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THE ASSOCIATION BETWEEN STUNTING AND ACADEMIC SCHOOL PERFORMANCE AMONG PRIMARY SCHOOL CHILDREN IN DERA DISTRICT, NORTH WEST ETHIOPIA, 2019

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MSc THESIS ON

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BY

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July, 2020

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The association between stunting and academic school performance among primary school children in Dera district, North West Ethiopia, 2019

BY

Tarekegn Tigabie

A Thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in applied human nutrition.

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DECLARATION

This to certify that the thesis in entitled "The association between stunting and academic school performance among primary school children in Dera district north west ,Ethiopia "submitted in partial fulfillment of the requirements for the degree of master of science in applied human nutrition under chemical and food engineering, Bahir Dar Institute Of Technology , is record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates . the assistance and help I received during the course of this investigation have been duly acknowledged

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GRADUATE PROGRAM

Approval of thesis for defense result

I hereby confirm that changes required by the examiners have been carried out and incorporated in the final thesis.

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As members of the board examiners, we examined this thesis entitled "The association between stunting and academic school performance among primary school children in Dera district north west ,Ethiopia" by Tarekegn Tigabie. We hereby certify that the thesis is accepted for fulfilling the award the degree of masters of Science in applied human nutrition.

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ABSTRACT

Background: Optimal cognitive, emotional development and physiological function in children and adolescents requires access to food of adequate quantity and quality at all stages in life. Recurrent food insecurity as experienced in Ethiopia may result in malnutrition with resulting developmental impairments such as poor learning capacity in children. Stunting is fundamental factor which resulted in delayed cognitive development and under achievement of academic performance later in children's life at school. They are numerous study related to the magnitude and consequences of under-nutrition from different parts of the globe, but its relationship with educational achievement were not properly investigated and requires further investigation.

Objective: To assess the association between stunting and school performance among primary school children, Dera woreda, northwest Ethiopia

Methods: School based cross-sectional study was conducted from September 20-October 5, 2019 .Simple random sampling techniques were used to select a total of 337 study participants. Data were collected by using a pre-tested structured questionnaire, height was measured by stadiometer and academic performance data were collected from school roster. Then the data entered into SPSS version 23 for analysis. WHO AnthroPlus software was used to calculate the Z-score of height-for-age of children and multivariable logistic regression analysis were employed to control the effect of potential confounders. Variables with a p- value<0.05 in the multivariable model identified as predictors of school performance.

Result:-.The mean academic performance for study participants was 65.54(±13.63SD). The prevalence of stunting was very high 47.6% with 95%CI. The regression result of this finding generally shows that age 9-10 (OR=11.458) and 11-12(OR=12.916) have positively significant relationship with 90-100, Eating breakfast (OR=0.153) has negatively significant relationship to achieve 80-89 and workload (OR=0.429) has negatively relationship with 60-79 to achieve academically.

Conclusion: Academic performance was varying among sex; male students perform academically better than females. Academic performance was also varying among monthly income, the higher average monthly income the better achiever. Even though HAZ are not statistically significant relationship with academic achievement, the prevalence of stunting among study participants was high and varies among sex; males were highly stunted than females.

Keywords: Malnutrition, stunting, Child, School children, Associated factors, school achievement

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LIST OF ABBREVIATIONS

ANRS Amhara National Regional State

BDU Bahirdar University

BMI Body Mass Index

COHA Cost of Hunger in Africa

CSA Central Statistical Agency

EDHS Ethiopian demographic health survey

EFA Education for All

GTP Gross Transformation Program

ESDP IV Education Sector Development Program IV

HAZ Height-for-age Z-score

LMICs Low- to Middle-Income Countries

MDG Millennium Development Goals

NEP Nutrition Education Program

PSLCE Primary School Leaving Certificate Examination

PTAs Parents-Teacher Association

SBP School Breakfast Program

SFP School feeding program

UNESCO United Nation Education, scientific and Cultural Organization

USDA United States Department of Agriculture

US-NCHS United States-National Center for Health Statistics

WAZ Weight for Age Z score

WHO world health organization

WHZ Weight for height Z score

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1. INTRODUCTION

1.1. Background

Child malnutrition is one of the most serious societal health problems in the world. (Tsedeke W, 2016). Primary school children who are suffering from stunt have under achievement of academic performance which potentially affects their excellence of life in the future (Sarma M, 2015) Children are well thought-out the greatest national source of any country for the development of the nation (Shaikh M, 2016). Stunting remains as a key crisis in adolescents' school performance due to inappropriate eating practices (Hioui M, 2016). Despite the progress that has been made by the Millennium Development Goals (MDG) and Education for All (EFA) goals, 58 million primary school age children are out of school worldwide due to diverse reasons (UNESCO, EFA, UNICEF. , 2015).

Schooling provides knowledge and skills for children to accomplish something in life and associated with increased incomes, reduced poverty and improved health. (Watkins, 2016) . Ethiopian elementary education is free with first and second cycles lasting for 8 years. Children in second cycles seated for Primary School Leaving Certificate Examination (PSLCE) which determines succession to secondary school (Azubuike, 2015). Elementary schooling is enormously grave for the development of nations which provide an average highest public returns to investment for the state with a dynamic financial growth. Appropriate nutrition is significant for maximizing intelligence, learning and cognitive performance (Berezowitz C, 2015).

Food insecurity leads to undernourishment which is resulted in poor educational achievement (Rausch, 2013). Enhanced nutrition has an affirmative impact on academic success in which well-nourished children prepared more to learn and present at school and class in order to take the advantage of educational opportunities (Naik S, 2015).

Primary education is an instrument in order to meet United Nation Education, scientific and Cultural Organization (UNESCO) goal "quality education and lifelong learning for all by 2030"and "end poverty by 2030". In addition it is one of the most potential approaches to realize Ethiopia's current Gross Transformation Program (GTP) development vision to Become a middle income economy by 2025 (Education for All National Review Report of Ethiopia, 2015). Under-nutrition is detrimental for the academic achievement of school age children which will resulted in a cyclic food insecurity and scarcity So nutritional intervention is important for children attending primary school since it enhance efforts to reduce levels of malnutrition and supplement better academic achievement in the preschool years.

1.2. Statement of the problem

Globally more than 450 million children will be affected by stunting in 2025 when compared to the 2010 data (Lane, 2012.). Globally around 38% of undernourished children depart primary school without learning how to read, write and do simple arithmetic skills (Watkins, 2016). All country is facing a Serious public health confront from malnutrition in which 1 in 3 people is malnourished and an estimated 45% of deaths of children under age 5 are linked to malnutrition (Haddad L, 2016; .). 59 million children in Africa are suffering to stunt. Stunting was highly prevalent in Eastern Africa (24.0%) when compared with Western Africa (19.2%)(Hayashi C, 2017). Schools face increasing demands to improve core academic performance as it depends on the child's health, nutrition, cognitive development and socio-economic status ((Hioui M, 2016)(Berezowitz C, 2015)

In many developing countries stunting is pervasive that negatively affect the ability of children to learn and put them to perform at a lower level in school (Haile D, 2016). Children who are suffering from stunting before 2 years of age will have deficits in cognition and school achievement from the age of 5 years to adolescence (Prado E, 2014). Stunting is being one of the principal barriers to children's growth and development which have negative effect on the educational achievement of learner's (Chinyoka, 2014).

African malnourished school age children are at risk of repeating grades and dropping out of school with an achievement of 0.2 to 1.2 years less in school education (NEPAD, 2014). More than a quarter of children in sub-Saharan Africa are too thin which is resulted in impaired mental development and low educational achievement (Abebe F, 2017). In 2025 an additional 11.7 million children will be stunted in sub-Saharan Africa when compared to the 2010 data (Lane, 2012.).

The Cost of Hunger in Africa (COHA) summary report revealed that more than 2 out of every 5 children in Ethiopia are stunted with 16% repetitions in primary school children and an achievement of 1.1 years less in schooling. Although the targets set in Education Sector Development Program IV (ESDP IV) for dropout and repetition rates of 1% in all primary grades were strive, the academic performance in primary school children were touching these targets in which they have achieved poor (ESDP, 2015.). The study area has low school enrolment, high absenteeism, early dropout, high repetition rate and unsatisfactory school performance. So this study is important for the study community to improve school performance, by improving their nutritional status and by reducing school enrolment, absenteeism, repetition rate and early dropout. Even though numerous research findings stated the magnitude and consequences of stunting from

different parts of the globe, its relationship with educational achievement requires further investigation with strong study design

1.3. Objectives

1.3.1. General objective

- To assess the association between stunting and school achievements among school age children in Dera woreda, south Gondar Zone, Amhara regional state, North West Ethiopia.

1.3.2. Specific objectives

- To assess the school achievements among school age children in the study area
- To assess prevalence of stunting among school age children in the study area
- To determine the association between stunting and school achievements in school age children in the study area.

1.4 Scope of the study

To determine whether stunting is the factor of academic performance or not in the study area .To know the effect of stunting on primary school children's academic performance. The scope of this study was using nutritional intervention to reduce stunting and to achieve good academic performance and earns sustainable development for the future.

1.5 Significant of the study

The result of this study provides baseline data for the study area and serves as guidance for the health and education professionals and other health care providers on nutritional status, academic achievement and their relationship. So health professionals will consider nutritional status assessment at school in addition to health education regarding hygiene, vaccination for childhood illnesses like measles, trachoma and parasites. It serves as a supplementary data to the regional state in addition to the existing facts. The study also provides information for researchers to conduct further investigations in the school population with strong study design and large sample size. By far this study benefits the woreda, zonal and regional education and health office policy makers and planners to intend appropriate nutritional interventions through SFP and NEP at school in order to deal with the impact of stunting on academic performance among primary school

2. LITERATURE REVIEW

2.1 The association between stunting and academic performance

Worldwide more than 60 million undernourished primary school aged children are out of School (Admasie A, 2013). USA school-age children who have a proper balanced diet will have better intelligence ability, maximized cognitive capability and better educational achievement (Rausch, 2013). A study from United Kingdom shows that there is a strong association between breakfast consumption and educational achievement in primary-school children (. Hannah J, 2015). Students perform 74.6% for written, 79.7% for reading and 78.0% for arithmetic tests. This was lower achievements which show a statistically significant relationship with stunting (Izidoro, 2014). Food insecurity has been found to be negatively associated with poor academic achievement, intellectual wellbeing and cognitive development in school-aged children (Faught E, 2017)

The academic achievements of school aged children were increased in students who have participated in the United States Department of Agriculture (USDA) School Breakfast Program (SBP). In Santiago, Chilean adolescent students who had unhealthy nutrients were performing low academically which shows significant association between diet and educational achievement (Paulina C, 2016). The finding in Turkish reveals that malnutrition is not the only factor why students have very poor academic performance (Naelga S, 2016). Energy consumption and protein intake has an overt positive relationship with the academic achievement of Tripura's primary school children in India. Children having frequent breakfast had perform well in IQ test scores while those who occasionally have breakfast perform low (Jianghong L, 2013).

