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Correlation of Nutritional Status and Assessment of Affective Domain as Indices of Health Promotion among Students of Yenagoa Local Government Area of Bayelsa State

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Abstract

This study examined the correlation of nutritional status and affective domain of students in Yenagoa Local Government Area of Bayelsa State. Only private secondary schools were involved in the study as they have an assessment format for affective domain. The study design was a correlation survey design. Three private secondary schools were randomly selected from the twelve private schools that have assessment format for affective domain. The population was all the 153 JSS2 students (51 JSS2 students in each of the three schools). Total population sampling (sample size equaling the population size) was used as the population of JSS2 students in each of the school was 51 students (not large). The respondents were 153 Junior Secondary School (JSS) students (76 males and 77 females) ages 9-14 years from three private junior secondary schools. Two research questions were posited for the study. The instruments for data collection were students' learning report card which already has measures of affective domain characteristics such as attentiveness, attitude to class work/assignment, attendance, and diligence and the other instrument was anthropometric measures of height, weight and Body Mass Index (BMI). Anthropometric measurements were done using manual weight scale in kilograms (kg) to measure participants' weight and stadiometer calibrated in centimeter (cm) to measure participants' heights. Affective domain characteristics extracted from participants' report card were scores for: attentiveness, attitude to class work/assignment, attendance, and diligence. The data were analyzed using Microsoft Excel 2010, and Graph Pad Prism. Pearson Product Moment Correlation Coefficient at P>0.05 significant level was used to determine the level of correlation between BMI categories of healthy weight, overweight, obese, and underweight; and the affective domain characteristics of each student. The findings show that participants with healthy weight have the highest level of the affective domain characteristics (78.44%), while obese participants have the least (3.9%). The findings also revealed a strong positive correlation between overweight and attentiveness; and attitude to class work/assignment but revealed a weak correlation with diligence in male participants. Good diet with healthy lifestyle is therefore recommended as it has significant health benefits that can help reduce the risk of major health problems.

Keywords: health promotion, nutritional status, affective domain, secondary school, correlation

Introduction

Nutritional status is an important index for measuring quality of life especially in children. The nutritional status of school-aged children has impact on their health, cognition and subsequently their educational achievement (Karak, Maiti, Das & Karmakav 2017). Study has proven that obesity has a negative impact on children's education such that overweight/obese children are said to have lower reading skills and mathematics scores, poorer classroom performance, less connection to school mate, greater desire to quit school and find it difficult to further their education in life with the same level of success as normal weight children (Judge and Johns, 2007; Hamilton-Ekeke & Thomas, 2007). As such children, during their school age need to have balance healthy diet as it provides energy and nutrients to stay healthy and also perform well in school.

The Body Mass Index (BMI) of an individual is a health index of public health importance. The BMI is determined by dividing a person's weight in kilogram (kg) by the square of height in meters (m^2), where it measures underweight, healthy weight, overweight and obese in a population (Dotimi, Hamilton-Ekeke, Ephraim-Emmanuel, Kei & Bozy, 2013). BMI gives information about the nutritional status of children and adolescents by measuring their heights and weights and comparing with reference standard based on age and sex. Body Mass Index (BMI) depends on several variables, including behaviour patterns, nutritional habits, social ideas and also changes due to aging (Pakanahad, Omidvar, Mahbuobob, Afiatmilani, Ostadrahimi & Ebrahimi, 2011). Students are either overfed, well-fed or underfed depending on the socioeconomic background of the family they belong (Hamilton-Ekeke, 2014). This may however affect their nutritional status resulting in underweight (below a weight considered normal or desirable), overweight (above a weight considered normal or desirable), obesity (BMI at or

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above the 95th percentile) or stunting (reduced growth rate in child development). A study by Florence, Asbridge and Veugelers (2008) on impact of student diet and nutrition on academic and behavioral outcome revealed a higher quality diet as associated with better performance on exams. When student diet is improved, they tend to live healthy, have fewer absences and are able to attend class more frequently. In addition, students may improve in their behaviour and less distracted thereby creating an enabling environment for learning in classroom (Just, 2014).

