review of Literature. The review of literature thus becomes a link between the research proposed and the studies already done. This is essential to make sure that researcher is not repeating the work that someone has already done earlier. Sometimes if the research proposed has already been undertaken earlier then it provides an option of modifying the work by adding a new perspective or altering some of the methods of research to obtain a perspective that will be different from earlier works thus more valuable.

Basch (2011) conducted a comprehensive review of how children's health and health disparities influence academic performance and learning. The author's report draws on empirical evidence suggesting that education reform will be ineffective unless children's
health is made a priority. He also concluded that schools may be the only place where health inequities can be addressed and that, if children's basic health needs are not met, they will struggle to learn regardless of the effectiveness of the instructional materials used.

According to Coe et al. (2006); Castelli et al. (2007); Carlson et al. (2008) the positive influence of physical activity i.e. physically active students have shown good academic performance. The improvement has been seen in better grades and higher scores on standardized tests.

According to Welk et al. (2011) a healthy level of aerobic fitness, as defined using criterion-referenced standards is a desired learning outcome of physical education programming. Regular participation in physical activity is a national learning standard for physical education, a standard intended to facilitate the establishment of habitual and meaningful engagement in physical activity which affects the academic outcomes of the students. Physical activity exhibits a positive relationship with academic performance and BMI in the adolescent age group.

Prakash (1994) studied physical fitness of secondary school girls in relation to their somatotyping, body composition and social economic status. It has been revealed that physically fit girls have higher lean body mass and a higher rating in mesomorphic components.

Rampersaud et al. (2015) demonstrated that nutrition affects students’ thinking skills, behavior, and health, all factors that impact academic performance. Research suggests that diets high in trans and saturated fats can negatively impact learning and memory, nutritional deficiencies early in life can affect the cognitive development of school-aged children, and access to nutrition improves students’ cognition, concentration, and energy levels.

Kudzai, (2014) and Growdon et al. (1990) proposed that malnutrition is a major problem in both developed and developing countries and deficiencies in some nutrients have been reported to cause diseases which could lead to impaired cognitive development. Other studies have related lifestyle of students, particularly breakfast consumption, to their cognitive abilities as reflected in their academic performance. Undernourished children have been shown to have decreased attendance, attention, and academic performance as well as experience more health problems compared to well-nourished children.

Kar et al. (2008) examined the effect of stunted growth on the nature of cognitive impairments and on the rate of cognitive development. The study investigated if malnutrition would result in a concentrated impairment and a general slowing in the rate of development
of all cognitive processes or these effects could be present for some specific cognitive processes. Effects of malnutrition on cognitive processes were also looked at in relation to impairment without affecting the rate of development and its effect on the rate of development of the cognitive process itself. The participants were identified as being malnourished or adequately nourished in the age groups of five- to seven-year olds and eight- to ten-year olds. Students in the malnourished group were identified by their height (stunting) and weight (wasting) of children in the same age categories with reference to the National Center of Health Statistics (NCHS). Height for age/weight for height score less than two standard deviations from the mean were considered an indicator for moderate to severe malnutrition. Adequately nourished students were identified as children who were in or above the 50th percentile of height and weight as stated by the NCHS standards. Adequately nourished students were paired with malnourished students with respect to age and grade level.

From the above study, the researcher gained the knowledge about the past and current state of a selected topic, organizes the literature into topics and documents are needed for a proposed study. The review serves the purpose of providing a need for a study and demonstrating that other studies have not addressed the same topic in exactly the same way. It also indicates to audiences that the researcher is knowledgeable about studies related to a topic.

**DESIGN OF THE STUDY:**

From the present research study it demonstrated that the activities of the research findings required specific data and sources. The present study would be descriptive one. Secondly the study has envisaged to collect data from various data sources, both rural and urban areas institutional and to explore in present conditions the underlying relationship among various measures of the variables. Hence, survey approach to research has been considered to be justified. Therefore, in brief the present investigation has reasoned out to apply various principle of survey method in educational studies as the undertaken problem pertaining to educational field.