African school aged children who were stunted before the age of five will have reduced cognitive competence and underperformance in school with reiterate grades. Among the 7 to 16% of all grade repetitions in stunted school aged children, the mass (90 %) take place in primary school (Azubuike, 2015). A study conducted in Zimbabwe grade seven learners reveals that having frequent meals and receiving a regular breakfast, lunch and dinner have positive effects on children's learning achievement (Chinyoka, 2014). A study in Morocco rural school children shows that the prevalence of malnutrition was significantly more frequent among boys than girls in which stunting was 12.2% among boys. This study also reveals 30.1% of girls and 38.7% of boys rated as poor for mathematics and 17.1% of girls and 37.3% of boys rated as poor to average. This finding concludes that school performance is determined by various factors which are dependent on child and parental characteristics (Hioui M, 2016)

Stunting is a key public health problem which affects the large number of school children's wellbeing, development and educational achievement (Mekonnen H, 2013). In Ethiopia the likely grade level achieved by stunted school age children were lower than from that of who did not suffer from childhood under nutrition. The highest repetition in under nutrition school children by grade level were grade one (38, 713) grade two (25,508), grade five (19,563) and grade four (19,449) respectively (Education for All National Review Report of Ethiopia, 2015). A study in Adama, Ethiopia found that 15.6% stunted are adolescent girls. This study reveals that the prevalence of stunting and low dietary diversity were higher among government school children when compared to those from private school children (Roba K, 2016). In contrary a research done in South Gondar, Ethiopia shows that stunting as measured by BMI did not show an association with academic performance (Admasie A, 2013).

A study done at Goba town, Oromia found that there was a statistically significant positive correlation between stunting and mathematics score among school aged children. A study at HawaGelan, Southwest Ethiopia found a significant correlation between stunting and academic performance. Both stunted and underweight students were less likely to achieve good academic performance when compared to students having no stunting and normal weight respectively (Abebe F, 2017). Another study in Gurage Zone, Ethiopia revealed that stunting had negative association with academic performance of primary school children (Melese, 2017) .As in general Nutrition is a vital component of human health, life, and brain development through the entire lifespan. However, stunting is a major public health concern affecting a significant number of school- age children influencing their health, growth and development, and academic school performance (Zelelew.D.A, 2014). Health problems due to stunting in primary school children are among the most common causes of low school enrolment, high absenteeism, early dropout and unsatisfactory classroom performance in developing countries including Ethiopia (Zelelew.D.A, 2014). Stunting in primary school children impacts their health, cognition and subsequently their educational achievement (Tsedeke W, 2016)

2.2. Academic performance

Academic performance in primary school children is crucial for the future of Ethiopian nation which is affected by several factors such as nutrients taken, frequency of diet, socio-demographic and economic conditions and parental education and support (Haile D, 2016). This literature review is done to assess the current stunting status, academic achievement and their relationship in primary school children students. Different literatures have been reviewed based on the findings which are reliable with the research variables

and objectives of this study from the global, Africa and Ethiopia aspect. The literature reviewed shows the prevalence of stunting, academic performance and the relationships between stunting and academic performance.

2.3 Factors related with academic performance

There are many reasons for children to underperform at school, such as socio-demographic characteristics, Health status of the child, School environment/factors, Food insecurity at the household level, Nutritional status of the children

2.3. 1 Socio-demographic /Economic status

Primary school children's with unhealthy diets were performing less in language tests and mathematics tests (Paulina C, 2016). A research finding reveals that sex and learning approach were both strongly related to school performance. Males were more affected by malnutrition than females which resulted in low educational performance of males than females (Sarma M, 2015). A study from Nigeria found that girls perform academically better (66.39%) than boys (63.45%) (. Opoola F, 2016).

Socio demographic factors including sex, absenteeism, and distance from school, grade attended, parental socio economic status and parental involvement in their children's schooling were found to be significantly associated with primary school children's academic performance (Abebe F, 2017). Students, who were female, attend 2nd cycle and have educated parents been more likely to achieve good academically. In addition students from high income (>2000 ETB) households were 2.85 times more likely to achieve good academically when compared to students from low income (<1000 ETB) households. Students who have no parental support were less likely to achieve good academically when compared to those who have parental support (Abebe F, 2017). Studies from North-Central Ethiopia and South Central Ethiopia reveals that sex significantly impact school performance in which males performed 2.39 times better than females in academic performances (Admasie A, 2013)(Melese, 2017). A study done at Goba town found that age and wealth index was positively associated with average score of all academic subjects of the previous semester. But variables including residence, maternal education, paternal education, diet diversity, meal frequency, breakfast habit, sex of the child, occupation, attendance of preschool program and family size were not significantly associated with academic performance (Haile D, 2016). In general the academic achievement of primary school children is affected by several factors as the different reviewed literatures illustrate. The

principal issues raised in many findings were nutritional status, socio-demographic and economic characteristics and academic performance.

2.3.2 Health status of the child

These conditions have been reported to have an independent effect resulting in poor school performance. Malnutrition in early childhood is associated with poor cognition in later years and this is independent of psychosocial adversity. Chronic iron deficiency anemia, zinc deficiency and inadequate intake of vitamins A, B1, B2, B6, D, and E and niacin amide adversely affect long- term cognitive development. (Member Y, 2017).Infestation with roundworm, hookworm and whipworm often affects malnourished children's school performance because it can stunt growth, decrease physical activity, and cause poor mental development (Melese, 2017).

Child immunization: The nature of stunting as a chronic nutritional problem which develops over a relatively long period of time and which is difficult to reverse once established. A strong relationship was established in the present study between lack of immunization and stunting (Mekonnen H, 2013). The reasons for this association were not investigated and are more likely to be indirect than direct. It may be argued that poorly vaccinated children are more likely to contract illnesses that may in turn lead to stunting. It is also plausible that the same socio economic and cultural factors responsible for stunting may also influence the attitude and practice of parents with respect to child immunization (Sarma M, 2015)(Haile D, 2016)

2.3.3 Food insecurity at the household level

Food insecurity at the households level is directly associated with cognitive, emotional, mental and physical consequences of school children's. Food insecurity and poor nutrition, in a wide body of research indicates that the consequences follow children into the classroom, often resulting in poor academic performance. Children from homes with persistent food insecurity have shown poor in both reading and Mathematics than their food-secure counterparts (UNICEF/WHO/World Bank Group , 2016.)

Food-insecure children and teenagers have been shown to miss school more frequently, and are more likely to repeat a grade than food-secure children (EDHS, 2011.). Food insecurity has been shown to reduce a chance of students graduated from high school. Many researches shown that workers who experienced hunger as children "are not as well prepared physically, mentally, emotionally or socially to perform effectively in the contemporary workforce. "There is no doubt that a child who grows up without adequate

nutrition will face significant barriers to academic achievement (CHD, DoHS, Mo., 2004.). The various physical, behavioral, emotional, and cognitive costs of food insecurity make it extremely difficult for these students to reach their full potential. Although programs like the national school lunch program and the summer food services program have been providing meals to income-eligible students for years, research indicates they may not be enough on their own to mitigate the damaging effects of food insecurity on students. Despite federal food assistance and private charitable programs, food insecurity is a persistent national problem (Tsedeke W, 2016), affecting 11% of all households (Sarma M, 2015) and 16% of households with children (Shaikh M, 2016)

2.3.4. School environment/factors

School environment is a determining factor for school performance and survival at any given educational level." More factors related to institutions and learning environment are: the rules and regulations that govern teacher's code of conduct, availability of support systems for both sexes in the form of guidance and counseling, the school environment, teachers' attitudes and pedagogy, and gender bias in learning materials affects the performance and attainment of the students.(ZewdituGetahun, 2001.) Regarding the relationship between school resources and students' academic achievement measurements are inconsistent (Naik S, 2015)

Much research evidence indicated that variations in school characteristics are associated with variations in student outcomes. Attending a school with a better physical environment is associated with increased their academics scores. A significant positive effect on schooling outcomes associated with student-teacher ratio, instructional materials, size of the library and teacher training .Some studies suggested that family background is an important determinant of school outcomes, whereas school characteristics have minimal effects. Others argued that in various studies they indicated both home and school (Tesfahun Yonas, 2018)

Globally children are pressurized to learn more in schools and improve their abilities to read write and apply solution of problems in order to pass a successful and comfortable life. Attempts to improve academic performance in school include high expectations, task on time, safe climate and challenging curriculum. Schools are often blamed for student's poor academic performance despite the fact that teachers and principal work hard to provide strong curricula, high expectations and safe climate (Admasie A, 2013)