In attainment of educational objectives in learning, Benjamin Brown first developed taxonomy of learning domains in 1952 to assist in design and assessment of educational objectives which consist of three domains (Krathwool, Bloom & Masia, 1964). These three domains of learning are cognitive, affective and psychomotor, the cognitive domain has to do with the learner's knowledge, affective domain relates to those value and attitude that result in action, and the psychomotor domain deals with the acquisition of technical skills. In the educational system, affective domain is an important tool in achieving educational objective. Affective domain is concerned with objectives that relate to human disposition, attitude, motivation, self-efficiency and willingness for acceptance and rejection. Affective domain is further classified to five stages where the objectives takes one from the lower to the higher order: - receiving, responding, valuing, and organization through characterization (Alonsable 2009). Alonsable (2009) further explains the levels of affective domains as thus:

- Receiving-involves a learner passively paying attention and being aware of the existence of certain ideas, material or phenomena.
- Responding- the students actively participating in the learning process. He or she is not only aware of a stimulus but reacting to it in some way.
- Valuing- the ability of a child to see the value or worth of something and express it.
- Organizing- the child is able to put together different values information and ideas and then relating them to already held beliefs to create his/her own unique value system.
- Characterizing- the child act in accordance with the values he or she has internalized.

Often times, learning is seen as an intellectual or cognitive (mental) function but when children learn by combing the affective domain (like attitudes, behaviour), cognitive (mental) and psychomotor (physical skills) which are the three domains of Blooms taxonomy (widely used as frame work in development of instructional materials and teaching session), this however makes the learner become more successful in attaining educational goals. In Nigeria, most of the primary and secondary schools concentrate on the cognitive and psychomotor aspect of student's performance for evaluation neglecting the relevant scopes of affective domain (attitudes, motivation, feelings, emotions etc) as part of educational goals in learning. Several studies carried out addressing nutritional status focus mostly on BMI and cognitive domain (Ahmad, Ahmed & Airade, 2013; Amuta & Haumsou, 2009; Dotimi et al., 2013). The relationship between nutritional status and affective domains has not been extensively investigated as compared to the cognitive domain.

This study therefore attempts to fill-in this gap by investigating the relationship between nutritional status and affective domain using body mass index (BMI percentile gotten from heights and weights) and affective domain characteristics of students (which are attentiveness, attitude to class work/assignment, attendance and diligence) and considering age and sex of participants as intervening variables. In Nigeria, stakeholders in education policies have only concentrated mainly on cognitive domain for students scoring and evaluation for their performance in examination (Nande, Aboho & Madueweis, 2012). Ensuring the implementation of the three classification of domain - cognitive, affective, and psychomotor domain in the school curriculum of education content will however give a more holistic assessment of educational objectives.

Objectives of the study

The objective of the study is to demonstrate the relevance of the affective domain in the overall evaluation of educational objectives of learners and how nutritional status can affect the affective domain as it does affect the cognitive domain. The specific objectives of the study are:

- To determine the prevailing BMI categories of healthy weight, over weight,obese and under weight of participants based on age and also based on sex (gender).
- To determine the relationship between BMI categories and affective domain characterisitics (attentiveness, attitude to class work/assignment, attendance and diligence) of participants.

Research Questions

Two research questions are posited for the study:

- What could be the pravailing BMI categories (healthy weight, over weight, obese and under weight) of partcipants based on age and sex?
- Is there a relationship between BMI and affective domain characteristics (attentiveness, attitude to class work/assignment, attendance and diligence) of participants?

Method

The study adopts a correlation survey design. The study design examines the degree or pattern of the correlation between the two variables investigated (nutritional status determined by BMI and indices of affective domain such as attentiveness, diligence, participation in class work). The sample size for the study was selected from three (3) private junior secondary schools (Government approved) out of the twenty eight (28) in Yenagoa Metropolis. The three schools were randomly picked by writing all the names of the twenty eight schools on pieces of paper and shuffled in a bag. Without looking into the bag, three pieces of the papers are picked out in turns and the school on the paper were contacted through a consent letter detailing the objective of the research and requested if they be willing to be part of the research. All three schools consented. A similar procedure of randomization was again adopted in the selection of the arm (JSS1 to SSS3 classes to be involved in the study). Junior Secondary School two (JSS2) was picked out of the bag contain the classes JSS1 to SSS3. In each of the three schools involved in the study, the JSS2 classes have a population of fifty one (51) students, because of the small population size; total population sampling was adopted meaning all the JSS2 students in each of the schools were involved in the study. The sample size of the study consisted of 76 males and 75 females. The students that participated in the study were within the age range of 9 – 14 years.

Instrumentation

The instruments implored in this study include: (a) students information on Body Mass Index (BMI) percentile using anthropometric measurement which was done using manual weighing scale calibrated in kilograms (kg) to measure participants' weight and stadiometer (measuring rod) calibrated in centimeter (cm) to measure participants' height; (b) students' information on performance in affective domain of the following characteristics - attentiveness, attitude to class work/ assignment, attendance and diligence; which were extracted from students' end of term report card (the report card already has measures of the affective domain characteristics - attentiveness, attitude to class work/ assignment, attendance and diligence which were under investigation in this research).