**OBJECTIVITY:**

To explore the relationship between physical activity and academic performance and assessing the correlation of physical activity and BMI with academic performance in rural and urban school students among 16–19 years.
To determine the relationship of physical fitness and nutritional status with the academic performance, data were collected from the school students of rural and urban areas. So we try to correlate school students’ performance with physical activity and BMI of the above areas by the following ways:

- To identify the health status of the rural and urban students and their impact on their academic performance.
- To identify health practices of the students.
- To determine physical fitness and their academic performance.
- To identify impact of health hazards on students academic performance.
- To determine impact of nutrition on their academic performance.
- To identify any difference between rural and urban areas in respect of physical fitness.
- To determine academic difference on the basis of gender.
- To identify academic performance on the basis of area.
- To determine the relationship between nutritional status and physical fitness.

VARIABLES SELECTED FOR THE HYPOTHESES:

- **Independent Variables**: Height, weight, sit up, shot put, flexibility, 12 minutes of running and body fat percentage.
- **Dependent Variables**: Physical fitness, BMI and academic performance.
- **Subject related Variables**:
  - Gender of the subject – boys and girls.
  - Geographical location – rural and urban.
  - Language includes both Bengali and English.

HYPOTHESES:

1. There will be significant relationship between total rural students versus total urban students in respect of health status.
2. There will be significant relationship between heights of rural girls students with the height of urban girls students.
3. There will be significant relationship between heights of rural boys students with the height of urban boys students.
4. There will be significant relationship between weights of rural girls students with the weights of urban girls students.
5. There will be significant relationship between weights of rural boys students with the weights of urban boys students.
6. There will be significant relationship between sit up and physical fitness of rural and urban students both boys and girls.
7. There will be significant relationship between shot put and physical fitness of rural and urban students both boys and girls.
8. There will be significant relationship between flexibility and physical fitness of rural and urban students both boys and girls.
9. There will be significant relationship between 12 minutes of running and physical fitness of rural and urban students both boys and girls.
10. There will be significant relationship between body fat percentage and physical fitness of rural and urban students both boys and girls.
11. There will be significant relationship between physical fitness of total rural boys versus total urban boys.
12. There will be significant relationship between physical fitness of total rural girls versus total urban girls.
13. There will be significant relationship between nutritional status of total rural boys versus total urban boys.
14. There will be significant relationship between nutritional status of total rural girls versus total urban girls.
15. There will be significant relationship between nutritional status and academic performance among the rural students and urban students.
16. There will be significant co-relationship between nutritional status and physical fitness.
17. There will be significant co-relationship between physical fitness and body mass index (BMI) of rural and urban students.
18. There will be significant relationship between rural girls and urban girls in respect of academic performance.
19. There will be significant relationship between rural boys and urban boys in respect of academic performance.
20. There will be significant co-relationship between body fat percentage and Madhyamik result of rural girls versus urban girls and rural boys versus urban boys.
DEFINITION OF IMPORTANT TERMS:

Important terms of this study are identified as follows:

**HEALTH** : The WHO constitution of 1948 defines health as a state of complete physical, social and mental well-being and not merely the absence of disease or infirmity. In addition, the Ottawa Declaration states “an individual or group must be able to identify and realize aspirations, to satisfy needs, and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities” (WHO 1995).

**SIT UP** : The sit-up is an abdominal endurance training exercise commonly performed to strengthen and tone the abdominal muscles. It is similar to a crunch but sit-ups have a fuller range of motion and condition additional muscles. Sit-ups target the hip flexors, rectus abdominus and also work the iliopsoas, tensor fasciae latae, rectus femoris, sartorius to a very small degree.

**SHOT PUT** : It is an athletic contest in which a very heavy round ball is thrown as far as possible. It is a throwing event of track and field competitions. For the shot put event required materials are shot: made of bronze or similar metal; 7.3 kg (men) and 4 kg (women), shoes: made of leather. For a successful event the rules that are followed: Keep the shot against the neck during the movement, leg and hip lead the movement, shot put is a pushing action whose force comes from the ground up, through legs, hips to shoulders and then to arm.