2.3.5. Conceptual frame work

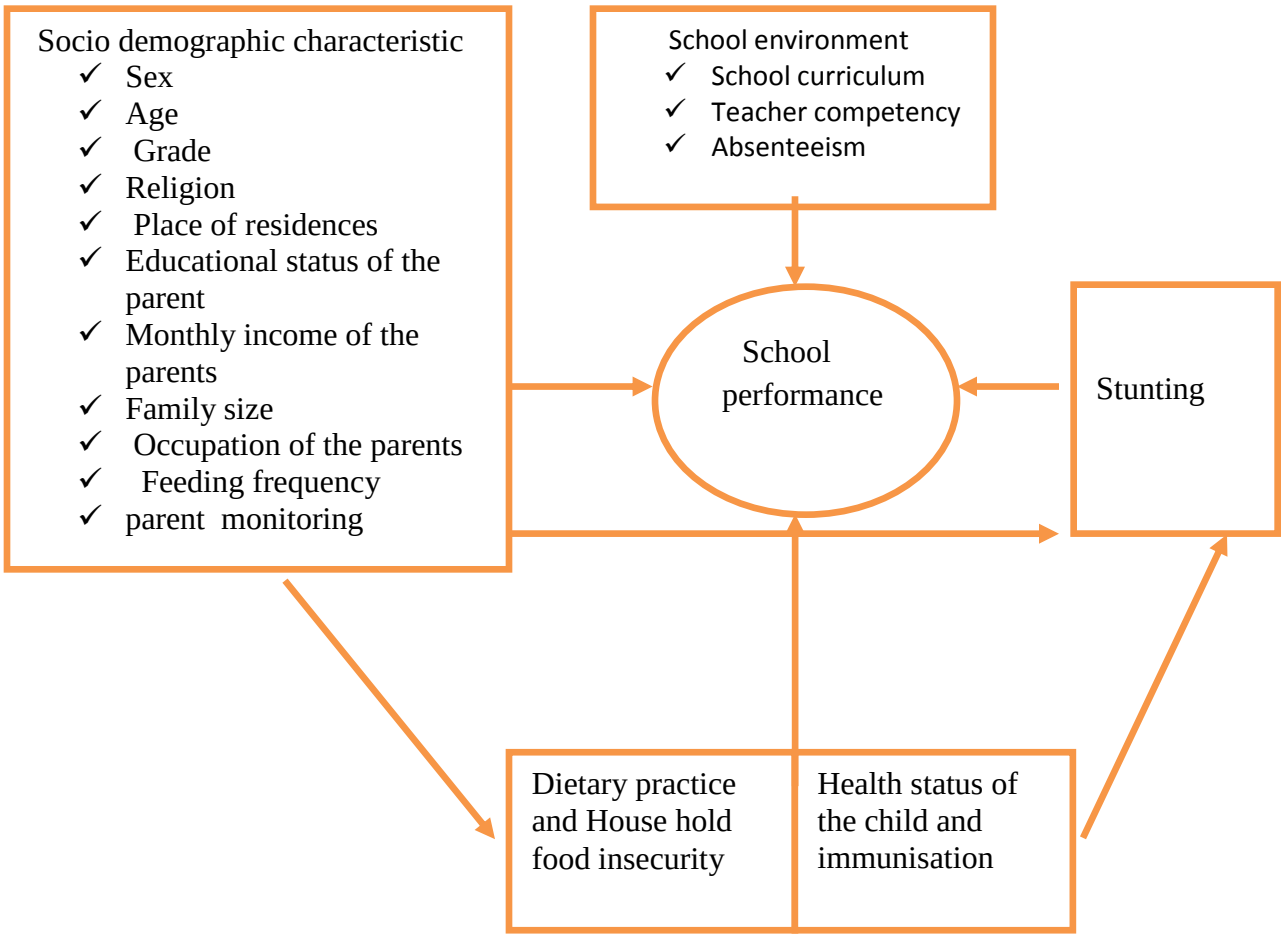

Figure1. Conceptual framework

3. METHODOLOGY

3.1 Study Area and Period

The study was conducted from September 20 to October 5/ 2019 in Dera district, North West, Ethiopia. Dera district is one of the 15 Woreda in south Gondar zone ANRS. Dera is bordered on the south by the Abbey River which separates it from the Mirab Gojjam zone on the west by Lake Tana, on the north by fogera, on the northeast by Misraq Este, and on the East by Mirab Este. Based on the 2007 national census conducted by the Central Statistical Agency of Ethiopia (CSA).This district has a total population of 248,464 an increase of 17.01% over the 1994 census of whom 126,961 are men and 121,503 women;16772 or 6.75% are urban inhabitants, with an area of 1525.24 square kilometer . The organizational structure of the district includes 03 urban and 36 rural Keble. They have 20 primary schools, sixteen rural and four urban schools with a total of 22464 primary school age children of this 11512 of them are male and 10,952 are female

3.2 Study design

Institutional based cross sectional study design was used

3.3The source and Study Population

3.3.1The source Population

The source population was all children who are enrolled at all public primary schools from 7 -14 years in Dera district

3.3.2. The Study Population

All children who have attended their primary education in the selected public primary schools of Dera district and those who full fill the inclusion criteria.

3.4. Inclusion and Exclusion Criteria

3.4.1. Inclusion Criteria

All primary school children in the selected public primary schools aged 7 - 14 years and those who have at least two semesters total subject average score during the study period were included.

3.4.2. Exclusion Criteria

Children who were unable to communicate and have critical health problems during the study period were excluded from the study.

Children with physical deformities like scoliosis/ kyphosis were excluded from the study

3.5. Sample size

Sample size is determined by using a single proportion formula with the following assumption; the prevalence of stunting among school age children was used based on the finding done at Debre Markos town (Zelelew.D.A, 2014)for the prevalence of stunting among school age children is 27.5%, with a 95% confidence level, 5% tolerable error the sample size will give 307.

$$n = (\frac{z}{d})^n \times p(1-p)$$

[Where n = sample size, Z = Z score at 95% CI = 1.96, p= 27.5%, d = marginal error = 0.05]

$$n = \frac{(1.96)^2 \times 0.275 \times 0.725}{(0.05)^2} = 306.36 \approx 307$$

By adding 10% non-response rate the minimum sample size required to estimate the prevalence of stunting among governmental primary school age children 307 + 10%, 307 + 30 = 337

3.6. Sampling procedure

Simple random sampling method was used to select children's in primary school. In the selected school, a sampling frame was prepared from the students roster in each grade, and students each grade were selected by simple random (a lottery) method proportional to the student size of the class.

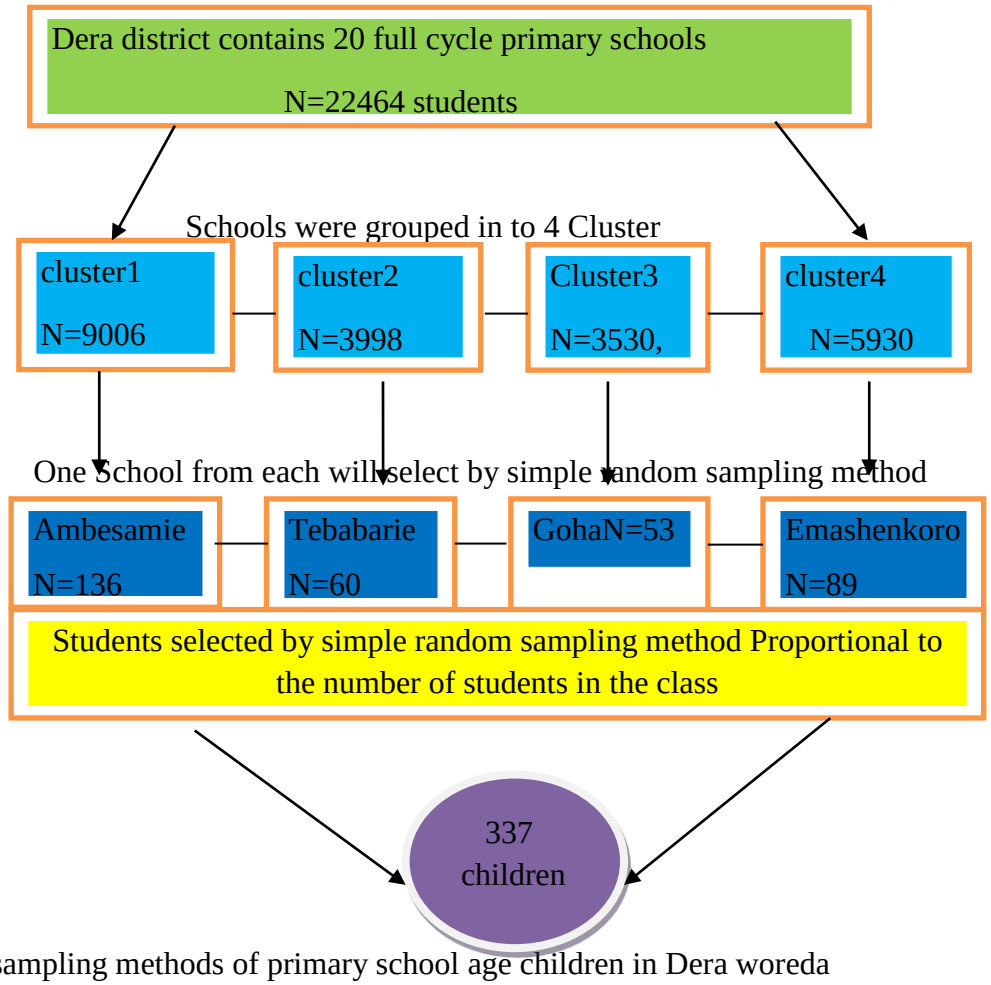

Figure2. The sampling methods of primary school age children in Dera woreda

3.7. Study variables

3.7.1 The dependent variable

Academic performance

3.7.2. The independent variables

The independent variables are socio-economic characteristics of child (age, sex, educational attending, height, medical conditions), parents characteristics (educational status, religion, occupation, marital status, and ethnicity), and household characteristics (household income, frequency of feeding, food availability, and family size), school environment (teachers competency, school curriculum Absenteeism), health status of the child and nutritional status (stunting) all are associated for academic school achievements,

3.8. Definition of terms

Stunting: Reflects long term cumulative effects of inadequate nutrition and health. Shortness in height refers to low height-for-age that may reflect either normal variation in growth or a deficit in growth. Stunting refers to shortness that is a deficit or linear growth retardation. Stunting is defined as low height-for-age at <-2SD of the median value of the NCHS/WHO international growth reference. Severe stunting is defined as <-3SD (Shaikh M, 2016)(Azubuike, 2015).