The recording format for the anthropometric measures was developed by the researcher and validated by three experts in health education, school head teacher, and a class teacher.

In order to test the reliability of the weighing scale and the stadiometer which were used to measure BMI, they were both used in a seperate school not involved in the main study and the readings were considered reliable using Pearson Product Momment Correction Coefficient and r = 0.81 was realized which is within the acceptable benchmark of reliable coefficients. Consent was sought from school management and consent letters were given to the students to take home to parents. No parent objected, so the inclusion of participants were:
- Students from 9-14 years of both sex were selected.
- Only apparently healthy students (this was judged by looking at the students).
- BMI (underweight, overweight, normal and obese) study covered all enrolled students.

Anthropometric Measurement

A newly purchased scale was used in the measurement of weight. A portable stadiometer was used in the measurement of height. Both types of equipment were already calibrated and accurate before being used by the researcher.

Process for Measuring Weight

The scale was set on zero reading. Participants were asked to remove shoes and empty pockets of any object. They were asked to step on the platform of the scale with both feet and with arms hanging at sides of the body while they look forward. Weights were read to the nearest 0.1kilogram and values were recorded. The scale was ensured to return to zero position before use on the next participants.

Process for Measuring Height

The participants were asked to remove shoes and cap. They were asked to stand on a flat floor, bringing the legs together and allowing the back- heels, buttocks, upper back and head touch against the stadiometer rule,

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with the arms straight and shoulder relaxed. The head was uprightly straight; the participants were asked to take in deep breath and out. The headpiece was lowered until it touched the head; with the eyes of the measures positioned parallel with the headpiece, measurement was read to the nearest 0.1cm.A second measurement followed the previous procedure, an average of the two measures were accepted, using the gender-correct growth chart, the student age on the horizontal axis and the BMI on the vertical, the point of intersection was considered as the BMI for -age percentile.

Process of Measuring Affective Domain

The data for affective domain characteristics of students namely; attentiveness, attitude to class work/assignment, attendance and diligence were accessed through the help of class teachers of the participants. The results of the affective domain characteristics of students scored by teachers were tabulated in their report cards (see sample in Appendix C). The Microsoft Excel (Version 2010) and Graft Pad Prisms 5 were used for statistical analysis of data. The BMI prevalence was calculated based on simple percentage. The Pearson Product Moment Correlation Coefficient (r) was used to determine the correlation between BMI categories and affective domain characteristics.BMI were determined considering the age, weight, height, and sex of participant. The weights in kilograms were divided by the height in meters square and the obtained BMI were expressed using percentile growth chart for boys and for girls. Normal BMI values were taken between 5th and 85th percentiles (Centre for Disease Control and Prevention, 2000). BMI of participants were correlated with affective domain characteristics.

Results

The results are analysed and presented below according to the research questions posited in the study.

Research Question 1: What could be the prevailing BMI categories (healthy weight, overweight, obese and underweight) of participants based on age and sex?

Table 1: Prevailing BMI of Participants by Age

AGE GROUP	N	Healthy Weight	Overweight	Obese	Underweight
9	3	2 (1.31)	-	1 (0.65)	-
10	15	10 (6.54)	3 (1.96)	-	2 (1.31)
11	36	26 (16.99)	5 (3.27)	1 (0.65)	4 (2.61)
12	47	37 (24.18)	5 (3.27)	3 (1.96)	2 (1.31)
13	29	27 (17.65)	-	-	2 (1.31)
14	23	18 (33.33)	2 (1.31)	1 (0.65)	2 (1.31)
Total	**153**	**120 (78.44%)**	**15 (9.81%)**	**6 (3.9%)**	**12 (7.84%)**

Table 1 revealed that majority of the students, n = 120(78.4%) had healthy weight, 15(9.81%) were overweight, 12(7.84%) were under weight and 6(3.9%) were obese. In healthy weight age 12 had highest percentage of 24.18% (n = 37) and least was found in age 9 with 1.31% (n=2). There were no overweight students in ages 9 and 13. All age groups had underweight population except in age 9. Obesity was observed in all groups except age 10 and 13.