**FLEXIBILITY** : Flexibility is the range of motion in a joint or group of joints or the ability to move joints effectively through a complete range of motion. Flexibility training includes stretching exercises to lengthen the muscles and may include activities.

**BODY COMPOSITION** : It refers to the proportion of fat and fat-free mass in the body. A healthy body composition is one that includes a lower proportion of body fat and a higher proportion of fat-free mass. Body composition is one measurement that is used to assess health and fitness level.

**PHYSICAL ACTIVITY** : Physical activity is defined as any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a resting level. Physical activity can be repetitive, structured, and planned movement sports-focused, or
transportation-related. Studies have demonstrated that physical activity is connected to physiological aspects of cognitive functioning (Sallis et al. 1999; Shephard 1997).

**PHYSICAL FITNESS** : In contrast to physical activity, physical fitness is a complex set of functional capacities and capabilities. These are partly determined by genetic factors and stage of biological maturation as well as the amount of physical activity undertaken.

**ACADEMIC ACHIEVEMENT** : According to Ward et al. (1996) academic achievement is commonly measured by examinations or continuous assessment but there is no general agreement on how it is best tested or which aspects are most important — procedural knowledge such as skills or declarative knowledge such as facts.

**ACADEMIC PERFORMANCE** : Academic performance is used broadly to describe different factors that may influence student success in school. These factors fall into three primary areas: Cognitive Skills and Attitudes such as attention/concentration, memory, verbal ability; academic behaviors like conduct, attendance, time on task, homework completion and academic achievement such as standardized test scores, grades.

**COGNITIVE PERFORMANCE** : Cognitive performance refers to the child’s performance when assessed using a recognized and validated test of cognitive function. Tests assess components of cognition such as reaction time, attention, working memory and stimulus response (collectively referred to as executive control). Cognitive and academic performances are thought to interrelate as aspects of cognition such as attention and working memory are vital for academic success.

**BODY MASS INDEX (BMI)** : BMI is a number calculated from a person’s height and weight. It provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems.

**FOOD INSUFFICIENCY** : Jyoti et al. (2005) suggest food insufficiency is when an individual or a family has limited access to or availability of food or a limited or uncertain ability to acquire food in socially acceptable ways.

**NUTRITION** : Megill et al. (1999) relate nutrition with science that interprets the interaction of nutrients and other substances in food e.g. phytonutrients, anthocyanins, tannins, etc. in relation to maintenance, growth, reproduction, health and disease of an
organism. It includes food intake, absorption, assimilation, biosynthesis, catabolism and excretion.

**METHODOLOGY:**

The procedural method with specific operation directed towards the conclusions has been planned. This chapter of methodology deals with the following: Selection of the sample—six hundred rural students, among them 300 girls and 300 boys students; six hundred urban students, among them 300 girls and 300 boys students; criterion measured, construction of tools, procedure for administering the study, measurement of personal data which includes height, weight, sit up, shot put, 12 minutes of running, flexibility, physical fitness measurements, anthropometrical measurements included the measurement of height and weight to assess the nutritional status of each subject, body mass index, measurement of academic performance is based on the average of the end-of-the-year academic marks, as recorded in school schedules and children’s report cards according to the prescriptions of the National Department of Education (DoE, 2005). The research study was carried out by involving a questionnaire based on collection of data from students of class XI of the selected area. The data were then analyzed using correlation by SPSS software.

**ANALYSIS OF THE FINDINGS:**

A moderately good positive correlation was observed for physical activity with academic performance of girls students is significant at the level of 0.01 with \( r = 0.357 \), the co-relational value of physical fitness and BMI value is 0.051. It is positively correlated by the academic performance.

The correlational value of academic performance and physical fitness is 0.050 and BMI value is 0.175. So it is shown that academic performance is positively correlated with physical fitness. The BMI value in respect of physical fitness is \(-0.043\). It is shown that physical fitness and BMI is negatively correlated. It reveals that the academic performance in respect of BMI is significant at the 0.01 level.