Academic performance: The overall subjects the students were given in the academic year 2018/19 were considered to examine the academic achievements of the students. The annual average score was computed by taking the result of two consecutive semesters of the year. To verify the relationship between nutritional status and academic performance, average marks of the overall subjects the students received were excellent (90-100) ,very good(80-89) ,satisfactory(60-79) ,fair(50-59) and poor (less than 50) academic achievement, in accordance with an average mark of below 50%. This cut off average point was decided by considering the pass mark set by Ethiopian ministry of education (Education for All National Review Report of Ethiopia, 2015)

3.9. Data collection procedure

Data was collected by using, pre-tested and structured questionnaire translated into local language (Amharic) by trained and experienced data collector. Respondents were parents/ caregivers of the children identified in the study schools. After students were randomly selected from the schools, their household address was traced in the students' parent database. Training on the standard procedures and technique how to collect data were given for the data collectors and supervisors for 2 consecutive days. The contents on questionnaires were briefly described to reduce interviewer bias. Data collectors were go to the children's house to administer the questionnaire to one of the parents/caretakers. A unique identifier was given to link the children anthropometric measurement and household characteristics. In addition, mothers/caretakers were asked about whether the child was sick and treated during the previous 15 days before the survey. Information about school achievements was finally collected from school rosters at the end 2011 E.C./2019.

Anthropometric measurements

The age of the children was derived from the school register. To assess the nutritional status of students, height was measured according to the WHO standard procedures. Individual's height was measured to the

nearest 0.1 cm by using studio meters. The subject was asked to remove their shoes, stand erect and look straight in horizontal plain. The shoulder blades, buttocks and the heel touch the standing measuring board. School children with Z-score values of < -2SD for height for age were classified as stunted and those who were < -3SD were termed as severely stunted. This was done as per the WHO criteria and classification standard.

3.10. Data processing and Analysis.

After ensuring the completeness of the questionnaire the Data were enter into SPSS version 23 for analysis. Descriptive statistics was used to describe the data. WHO Anthro Plus software was used to calculate the Z-score of height-for-age of children and a bivariate analysis was used primarily to check variables having association with the dependent variable. Then variables found to have p-value of less than 0.2 were fit in to Multiple Logistic regression for controlling the possible effect of confounders. Variables with a p-value<0.05 in the multivariable model were identified as predictors of academic school performance. Finally the association between stunting with school achievement was analyses by odd ratio (AOR) with 95% CI or at $p < 0.05$ level of significance.

3.11. Ethical considerations

Ethical clearance was obtained from Institutional Review Board of the Institute of Technology, School of Chemical And Food Engineering, Bahir Dar University; official letters was submitted to the ANRS health institute. The regional health institute bureau ethical review board was approved and gives formal letter to the zonal health institute. Zone health institute was also approved and gives formal letter to Woreda educational and health bureau. Supervisors and data collectors were trained on confidentiality .The purpose and importance of the study was explained to the study participants and verbal informed consent was obtained from all participants before starting the interviews or taking body measurements and also they were informed about the possibility to refuse participation at any time of data collection.

Confidentiality of the data was assured and kept anonymously; code number was assigned to the study participants without mentioning the name, the information that were collected by the study were kept in a file and locked with a key. Participants identified as stunted were given nutritional advice and linked to the possible supporting organizations.

4. RESULTS AND DISCUSSION

4. 1.Result

4.1.1 Socio-demographic and economic characteristics

A total of 337 public primary school children were enrolled with 99.1 % response rate, out of these participants 177 (52.5%) were males with a mean age of 10.82 (±2.226 SD). Majority of the study participants 97 (29.1%) were in the age group 13-14 and 199 (59.05%) were from grade 1-4. Most of children were Orthodox Christian 303 (89.9%), rural residence 184 (54.6%) and have married families 281 (83.4%). Many of the participants, 162 (48.1%) were from a family size of more than five. Majority of the participants 195 &163 (57.9% & 48.4%) came from illiterate mothers and fathers respectively and monthly income of <1000 ETB 115 (34.1%). The vast majority of participants were from family support of child education 268 (79.5%) and no work load at home 199 (59.1%). Most of the participants 194 (57.6%) were travel to school less than 30 min.

4.1.2 Academic performance

The mean academic performance for primary school children was 65.54(±13.631SD).It was 67.08 (±13.541SD) for males and 63.82 (±13.56 SD) for females. Study participants in the age group 11-12 perform 67.73(±13.423SD) academically. The majority of the respondents 154 (46.2%) were scores 60-79 in both male and female. Among the study participants 58 (17.4%) were academically scores below 50 average marks at the end of the academic year. Only 15 (4.5%) of respondents were achieves 90-100 in both male and female. Children's from grade level 1-4 were performs 68.20(±13.327SD) while grade levels 5-7 performs 61.75(±13.202SD). High monthly income parents were performs better 72.50(±13.067 SD) relative to the average. Educational achievement for family members of (4-5) scores 64.21(±13.123SD).

The Children who had normal height over age perform 65.77(±13.550 SD) and those severely stunted children's achieve 64.36 (14.050SD academically. Children's who have work load at home academically achieves 63.35(13.977SD).Regarding to distance, students move greater than 30 minutes achieves 64.99(13.491SD).Absenteeism in school also achieves 64.88 (±13.680SD) academically .

Table 1. Socio demographic characteristics related to school performances of primary school children

Variables	Category	Mean score	N	Std. Deviation
age	6-8	66.46	74	12.499
	9-10	67.37	71	14.318
	11-12	67.73	91	13.423
	13-14	61.46	97	13.454
	Total	65.54	333	13.631
sex of respondents	male	67.08	176	13.541
	female	63.82	157	13.568
	Total	65.54	333	13.631
Educational status	1-4	68.20	196	13.327
	5-7	61.75	137	13.202
	Total	65.54	333	13.631
height over age z score of the respondents	>-2	65.77	173	13.550
	{-3,-2}	65.44	115	13.754
	<-3	64.36	42	14.050
	Total	65.48	330	13.651
religion	orthodox	65.74	303	13.462
	Muslim	63.81	26	14.848
	catholic	54.33	3	17.898
	Total	65.49	332	13.614
Region of respondent	Amhara	65.54	333	13.631
	Total	65.54	333	13.631
marital status	married	65.35	281	13.501
	non married	75.00	2	8.485
	divorced	66.33	29	14.074
	died	66.15	21	15.526
	Total	65.54	333	13.631
Residence	urban	65.30	149	13.471
	rural	65.74	184	13.794
	Total	65.54	333	13.631
Mother's occupation	housewife	65.07	242	13.942
	office worker	70.09	29	12.921
	merchant	66.50	14	8.112
	daily laborer	64.91	48	13.551
	Total	65.54	333	13.631
Father's occupation	farmer	65.20	217	13.853
	office worker	67.81	51	13.828
	merchant	61.68	10	11.551
	daily laborer	65.41	51	13.249
	Total	65.53	329	13.685

Mother's Educational level	illiterate	64.75	195	13.205
	primary school	66.19	76	14.890
	secondary school	66.86	30	12.323
	college	67.29	17	14.736
	university	67.90	15	14.675
	Total	65.54	333	13.631
Fathers educational level	illiterate	65.17	163	12.999
	primary school	63.94	96	13.951
	secondary school	66.55	29	13.659
	college	66.03	16	17.126
	university	71.82	28	13.325
	Total	65.54	332	13.651
monthly income(ETB)	<1000	63.84	115	13.643
	1000-1999	62.31	56	13.469
	2000-2999	64.65	60	12.712
	3000-4999	66.98	50	13.067
	5000 and above	72.50	51	13.449
	Total	65.53	332	13.651
family member	1-3	68.26	42	14.044
	4-5	64.21	128	13.123
	>5	65.87	162	13.914
	Total	65.53	332	13.651
did your child have much work load at home /out of home	yes	63.35	134	13.977
	no	67.02	199	13.225
	Total	65.54	333	13.631
Did you support/encourage your child education	yes	65.36	269	13.410
	no	66.33	64	14.609
	Total	65.54	333	13.631
How long your children walk to home?	<30minuts	65.94	194	13.752
	>30minutes	64.99	139	13.491
	Total	65.54	333	13.631
Did your child have been absent from school?	yes	64.88	243	13.680
	no	67.34	90	13.409
	Total	65.54	333	13.631
If yes, for the above question how many days your child absent from school?	<5 days	64.22	179	13.963
	>5 days	66.70	64	12.782
	Total	64.88	243	13.680

In this study Eating breakfast achieves 64.94(±13.477SD) was not contribute to good academic achievement relative to the non-eater .Academic achievements was better in students who have medium food availability 67.29(±12.425SD) and feeding frequency 3 meals per day 67.20(±12.965SD).Academic achievements in fully immunized children was 64.68 (±13.522SD). Students who get support as a form of money from any organizations scores 72.83 (±15.248SD) and who supported 1-3months score 75.90(±11.195SD)

academically. The Children who gains dietary counseling/advice achieves 66.19(±13.279SD) but doesn't gains dietary counseling/advice achieves 64.77(±14.045SD)

Table2. Dietary practice and health status at household level related to academic achievements in Dera district primary school

Variables	Category	Mean score	N	Std. Deviations
having breakfast	Yes	64.94	308	13.477
	No	72.96	25	13.605
	Total	65.54	333	13.631
If yes, for the above question how frequent your child ate?	Always	65.65	122	13.949
	sometimes	64.39	187	13.192
	Total	64.89	309	13.488
How frequent availability of food	Low	62.94	39	15.766
	medium	67.29	153	12.425
	High	64.37	141	14.106
	Total	65.54	333	13.631
How many times do you eating per day?	2 meals per day	60.65	27	15.745
	3 meals per day	67.20	147	12.965
	more than 3 meals per day	64.84	159	13.682
	Total	65.54	333	13.631
What is your immunization status during child hood?	fully immunized	64.68	263	13.522
	not fully immunized	68.77	70	13.651
	Total	65.54	333	13.631
Do you get any nutritional care from any organization?	Yes	67.18	35	15.538
	No	65.35	298	13.406
	Total	65.54	333	13.631
If yes, to the above what type of support do you get	food product	64.72	8	13.690
	money	72.83	9	15.248
	closes	63.58	9	13.778
	shelter and food	69.36	12	15.165
	Total	67.84	38	14.439
For how long have you been supported by these organizations?	<than one months	64.63	15	13.093
	1-3 months	75.90	12	11.195
	>3 months	63.41	11	16.687
	Total	67.84	38	14.439
Are you still being supported	Yes	65.08	13	16.940
	No	69.27	25	13.101
	Total	67.84	38	14.439
Have you been given any dietary counseling/advice?	Yes	66.19	181	13.279
	No	64.77	152	14.045
	Total	65.54	333	13.631

4.1.3 Stunting in primary school children

The anthropometric assessment of the study participants revealed that the prevalence of stunting in both male and female were 47.6% .it was (48.57%) for males and (46.45%) for females (figure 3&4).