Table 2: Prevailing BMI of Participants Based on Sex (Gender)

GENDER	N	Healthy weight	Over weight	Obese	Underweight
MALE	76	60(39.22)	10(6.54)	3(1.96)	3(1.96)
FEMALE	77	60(39.22)	5(3.27)	3(1.96)	9(5.88)

Altogether, 153 students from age 9 – 14 were involved in this study, 76 (49.7%) were males and 77 (50.3%) were females. Both male and female students had equal prevalence in healthy weight (39.2/39.2) and in obesity (1.96%); more males were overweight 10(6.54%), compared to females 5(3.17%). On the other hand, more female students were underweight 9(5.88%) than their male counterparts 3(1.96%).

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Research Question 2: Is there a relationship between BMI weight categories and affective domain characteristics?

Table 3: Correlation between BMI Categories and Affective Domain Characteristics for Males

BMI weight categories	Affective domain characteristic			
	Attentiveness	**Attitude to class work/Assignment**	**Attendance**	**Diligence**
Healthy weight				
person r	-0.07477	0.01269	0.09628	-0.01856
P value (two tailed)	0.5603	0.9213	0.9213	0.4529
Overweight				
person r	0.8893	0.8893	-0.5774	0.3333
P value (two tailed)	0.1107	0.1107	0.4226	0.6667
Obese				
person r	-0.7086	-0.3037	_	0.01125
P value (two tailed)	0.2914	0.6963	_	0.9888
Underweight				
person r	-0.1380	0.5629	-0.7226	0.8455
P value (two tailed)	0.7943	0.2449	0.1048	0.0340

Table 3 shows that in male students, there was strong positive relationship between overweight and attentiveness (r=+0.8893, p= 0.1107); overweight and attitude to class work/assignment (r=+0.8893, P=0.1107), underweight and diligence (r=+0.8455, P=0.0340) but weak positive relation between overweight and diligence (r=+0.3333, P=0.6667). There was no correlation between healthy weight and attentiveness (r=0.07477, P=0.5603), healthy weight and attitude to class work/assignment (r=0.01269, P=0.9213); healthy weight and attendance (r=0.09628, P=0.9213); Healthy weight and diligence (r=0.01125, P=0.9888) respectively. A weak negative relationship was also observed in the males, between the underweight and attentiveness (r=-0.1380, P=0.7943); obese and attitude to class work/assignment (r=0.3037, P=0.6963). The findings also show a strong negative association between underweight and attendance (r=-0.7226, P=0.1048); obese and attentiveness (r=-0.7086, P=0.2914).

Table 4: Correlation between BMI Categories and Affective Domain Characteristics for Females

BMI weight categories	Affective domain characteristics			
	Attentiveness	**Attitude to class work/Assignment**	**Attendance**	**Diligence**
Healthy weight *Pearson r*	0.05516	-0.02658	-0.1997	-0.1281
value (two tailed)	0.6864	0.8458	0.1401	0.3467
Overweight *Pearson r*	0.08103	0.0	0.0	0.07906
value(two tailed)	0.7924	1.0000	1.0000	0.7974
Obese *Pearson r*	-0.5000	-0.5000	+0.5000	-0.5000
value(two tailed)	0.6667	0.6667	0.6667	0.6667
Underweight *Pearson r*	0.2294	0.7544	-	-0.1325
value(two tailed)	0.7706	0.2456		0.8675

Table 4 revealed that in female students, there was strong positive correlation between obese and attentiveness (r=+0.5000, p=0.6667), overweight and attitude to class work/ assignment (r=+0.7544, p=0.7924) respectively. There was no correlation between overweight females and all the four categories of affective domain characteristics. The study also observed a weak negative relationship between healthy weight and attendance(r=-0.1997, p=0.1401); healthy weight and diligence (r=-0.1281, p=0.3467); underweight and diligence (r=0.1325, p=0.8675) respectively. There was no correlation between Healthy weight and attentiveness(r=0.05516, p=0.6864); Healthy weight and attitude to class work/assignment(r=0.02658, p=0.8458). A strong negative relationship was also observed between the obese female students and attentiveness (r =-0. 05000, p=0.6667) and diligent (r=-0.5000, P=0.6667). Finally, there was a weak positive correlation between underweight female student and attentiveness (r=0.2294, P=0.7706).

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Discussion of Findings

This study investigated the correlation between BMI and affective domain characteristics of students in private junior secondary schools in Yenagoa local government. The relatively high prevalence of healthy weight observed among the private school participants located at the city may be due to the fact that most of the students from parents of good socio economic background whose parents are working and can afford to take care of the children's health unlike the children from the low socio economic background that could be pre-disposed to diseases thereby affecting their health. This finding collaborates with Dotimi *et al.* (2013). Dotimi *et al.*, (2013) study investigated the determinants of the prevalence of large waist circumference and high body mass index and their relationship with blood pressure of staff of the Bayelsa State College of Health Technology Otuogidi-Ogbia town. They found out a relationship between socio-economic status and high BMI. The prevalence of underweight was low among the males in the study, in contrast with the study carried out by Esimai and Ojofeitimi (2009) whose finding was relatively high in underweight.