The academic performance of both girls and boys students are significantly correlated with physical fitness \((r = 0.214)\) and nutritional status \((r = 0.105)\). The BMI in respect of physical fitness is significantly correlated at the 0.05 level. The physical fitness and academic performance is also significant at 0.01 level.

The correlation between academic performance and physical fitness of rural students \((r = 0.166)\) and urban students \((r = 0.220)\) is significant at the 0.01 level. The negative
correlation has been shown between nutritional status and physical fitness of rural students \((r = -0.048)\) and urban students \((r = -0.082)\) which is significant at the level 0.05.

The correlational value of academic performance in respect of physical fitness of rural girls \((r = 0.056)\) and rural boys \((r = 0.196)\) is positively significant at the 0.01 level.

The correlational value of BMI in respect of physical fitness of rural boys \((r = -0.008)\) and rural girls \((r = -0.069)\).

It has been shown that co relational values between academic performance and physical fitness in respect of urban girls \((r = 0.367)\) and urban boys \((r = 0.120)\) and also relation between academic performance and BMI \((r = 0.108)\) of urban girls and urban boys \((r = 0.285)\) also shows positive significant correlation.

The negative correlational values between body fat percentage and Madhyamik result in respect of total girls \((r = -0.085)\), rural girls \((r = -0.127)\), urban girls \((r = -0.32)\) and also the co relational values between body fat percentage and Madhyamik result in respect of boys \((r = 0.060)\), rural boys \((r = 0.261)\) and urban boys \((0.060)\). It indicates positive correlation.

**INTERPRETATION OF DATA :**

The strongest evidence from scientifically rigorous evaluations represents a positive effect on academic performance of school students in respect of parental concerns and health of the students. Sometimes little evidence exists of negative effects of physical health and nutritional level on rural and urban students’ academic performance. Limited evidence from scientifically rigorous evaluations support the effect of nutrition and physical health on academic performance but some evidence from the literature reveals that these effects vary in different rural and urban areas. Few cases of rural students show better health than urban students. On the other hand few rural girls show better result than urban girls. Physical fitness has been associated with increasing school performance which includes better concentration, memory and classroom behavior. Physical activity during childhood and further any age has shown to be effective in preventing health problem which in beneficiary for academic performance of any area (rural and urban) of the students. At present, awareness of health and health related different types of programmes and their after effect is organized in different region of the school environment. So both the areas of students are more concerned regarding their health and as a result in some cases rural students are shown better health than the urban students, so academic performance is different in respect of area, gender and factors.

Relationships between nutrition and brain function have been focused on academic performance of the different regions (rural and urban) of the students. Present studies have
shown the impact of dietary foundations on normal brain functions. Chemical messengers within the brain called neurotransmitters have been studied in conjunction with nutrition. It has been shown that possibly our nutrition has a role in affecting our cognitive functioning. Studies were done with school going children and pointed to a direct correlation between poor nutrition and lower school performance. A lack of protein, also known as protein energy malnutrition, led to poor school performance by students and caused young children, adolescence to be lethargic, withdrawn, and passive, all of which affect social and emotional development.

Fat makes up more than 60% of the brain and acts as messenger in partial control of aspects such as mood. Vitamins and mineral are important substances for the functioning of the brain. Most important are the vitamins A, C, E and B-complex vitamins. Manganese and magnesium are two minerals essential for brain functioning. Sodium, potassium and calcium play a role in message transmission and the thinking process. So it reveals that nutrition is an important factor that affects cognition and academic performance of the students.