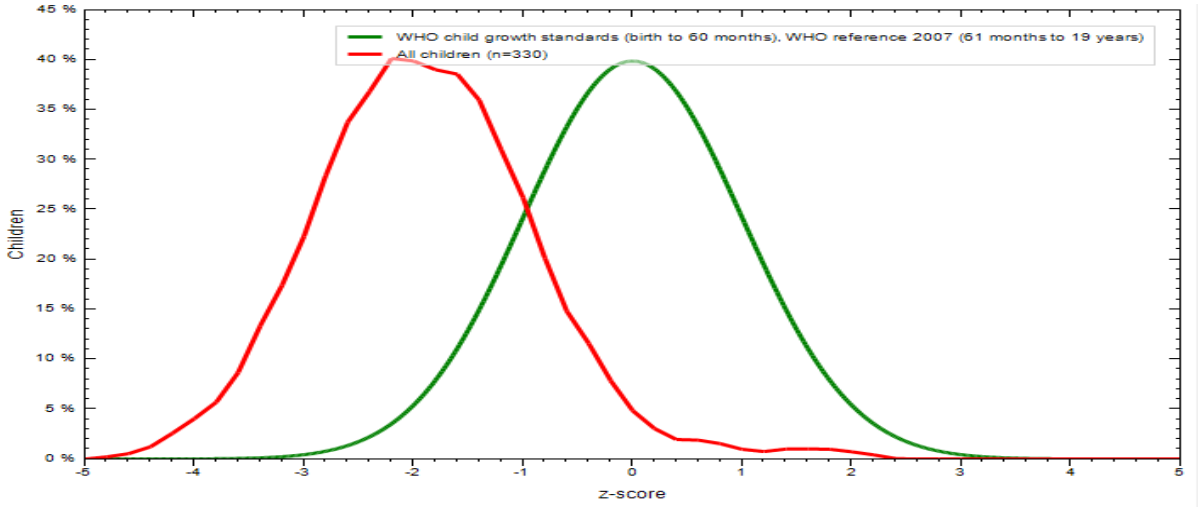

Figure 2Height-for-age z-scores among children age 7-14 years, Dera district, North West Ethiopia 2019.

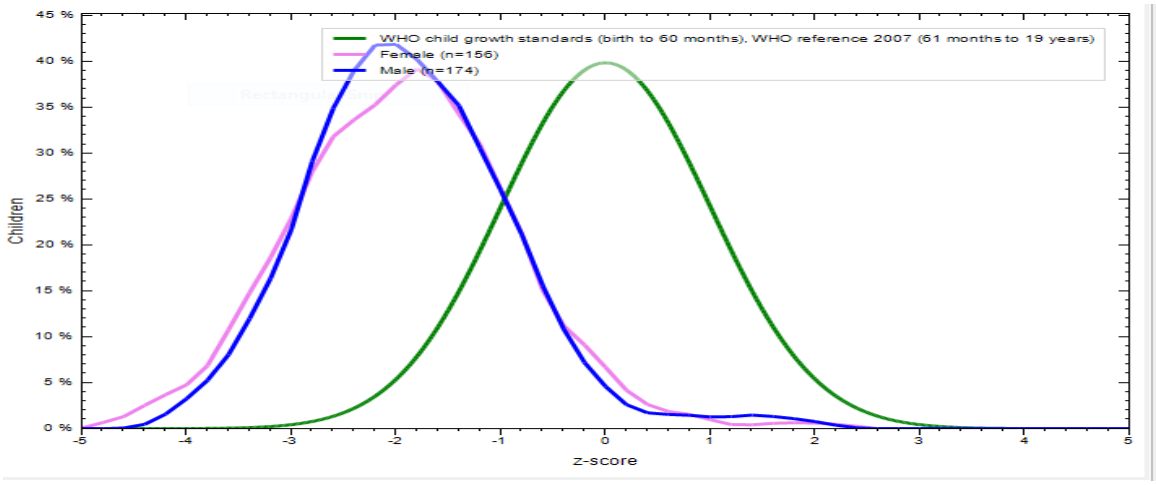

Figure 4 Height-for-age z-scores among children age 7-14 years by sex, Dera district, North West Ethiopia 2019.

4.1.4 The School curriculum assessment

The School curriculum assessment of the study participants in Dera district revealed that (45.1%) of the participants were agreed by comfortable of the class room & the majority (39.8%) of the participants were agreed that the teacher was provide enough tools to facilitate the teaching learning process. Many of the respondents (36.2%) were not freely communicate with their teachers. The majority of the respondents

41.5% were strongly agreed with the teaching learning process feel happy .The majority of the respondents 124 (37.2) agreed by the library have enough facilities to support the teaching learning process and 39.8% of respondents were strongly agreed by teachers encouragement on the teaching learning process.

The School curriculum related to academic achievements of the study participants revealed that the majority 152 (45.6%) of respondents who scores 67.73(13.232SD) academically were agree on comfortably of the class room. 87(26.1%) of respondents who scores 66.84 (±13.057SD) academically disagreed that the teacher providing enough tools to facilitate the teaching learning process. The majority 122 (36.6%) of respondents who answer disagree on you feel free to communicate with your teacher outside the class room scores 66.49(±12.836SD). According to the library facilities to support the teaching learning process 124 (37.2%) respondents who answers agree, scores 70.08(±12.802SD) and respondents who answers strongly disagree scores 56.70(±13.138SD). About teachers encouragement for students at the time of teaching learning process respondents who answers disagree scores 67.19(±13.227).

T*able 3, school curriculum related with academic performance of students in Dera district primary schools*

Variables	Category	Mean	N	Std.Devation
you feel comfortable in the class room	strongly agree	63.72	111	13.878
	Agree	67.73	152	13.232
	Disagree	64.22	39	13.252
	Strongly disagree	63.03	31	14.183
	Total	65.54	333	13.631
The teacher is providing enough tools to facilitate the teaching learning process?	strongly agree	64.61	79	14.471
	Agree	65.72	134	13.464
	Disagree	66.84	87	13.057
	Strongly disagree	63.61	33	13.966
	Total	65.54	333	13.631
your teacher explains to you the class room participation	strongly agree	64.26	130	13.600
	Agree	66.02	138	13.469
	Disagree	66.94	52	14.635
	Strongly disagree	67.74	13	11.711
	Total	65.54	333	13.631
You feel free to communicate with your teacher outside the class room?	strongly agree	64.86	72	14.233
	Agree	65.87	110	13.858
	Disagree	66.49	122	12.836
	Strongly disagree	62.04	29	14.553
	Total	65.54	333	13.631
You feel happy with the teaching learning process	strongly agree	65.52	140	14.154
	Agree	64.83	123	12.997
	Disagree	67.13	52	13.832
	Strongly disagree	66.00	18	13.886
	Total	65.54	333	13.631

You get enough reading materials to support your learning?	strongly agree	64.76	70	14.026
	Agree	67.73	95	14.324
	Disagree	65.11	109	12.736
	Strongly disagree	63.74	59	13.520
	Total	65.54	333	13.631
The library has enough facilities to support the teaching learning process	strongly agree	68.87	76	11.549
	Agree	70.08	110	12.802
	Disagree	62.68	86	13.076
	strongly disagree	56.70	60	13.138
	Total	65.47	332	13.586
The teaching learning process approach is understandable in your class room?	Strongly agree	65.12	105	13.677
	Agree	65.61	158	13.500
	Disagree	68.79	55	12.953
	Strongly disagree	55.87	15	13.516
	Total	65.54	333	13.631
You are participating in the teaching learning process willingly?	Strongly agree	65.24	140	14.311
	Agree	65.55	142	12.872
	Disagree	67.76	43	14.229
	Strongly disagree	58.94	8	10.571
	Total	65.54	333	13.631
your teacher encourages you to explain your view on the teaching learning process	Strongly agree	64.29	134	13.891
	Agree	66.16	121	13.443
	Disagree	67.19	58	13.227
	Strongly disagree	65.29	19	14.814
	Total	65.54	332	13.651

4.1.5 The Relationship between factors and academic school performance

In bivariate analysis academic school performances were associated with the factors such as Age, Grade levels of the respondents, family Average income, Work load, Breakfast habit and Library facility. Among the selected factors with 95% of CI, Age, breakfast habit and work load are significantly associated with academic performance of the students (p -value < 0.05) The regression result of this finding generally shows that there was a statically significant positive relationship between age and academic achievement with 95%CI. Age 9-10 (AOR=11.458) and Age 11-12(AOR=12.916) have positively related to achieve 90-100 academically. Eating breakfast (AOR=0.153) to achieve 80-89 and workload (AOR=0.429) to achieve 60-79 academically have statically significant negative relationship with academic achievement with 95%CI.

Table 4. Multinomial logistic regression analysis of school performance at 95%CI in Dera woreda primary school children

Average score		B	Std. Error	P-value	AOR(95% CI)
90-100	Intercept	-.190	1.707	.025	
	Age of respondents				
	9-10	2.439	1.165	.036	11.458 (1.169,112.303)
	11-12	2.558	1.151	.026	12.916(1.353 ,123.292)
	13-14	0	0	0	0
80-89	Intercept	2.690	.986	.006	
	Breakfast eat Yes	-1.876	.722	.009	0.153(0.037,0.630)
	No	0	0	0	0
60-79	Intercept	2.041	.916	.026	
	Workload Yes	-.845	.329	.010	0.429 (0.226,0.818)
	No	0	0	0	0

The reference category is: less than 50

4.2 Discussion

In this study the mean academic performance for study participants were 65.54(±13.631SD). Which is a higher achievement when compared with a study done in, Tach-Gaynt, South Gondar, Ethiopia (62.25%), Hawassa, Ethiopia (35.1 ± 4.1SD) and lower than Hawa Glena in Oromia, Ethiopia (67.2% ±15.4% SD) (Tsedeke W, 2016)(Abebe F, 2017)(Admasie A, 2013) .