Also the prevalence of overweight among participants age 10-14 years which was relatively low in this study disagreed with the findings of the study carried out by Ene-Obong and Ekwaguo (2012) on nutritional status of rural school children in Ebonyi State whose record was significantly high in stunting with children from poor social economic background and poor dieting. In the study prevalence of healthy weight and obese are same for both male and female students, in the study also the prevalence of underweight was found to be higher among female than male. The study contradicts the study of Essien, Emebu, Iseh andHaruna (2014) whose results showed that prevalence of underweight was higher among the males than in the females. In the present study the males were more over weight than their female counterparts which agrees with the study carried out by Ukegbu, Oni, Mewu and Ukegbu (2007) in Umuahia where the prevalence of overweight was lower in females than in males.

The Study provided data on correlation between BMI categories and affective domain characteristic behavior of participants. The findings observed a strong positive correlation between overweight and attentiveness, and attitude to class work/assignment, but weak correlation with diligence in male participants. A strong negative relationship between overweight and attendance in male students was also revealed. Among other reason, it may be that obese children are faced with social difficulties and behavior problems compared with their normal weight peers. Being victims of bullying (cajoling) by their peer or class mates, they may tend to be missing school days, especially when they have physical education activities as observed by the study of Janseen, Craig, Boyce and Pickett (2004) which states that bullied students shay away from physical activities. This is also in support of the study of Eistenberg and Alsma (2005) which observed that obese children develop low self-esteem that could be translated to missing school, which may lead to poor performance in their education.

Finding also revealed that overweight in females had no relationship with all characteristics behavior of affective domain. Obesity in females had a strong negative association with attentiveness, attitude to class work/assignment and diligence, but positive relationship with attendance. This finding is supported by the findings of Judge and Johns (2007) who revealed that obesity has a negative impact on children education as they are said to have lower reading skills, poor to scores and poor classroom performance. In the present study, a strong negative relationship was found to exist between obese and attentiveness in both males and females. This shows that obese children find it difficult to pay attention in class. The reason may be due to the psychosocial problem faced by obese children which have affected their behaviour especially in attentiveness towards learning. This finding of the study also agrees with the study of Strauss (2000) which revealed that overweight and obesity lower children's self-esteem, and may indirectly affect their behaviour towards learning. It was also observed in this study that, there was no correlation between healthy weight, and affective domain characteristics behaviours of both male and female students. This shows that the healthy weight status of a child has minimal or no effect on the affective behaviour towards learning in class.

Furthermore, the study also revealed a strong positive association between underweight and attitude to class work/assignment in both males and females. The females had higher correlation than the males. This is in line with the study conducted by Honigsfeld and Dun (2003) which found out that girls, generally tend to have more positive attitudes towards home work (assignment) underweight in both male and female was also found to have a weak relationship with attentiveness. This could imply that underweight children, due to their size and health status, are affected in their attention toward learning in classroom. This view was supported by Djalel (2009) that lack of nutrition has an effect on changes in social behavior, decreases attention and learning ability, with poor learning outcomes. More so, this study revealed a significant relationship between underweight and diligence in males. There could be a possibility that males, due to their weigh status are able to perform their assigned task in school activities diligently. The study of Ukegbu *et al.* (2007) seemed to agree with this assertion.

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Conclusion

Healthy weight had highest percentage of the sampled respondents and obese the least, implying that most of the participants fall within the healthy weight BMI category. Nutritional status was found to be associated with affective domain characteristics of the students (both males and females) as learning outcome is affected both positively and negatively. It can then be concluded that positive correlation of good nutritional status and affective domain is an indices of health promotion.

Recommendations

Based on the findings, the following recommendations are made:

- Good diet with healthy lifestyle should be encouraged as it has significant health benefits that can help reduce the risk of major health problems;
- All the stakeholders in the upbringing of a child should also be educated on the consequences of obesity, overweight, mal-nutrition of children;
- Ministry of Education can organise in-service training for teachers on how to teach and assess affective domain;
- How to assess affective domain should be included in the curriculum of pre-service training of teachers;
- School based health programmes should be strengthened for periodic check of nutritional status of school age children by the State Ministries of Education and Health.

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