**SUMMARY AND CONCLUSION :**

From the study it has been suggested that a strong link between healthy behaviours and school performance. Health is important for optimal learning by the adolescents. Comprehensive school education programmes can facilitate healthy behaviors by the students through positively changing health related knowledge skills, attitudes and behaviours which in turn can play a vital part in improving school and academic performance. It reveals that physical activity and nutrition significantly affect students’ performance. School physical education programmes have shown favorable effects on students’ academic performance through increased concentration and improved performance on academic score. Poor dietary choices, inadequate nutrient intake and morning fasting have linked to lower motivation and attentiveness in school as well as academic performance. Rigorous randomized studies have shown that participation in school breakfast programmes is associated with significant improvements in academic functioning particularly among low income and / or poorly nourished children.

It indicates that healthy eating is essential for students to achieve their full academic potential, mental growth and lifelong health and well being. When children are not receiving proper nutrition, they are unable to reach their full potential which is irrespective of areas. School needs to educate parents and proper environment on how to live a healthy life-style that includes proper nutrition. Basically the students who belong to urban areas are conscious
regarding their health. They have also shown proper health and fitness by the required physical activity and nutrition. Different opportunities of physical activities and nutritional requirement are available in urban areas. So percentage of physical fitness and nutritional level is better in students of urban areas than the rural areas. Although in most of the cases academic performance of urban students is better than the rural students.

The link between nutrient supplementation and cognitive performance has been demonstrated in several randomized, controlled trials (Benton et al., 1988; Schoenthaler, et al., 1991; Schoenthaler et al., 2000). In these studies, children aged 6–12 years old that were given low-dose vitamin / mineral supplements experienced significantly greater gains in non-verbal intelligence than children given placebo. Nutrient supplementation appears to have positive consequences after a relatively short period – Schoenthaler and his colleagues found substantial benefits after as little as three months. It also reveals that physically active and fit children tend to have better academic performance, higher levels of physical fitness with better school attendance and fewer disciplinary problems, physical education should be a regular part of school education, physical activity and proper nutrition could improve academic performance, including enhanced concentration skills and classroom behavior.

SIGNIFICANCE OF THE STUDY:

- Schools with available health services contribute positively to students’ health and can help reduce barriers of learning.
- To observe the relation between health of students and academic performance.
- To reveal good health condition of the students of rural and urban areas which correlated with the student’s educational progress to reveal body mass index, nutrition and physical activity of the students will effect on the academic performance.
- The outcomes of the present study will definitely be new knowledge in field of environmental education.
- Physical activities connect to aspects of cognitive functioning and also increased academic performance indirectly by improving emotional health, self esteem, and alertness – all of these are related to improved academic performance.
- There is a link between nutrient supplementation and cognitive performance.
- Nutrition should be taken as the back-burner and place front and center to help students reach their full learning potential.
- To make the commitment to offer quality meals and provide the energy and nutrients students need to achieve their maximum potential.
By offering a variety of healthy foods in the meal programmes of schools, children will be able to distinguish the different major foods and develop healthy eating habits which are related to academicals performance.

LIMITATION:

- Lack of proper awareness of parents regarding the physical exercise of the children throughout the whole developmental stages.
- There is lack of knowledge regarding the consideration of demographic factors that may moderate the physical activity-cognition relationship.
- Socio-economic status affects the nutritional status of the girls students than the boys students especially in rural areas.
- The overall lack of administration regarding the physical fitness and nutritional status of schools, local authority and governments.

SUGGESTION FOR FURTHER RESEARCH:

- School health interventions determined that implementation of nutrition, mental and physical service programmes are associated with positive outcomes for achievement.
- There is a growing body of research focused on the association between school-based physical activity including physical education and academic performance among school-going children. To better understand these connections, includes studies from a range of physical activity contexts, along with school-based physical education, recess, classroom-based physical activity and extracurricular physical activity.
- There is need for higher levels of specific cognitive performance such as concentration, memory, decision making, alertness and thinking speed.
- In the curriculum physical education and nutrition are selected as compulsory subjects, mostly up to school levels.
- Future research will need to do a better job of translating promising laboratory findings to the real world to determine the value of this relationship in ecologically valid settings.

REFERENCES:


DoE (Department of Education, 2005). The national protocol on assessment for schools in the general and further education and training band.


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Signature of Scholar                                Signature of Supervisor
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