In this study males perform better (67.08 ±13.541SD) academically when compared with female students (63.82 ±13.56 SD). This finding is consistent with a research finding in North Central and South Central Ethiopian that males have performed 2.39 times better than females in academic performances (Melese, 2017). In contrary findings in Nigeria, Morocco and India revealed that girls have better educational performance than boys (Shaikh M, 2016)(Hioui M, 2016)(. Opoola F, 2016).

Study participants in the age group 11-12 perform better 67.73(±13.423SD) academically when compared with other Age group but the age group 13-14 perform poor 61.46(13.454SD) than the other age group. The majority of the respondents (46.2%) were scores 60-79 in both male and female. Among the study participants 17.4% were academically scores below 50 average score at the end of the academic year. Only 4.5% 0f respondents were achieves higher score (90-100) in both sexes. Regarding to grade Children's from grade level 1-4 were performs higher 68.20(±13.327SD) than compare to grade level 5-7 who performs 61.75(±13.202SD). Children from high monthly income parents were perform higher 72.50(±13.067 SD) than those from low income parents 63.84(±13.643 SD).

Children's who have work load academically achieves poor 63.35(13.977SD) compared to children's who have not work load 67.02(±13.225SD). Absenteeism in school achieves poor 64.88 (±13.680SD) when compared to non-absent students 67.34(±13.409SD).

The anthropometric assessment of the study participants revealed that the prevalence of stunting in both sex were 157(47.6%) and, 42 (12.73%) were severely stunted. When we compare male to female respondents, male's respondents (48.57%) were highly stunted than females (46.45%) but in case of severity females (13.55%) have highly sever than males (12%).stunting is a key public health problem which affects the large number of school children's wellbeing, development and educational achievement but in this finding stunting did not show an association with academic performance. A study in Adama, Ethiopia found that 15.6% stunted are adolescent girls and the likely grade level achieved by stunted school age children were lower than from that of who did not suffer from childhood under nutrition(Roba K, 2016) . In contrary a research done in South Gondar, Ethiopia shows that nutritional status as measured by BMI did not show an association with academic performance (Admasie A, 2013). The finding of this study revealed that the prevalence of stunting was 47.6% which is higher than a finding in Oromia, Ethiopia (20.6%), Harar, Ethiopia (8.9%), Adama, Ethiopia (15.6%), Fogera, Ethiopia (37.2%) and India (18.5%), (Shaikh M, 2016) (Naik S, 2015)(NEPAD, 2014)(Mekonnen H, 2013)(Roba K, 2016)

In this study immunization scores 64.68 (±13.522SD) and eating breakfast scores 64.94(±13.477SD) is not contribute to higher academic achievement. Participants who ate breakfast always are achieves higher 65.65(±13.949 SD) than who ate sometimes 64.39(±13.192 SD) .Academic score is higher in students who have medium food availability 67.29(±12.425SD) and feeding frequency 3meals per day 67.20(±12.965SD). In the analyses a predictors of a scale group classification, such as students who were achieved excellent (90-100) ,very good(80-89) ,satisfactory(60-79) ,fair(50-59) and poor (less than 50) academic achievement. The reference category for the outcome variable was 'below 50'; each of the other four categories was compared to this reference group. The result of this finding generally shows that there was a statically significant positive relationship between age and academic achievement at 95%CI (OR>1), work load and beak fast eating habit were statically significant negative relationship with academic achievement at 95%CI (OR<1).but grade, library facility, Family Income and the remaining have not significant relationship with academic achievement.

In regression analysis age 9-10(OR =11.458SD) and age 11-12(OR =12.916SD) are statistically positive significant relationship to achieve 90-100 academic score with 95%CI and p-value < 0.05. In this study breakfast habit (OR=0.153SD) was statistically significantly negative relationship with achieving 80-90

academic performance. This finding is related to the finding in Goba town, Oromia that breakfast habit did not show significant positive association (Haile D, 2016).In order to score 60-79 academically, work load (AOR =0.429SD) have statistically negative significant relationships with 95%CI,p<0.05 .

The study shows that academically achieving 90-100 average mark, students age 9-10 a unit increases, academic achievement ,increases by 2.439(B:2.439,95%CI:1.169,112.303)& age 11-12 a unit increases academic achievements also increases by 2.558 (B: 2.558 ,95%CI:1.353,123.292). In this investigation eating breakfast is statistically negative relationship with achieving 80-89 academic performances. The academic performance of study participants who have eaten breakfast decreases by 1.876 unit change when compared with those who have not eaten breakfast (B: -1.876, 95% CI: 0.037, 0.630). This could be opposed to other many findings that explain the positive effect of breakfast as it replaces energy loss in children who spent most of their time on different recreational activities. It also makes students alert and active to learn, participate and attend class. In this study workload is statistically negative relationship with achieving 60-79 performances when Workload increases a unit academic achievements decreases by 0.845 (B:-0.845, 95%CI: 0.226, 0.818).Variables including sex of the child, residence, maternal education, paternal education, parental occupation and family size were not significantly related with academic performance which is parallel to the finding of Goba town in Oromia, Ethiopia (Haile D, 2016). Absenteeism was not significantly associated with school age children's academic performance which is opposite to the finding of Tach-Gynt in South Gondar, Ethiopia (Admasie A, 2013).

4.3 Limitation of the study

The study design does not show the causal relationship between stunting and academic performance. This study does not include grade eight students because of age almost above 14 years and the passing mark was not determined by the school the same to the other but they determined by regional level . The study does not assess the clinical and biochemical nutritional status of the students which are essential for growth and development of mind. It also does not assess the children's dietary diversity and young infancy period nutritional status like exclusive breast feeding and weaning practices which might be one of the determinants of educational achievement in school age children. In addition the study does not include private primary school children which might be a supplement for inference about nutritional status and academic performance relationship among school age children. The study did not assess the children's cognition which has a bearing on their educational achievement. The study also did not strongly asses' school rule and regulation and teachers competency.

5. CONCLUTION AND RECOMMENDATION.

5.1 Conclusion

Based on the preceding major findings, the following conclusions are made. Academic school performance was determined by age, the age of the child increases, children's are well prepared physically, mentally, emotionally or socially to perform better academic achievement. Academic performance was varying among sex; male students perform academically better than females.

Work load is a negatively determinant factor for better educational achievement. It loss their time, energy and effort to improve academic performance. The negative effect of breakfast on academic performance is unpredictable results opposed to other many findings that explain the positive effect of breakfast as it replaces energy loss in children who spent most of their time on different recreational activities. In addition it is a counteractive with school feeding program at the national level in which school feeding program is important for students make alert and active to learn, participate and attend class.

Stunting was not statistically significant relationship with school performance. Even though HAZ are not statistically significant relationship with academic achievement; the prevalence of stunting among study participants was high and varies among males and females. Generally in this study Age, breakfast habit and work load are variables that significantly associated with educational achievement of the study participants

5.2 Recommendations.

1. District health and education bureau

- ❖ The woreda education bureau should involve in strengthening of preschool programs for toddlers as it is a tool for better educational achievement of children later in their school age
- ❖ The woreda health and education bureau should work in collaboration to combat malnutrition (stunting) and to strengthen the positive effect of nutrition on educational achievement of primary school children.

2. Schools and teachers

- ❖ They should motivate children to attend regular class since students who attend class rarely perform low in academic performance.
- ❖ They have to motivate and encourage female students to learn, participate and attend classes for their better academic performance.

- ❖ They have to discuss with the parents of the study participants regarding their breakfast, class attendance and academic performance.

3. Researchers

- ❖ The majority of studies done in primary school children nutritional status and educational achievement relationship were cross-sectional which does not show the causal effect of one on the other. Therefore researchers should conduct further study with strong study design to investigate the true relationship between stunting and academic achievement of primary school children.
- ❖ Scholars should carry out further research by incorporating dietary diversity and food frequency habits of children in addition to anthropometric nutritional assessment tools.
- ❖ They are also recommended to perform further study with qualitative methods to get better clue on nutritional status and educational achievement of primary school children.
- ❖ Further study should be conducted on why males perform better than females.

4. Parents and children

- ❖ Both the parents and children should participate in NEP to get information about healthy eating habits and its importance.
- ❖ Children should practice healthy eating behaviors in order to be active and participatory in their learning with better educational achievement.
- ❖ Parents should engage in motivating children to go to school and attend regular class for better educational achievement.
- ❖ Parents should reduce work load on children because work load were high determinant factor for better educational achievement.

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APPENDIX

Information sheet and informed consent

Title of the project: the association between stunting and school performance among primary school children, Dera woreda, North West Ethiopia

Name of investigator: TarekegnTigabie

Name of the organization: Bahir Dar University, Institute Of Technology, School Of Chemical And Food Engineering.

Introduction: The information sheet and consent form prepared by the investigator with the aim of explaining the research project that you are asked to join by the research investigator. The main aim of this research project is to assess the association between stunting and school performance among primary school children, Dera woreda, North West Ethiopia. Decision on your involvement will be made by you and only you. The investigator includes 4 data collectors, 2 supervisors and two advisors

Purpose: The main aim of this study is to assess the association between stunting and school performance among primary school children in the study area and recommend possible interventions based on the findings.

Procedure: To assess the association between stunting and school performance among primary school children in the study area you are invited to participate in the project. If you are willing to participate in this project you need to understand and sign the agreement form. Then you will be requested to give response to some questions that will take a few minutes (about 30 minutes) and then there will be height and age measurements. All the responses given by you will be kept confidentially by using coding system whereby no one will have access to your response.

Risk: By participating in this study you may feel that it has some discomfort especially on wasting your time (20-30 minutes) to respond questions but this may not be too much as you are one of the members of the communities, your response will help as important input to determine the stunting and associated factors in school achievements. However there is no physical or psychological risk expected being involved in the study.

Benefits: If you participate in this study, you may not gain direct benefit but your participation will help us to assess the nutritional status and associated risk factors and to take measures based on the findings.

Confidentiality: Information about you will be collected without your name but a cod number assigned to it will be stored in a file and kept locked .Your personal information will only be used for the purpose of the study. Your response will be aggregated to yield summary data, but your individual response will not be reported.

Participation: You have to know that your participation is largely based on your willingness and approval. There are questions to be answered by you .you are expected to answer all of the questions but you have the right to say "no" and not participate in the study (you can choose not to respond to some or all of the questions). You also have a full right to withdrawal from this study at any time you wish without losing any of your right and without any penalty.

Person to contact: This research project will be reviewed and approved by the ethical committee of Bahir Dar University. If you want to know more information and ask any questions at any time you went you can contact with the following address.

1. Netsanet Fentahun (Phd) Bahir Dar University/advisor/ Mob. ----------
2. TarekegnTigabie (Bsc,) investigator/ Mob.
3. ----------Dera Woreda Health office administration Mob ----------

Are you willing to participate in the study?

Yes _____ then continue

No ____ thanks and move to the next study subject.

Annex 1. English version of questionnaire

Part I Information about socio demographic characteristics

s.no	Questions	Possible answers	Skip pattern
1	How old are you? complete age	7-8……1 9-10……2 11-12……3 13-14……4	
2	How tall are you? In centimeter	……	
3	Sex?	Male……1 Female……2	
4	What is your religion?	Muslim……1 Orthodox……2 catholic ……3	

5	What is your mother's current marital status?	Married……1 Divorced……2 Windowed……3	
6	Where is your residence	Urban……1 Rural……2	
7	What is your education status	1-4……1 5-8 ……2	
8	What is your mother's occupation currently?	House worker/housewife……1 Office worker ……2 Merchant……3 Daily laborer……4	
9	What is your father's occupation currently?	Farmer……1 Office worker……**2** Merchant……3 Daily laborer……4	
10	What is your father's educational status?	Illiterate ……1 Primary ……2 Secondary ……3 College ……4 University……5	
11	What is your mother's educational status?	Illiterate ……1 Primary ……2 Secondary……3 College ……4 University……5	
12	Average monthly income in ETB (birr)	<1000……1 1000-1999……2 2000-1999……3 2000-4999……4 >5000……5	
13	How many members have in your family?	1-3……1 4-5……2 >5……3	
14	Did your child have much work load at home/ out of home?	Yes ……1 No ……2	
15	Did you support/encourage your child education?	Yes ……1 No……2	
16	How long your children walk to home?	< 30 minutes……1 > 30 minutes ……2	
17	Did your child have been absent from school?	Yes ……1 No……2	
18	If yes, for the above question how many days your child absent from school?	Less than 5 days……1 More than 5 days……2	Skip to

PART II ASSESSMENT OF HOUSEHOLD FOOD SECURITY

S.No	Questions	Possible answers	Skip pattern

19	Did you eat breakfast?	Yes ……..1 No ……..2	
20	If yes, for the above question how frequent your child ate?	Always……..1 Sometimes……..2	Skip to
21	What is the availability of food in your household?	Low ……..1 Medium ……..2 High ……..3	
22	How many times do you Eating per day?	< 2 meals per day ……1 =2 meals per day.....2 ≥ 3 meals per day……3	
23	What is your immunization status during childhood?	Not immunized ……..1 Fully immunized……..2	
24	Do you get any nutritional care from any organization?	Yes……..1 No ……..3	
25	If yes to the above, what type of support do you get?	Food Products……..1 Money……2 Closing……..3 Shelter & food……..4 Other(specify)……5	
26	For how long have you been supported by these organizations?	Less than one month……1 1-3months……2 More than 3months……..3	
27	Are you still being supported?	Yes……1 No……2	
28	Have you been given any dietary counseling /advice?	Yes……..1 No……..2	

PART III Questions to measure the Physical aspect of School Environment

29	You feel comfortable in the class room.	Strongly Agree……1 Agree ……2 Disagree……3 Strongly Disagree ……4	
30	The teacher is providing enough tools to facilitate the teaching learning process?	Strongly Agree……1 Agree ……2 Disagree ……3 Strongly Disagree ……4	
31	Your teacher explains to you the purpose of class room participation.	Strongly Agree1 ……1 Agree ……2 Disagree ……3 Strongly Disagree ……4	
32	You feel free to communicate with your teacher outside the class room?	Strongly Agree……1 Agree ……2 Disagree ……3 Strongly Disagree ……4	
33	You feel happy with the teaching learning process	Strongly Agree……1 Agree ……2 Disagree ……3 Strongly Disagree ……4	

34	You get enough reading materials to support your learning?	Strongly Agree……1 Agree ……2 Disagree ……3 Strongly Disagree ……4	
35	The library has enough facilities for the teaching learning process	Strongly Agree……1 Agree ……2 Disagree ……3 Strongly Disagree ……4	
36	Class sets of important resource books would be available when needed.	Strongly Agree……1 Agree ……2 Disagree ……3 Strongly Disagree ……4	
37	The teaching learning approach is understandable in your class room?	Strongly Agree……1 Agree ……2 Disagree ……3 Strongly Disagree ……4	
38	You are participating in the teaching learning process willingly	Strongly Agree……1 Agree ……2 Disagree ……3 Strongly Disagree ……4	
39	Your teacher encourages you to explain your view on the teaching learning process?	Strongly Agree……1 Agree ……2 Disagree ……3 Strongly Disagree ……4	

Part IV: Anthropometric measurement

Sr. no	Height measurements(cm		
40	1st	2nd	Average

Part V: Academic performance

Sr. no	Academic record		
41	first semester average score of total subjects	Second semester average score of total subjects	Both semesters average score of total subjects

Thank you for your participation!!!

Identification

Identification number of the respondent _____

Name of data collector_____ signature _____

Name of Supervisor _____ signature_____

Date of data collection _____/_____ 2019

Name of school_____

Annex 2. Amharic version of questionnaire

የመረጃና የስምምነት ፎርም

የምርምርፕሮጀክቱርእስ፡
በአማራብሄራዊክልላዊመንግስትበደቡብጎንደርዞንበደራወረዳስርበሚገኙትአንደኛደረጃትምህርትቤቶችውስጥከሚማሩትአድሚያቸውከ 7እስከ 14 ባሉተማሪዎችአሞርኒነትእናበትምህርትላይያሳዉንተሰዕኖምንእነደሚመስልመዳሰስ

የዋናው ተመራማሪው ስም፡ታረቀኝ ጥጋቤ

የድርጅቱ ስም፡በባህርዳር ዩንቨርስቲ ቴክኖሎጅ ኢንስቲትዉት ኬሚካል እና ምግብ ምህንድስና ትምህርት ክፍል

መግቢያ፡ይህ የመረጃና የውል ስምምነት የተዘጋጀበት አላማ በምርምር ፕሮጀክቱ እርስዎ እንዲሳተፉ በፕሮጀክቱ አባላት በሚጠየቁበት ወቅት ስለፕሮጀክቱ መረጃ በማግኘት እንዲብራራሎት ነው፡የፕሮጀክቱ ዋና አላማ በአማራ ብሄራዊ ክልላዊ መንግስት በደቡብ ጎንደር ዞን በደራ ወረዳ ስር በሚገኙት አንደኛ ደረጃ ትምህርት ቤቶች ውስጥ ከሚማሩት ተማሪዎች ዕድሚያቸው ከ7እስከ14 ባሉ ተማሪዎች ላይ በአሞርነት እና በትምህርት ላይ ያለዉን ተፅዕኖ መዳሰስ ሲሆን በጥናቱ የመሳተፍም ሆነ ያለመሳተፍ ውሳኔው በእርሶና በእርሶ ብቻ የሚወሰን ነው፡ይህ አጥኚ ቡድን ትምህርትቢቶች ላይ የሚሰሩ አራት መረጃ አሰባሳቢዎች፣ሁለትየበላይተቆጣጣሪዎችበአማካሪነትያካተተነው፡፡

የጥናትፕሮጀክቱየሚካሄድበትምክንያት

የጥናቱ ዋና አላማ፡በአማራ ብሄራዊክልላዊ መንግስት በደቡብ ጎንደር ዞን በደራ ወረዳ ስር በሚገኙት አንደኛ ደረጃ ትምህርት ቤቶች ውስጥ ከሚማሩት ተማሪዎች ዕድሚያቸው ከ7እስከ14 ባሉተማሪዎች ላይ አሞርነት እና በትምህርት ላይ ያለዉን ተፅዕኖ ማወቅና ተያያይዝነት ያላቸው ነገሮችን መዳሰስ ሲሆን በሚገኘውም የጥናት ውጤትም ችግሩን ለመቅረፍ የሚያስችሉትን ስልቶችን ማመላከት ይሆናል፡፡

አተገባበር: በአሞርነት እና በትምህርት ላይያለዉን ተፅዕኖ ለማጥናት እርሶዎ በፕሮጀክቱ ተሳታፊ እንዲሆኑ ተጋብዘዋል፡፡በፕሮጀክቱ ለመሳተፍ ፈቃደኛ ከሆኑ ውስጢ ገባዎትና ሲፈርሙ ይገባል፡፡ከዚያም በመረጃ ሰብሳቢዎች ጥቂት ደቂቃዎች (ሰላሳ) ለሚወስዱጥያቄዎች መልስ እንዲሰጡ በአክብሮት ይጠየቃሉ፣የቀመትናየእድሚልኬታምይደረግሎታል፡፡ለእያንዳንዱጥያቄ ለሚሰጡት ምላሽ ማንም በማያገኘው መለያ ቁጥር ሚስጥራዊነቱ የተጠበቀይሆናል፡፡

ሊገጥም የሚችል ችግር/አለመመቸት: በዚህ ጥናት በመሳተፍዎ መጠነኛ አለመመቸት ማለትም የሰአት ብክነት (20-30ደቂቃዎች)ሊሰማዎትይችላል ቢሆንም ግን የህብረተሰቡ አካል እንደመሆኖ መጠንና የሚሰጡት መረጃ በአሞርነት እና በትምህርት ላይ ያለዉን ተሰዕኖ ለማጥናት እንደግብአት ለሚጠቅም የሚያጠፉት ጊዜ ቡዙ ላይሆን ይችላል፡፡ለሆነም በምርምር ፕሮጀክቱ በመካፈልዎ የሚደርስብዎ አካላዊም ሆነ ስነልቦናዊ ችግር የለም፡፡

ጥቅሞች:ከዚህጥናትአርስዎበቀጥታተጠቃሚላይሆኑይችላሉ።ነገርግን የአርሶ መሳተፍ በሰፍርነት እና በትምህርት ላይ ያለዉን ተሰፅኖ ለማጥናትና በጥናቱም ውጤት መሰረት አስፈላጊውን የማስተካካያ እርምጃ ለመውሰድ ከፍተኛ አገዛ ያደርጋል።

ስለተሳትፎ: በጥናቱለመሳተፍዎየአርሶሙሉፍቃደኝነትወሳኝነው።ለሚጠየቁት ጥያቄዎች ሁሉ ይመልሳሉ ብዬ ተስፋ አደርጋለሁ።ነገርግን ከሚጠየቁት ጥያቄዎች ለተወሰኑት አሊያ ለሁሉም መልስ ያለመመለስ መብት አለዎት።እንዲሁም ያለምንም ቅጣትና መብት መንደል በፈለጉ ሰአት ጥናቱን የማቋረጥ ሙሉ መብት አለዎት።

ረጅአካላት:ይህ የምርምር ፕሮጀክት በተመራማሪዉ እና በባህርዳር ዩንቨርስቲ ታርሞና ተከልሶ ይጸድቃል።ተጨማሪ መረጃ ካስፈለግዎትና ማንኛውንም ጥያቄ በማንኛውም ሰአትና ጊዜ መጠየቅ ከፈለጉ በሚከተሉት አድራሻዎች የፈለጉትን አካል ማነጋገር ይችላሉ።

1. ዶክተር ነጻነት ፈንታሁን ከባህርዳር ዩንቨርስቲ /አማካሪ/ ስልክ_____

2. የደራ ወረዳ ጤና ጽ/ቤት ስልክ_____

3. ታረቀኝ ጥጋቤ /ተመራማሪ/ ስልክ _____ ኢ-ሜል

በጥናቱ ተሳታፊ ለመሆን ፍቃደኛ ኖት ?አዎ _____አዎከሆነ ይቀጥሉ ,አይደለሁም _____ አመስግነውወደሚቀጥለውተሳታፊይለፉ

B. መጠይቆች፦አማርኛቅጽ

የጥያቄመለያቁጥር ----------

ክፍል አንድ፦የልጆችእና ወላጆቻቸው ማህበራዊ እና ኢኮኖሚያዊ ሁኔታዎች

1. እድሜህ/ ስንትነው? (በተጠናቀቀሙሉአመት) ? ....

2. ቁመትስንትነዉ (በሴንቲሜትር) .....

3. ፃታ? 1. ወንድ 2. ሴት

4. የሚከተሉት ሀይማኖት ምንድ ነው? 1, ኦርቶዶክስ 2, ሙስሊም 3, ፕሮቴስታንት / ካቶሊክ 4, ሌላካለይገለጸ

5. ብሄር ምንድነው? 1, አማራ 2, ትግሬ 3, ደቡብ 4, ኦሮሞ 5.ሌላካለይገለጸ

6. የቤተሰብ የጋብቻ ሁኔታ ምንድነው? 1, ያገባ/ች 2, ያላገባ/ች 3, የተፋታ/ች 4, የሞተባት /የሞተችበት

7. የትምህርትደረጃህ/ሽስንትነው? 1.1-4 2. 5-8

8. የመኖሪያቦታየትነው? 1, ከተማ 2, ገጠር

9.በአሁኑጊዜ የእናት ስራምንድ ነው? 1, የቤትእመቤት 2,የመንግስትሰራተኛ 3, የቀንሰራተኛ 4,ነጋዴ 5,ሌላካለይገለፅ

10. በአሁኑጊዜ የአባት ስራ ምንድ ነው? 1, ገበሬ 2, የመንግስትሰራተኛ 3, የቀንሰራተኛ 4, ነጋዴ 5,ሌላካለየገለፅ

11. የአባት የትምህርት ደረጃ ምንድን ነዉ? 1, ያልተማረ 2, አንደኛደረጃ 3, ሁለተኛደረጃ 4, ኮሌጂ 5, ዩኒቨርስቲ

12. የእናት የትምህርት ደረጃምንድን ነዉ? 1,ያልተማረ 2, አንደኛደረጃ 3,ሁለተኛደረጃ 4,ኮሌጂ 5,ዩኒቨርስቲ

13. የቤተሰቡ አጠቃላይ የወር ገቢ ምን ያህል ነው (ብርበወር) ...?1, ከ 1000 በታች 2, ከ1000 እስከ 1999 3, ከ2000 እስከ 1999 4, ከ2000 እሰከ 4999 5, 5000 እናበላይ

14. የቤተሰብ አባላት ብዛት ስንት ነዉ; 1,1-3 2, 4-5 3, >5

15. ልጅዎ በቤት ውስጥም ሆነ ከቤት ውጭ የስራ ጫና አለበት /አለባት? 1. አዎ 2. የለም

16.ለልጅዎ ትምህርት ድጋፍ ድርገው ያውቃሉ ? 1. አዎ 2. የለም

17. ልጅዎ ከቤት ወደት/ቤት ለመሄድ ስንት ጊዜ ይወስድበታል? 1. ከ 30 ደቂቃዎችያነሰ 2. ከ 30 ደቂቃዎችየበለጠ

18. ልጅዎ ከትምህርት ቤት ቀርቶ ያውቃል/ታውቃለች? 1. አዎ 2. የለም

19. ከላይ ለተጠቀሰው ጥያቄ መልስዎ አዎ ከሆነ ልጅዎ ከትምህርት ቤት ስንት ቀናት ቀረ/ች? 1. ከ 5 ቀናትበታች 2. ከ 5 ቀናት በላይ

<u>ክፍል 2 የምግብ እጥረት ችግሮችን ለመቅረፍ ለሚከናወኑ ተግባራት</u>

20. ወደ ትምህርት/ቤትስትሄድቁርስትበላለህ/ለሽ? 1. አዎ 2. የለምመልሽ/ህየለምከሆነወደ 22ኛዉይሂዱ

21. ከላይ ለተጠቀሰው ጥያቄ መልስዎ አዎ ከሆነ ለምን ያህል ጊዜ ትበላለህ/ለሽ? 1. ሁልጊዜ 2. አንዳንድጊዜ

22. የቤት ዉስጥ ምግብ አቅርቦት ምን ይመስላል? 1, ዝቅተኛ 2, መካከለኛ 3, ከፍተኛ

23. በቀን ዉስጥ እስከ ስንት ጊዜ ትመገባለህ/ሽ? 1, 2 ጊዜበቀን 2, 3 ጊዜበቀን 3, ከ3 ጊዜበላይ

24. በልጅነተዎ ሙሉ ክትባት ወስደዋል ? 1, አዎ ሙሉዉን ተከትቤአለሁ 2, አይአልተከተብኩም

25. ከማንኛውም ድርጅት የሚያገኙት እርዳታ አለ? 1, አዎ 2, አይ አይ ከሆነ ወደ 29 ይሂዱ

26. መልሶ አዎ ከሆነ ምን አይነት እርዳታ ነው የሚያገኙት? 1, የምግብዉጤቶች2, ገንዘብ 3,ልብስመጠለያናምግብ 4,ሌላካለ

27. በዚህ ድርጅት ለምን ያህል ጊዜ ተረድተዋል? 1, ከ1 ወርበታች 2, ከ1-3 ወራት 3, ከ3 ወራትበላይ

28. አሁንም ድረስ እየተረዱ ነዉ? 1, አዎ 2, አይ

29. ስለ ስነምግብና አመጋገብ የምክር አገልግሎት አግኝተው ያውቃሉ? 1, አዎ 2, አይ

<u>ክፍል 3 የትምህርትቤቱንገፅታበተመለከተ</u>

ከታች ለተመለከቱት ጥያቄዎች በሃይለኛው አስማማለሁ፣ አስማማለሁ፣ አልስማማም፣ በሃይለኛው አልስማማም, በማለት ከተዘረዘሩት አማራጮች መካከል ከስርየ ×ምልክት በማድረግ መልስስጡ።

ተ.ቁ	ጥያቄ	በሃይለኛው አስማማለሁ	አስማማለሁ	አልስማማም	በሃይለኛውአልስማማም
30	የመማሪያክፍሉሳንተ/ሳንችምቾትይፈጥራል				
31	መምህሩየትምህርትሂደቱንለማቀላጠፍየሚያግዙበቂመሳሪያዎችንያቀርባል				
32	መምህራችሁለክፍልተሳትፎአላማበግልጽይነግራችሃል				
33	መምህራችሁንከክላስዉጪሲታዋሩነጸነትይሰማችሃል				
34	በመማርማስተማርሂደቱደስተኛነህ/ነሽ				
35	ለመማሪያየሚያገለግሉበቂየመርጃመሳሪያታገኛላችሁ				
36	ቤተ መፅሀፍት ለትምህርት ሂደቱ የሚጠቅሙ በቂ መሳሪያዎች አለው				
37	እናንተ ክፍል ላይ የመማር ማስተማር ሂደቱ ግልፅነት አለው				
38	በትምህርት ሂደቱ በፈቃደኝነት ተሳትፎ ታደርጋላችሁ				
39	በመማር ማሰተማር ሂደቱ የእናንተ መምህሮች ሀሳብ እንድትሰጡ ያበረታቱአችሃል።				

<u>ክፍልአራት:- የሰውነት ልኬት</u>

ተ.ቁ	የቁመት ልኬት (በሴንቲሜትር)		
40	1 ኛ	2 ኛ	አማካይ

<u>ክፍል አምስት፦የትምህርት ውጤት አፈፃፀም</u>

ተቁ	ተ.ቁ የትምህርት አፈፃፀም ውጤት		
41	የአንደኛዉ ግማሽ ዓመት የጠቅላላው የትምህርት አማካይ ውጤት	የሁለተኛዉ ግማሽ አመት የጠቅላላው የትምህርት አማካይ ውጤት	የሁለት ግማሽ አመት የጠቅላላው የትምህርት አማካይ ውጤት

ስለሰጡኝ መልስ አመሰግናለሁ !!!

የተሳታፊው መለያ ቁጥር _____

የመረጃ ሰብሳቢው ሙሉ _____ ፊርማ _____

የተቆጣጣሪው ሙሉ ስም _____ ፊርማ _____

መረጃው የተሰበሰበበት ቀን _____/_____2019

የትምህርት ቤቱ ስም _____