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Influence of Family Socio-Economic Status on Mathematics Achievement in Secondary School in Dessie Town in North-Central Ethiopia

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Abstract Family socioeconomic status is among the widely cited factors strongly associated with students' academic performance. A descriptive survey design was used to assess the influence of socioeconomic status on Mathematics achievement in secondary schools in Dessie town in North central Ethiopia. A simple random sampling technique was further applied to obtain 245 students from grade 8 students, 167 teachers and 10 principals from the selected schools. The study used Yamane formulae to sample 205 respondents. The data were analysed using descriptive statistics and inferential statistics including mean and standard deviation, independent samples t-tests, Spearman's correlation and one-way ANOVA. The findings indicated that family type was more correlated with Mathematics achievement (r = 0.610; p= 0.000). Multiple linear regression analysis showed that family type contributed to 76.7% of the variation in the performance, hence playing a vital role in Mathematics achievement in public secondary schools in Dessie Town. The study recommended that the government should sensitize families on the need and importance of supporting their children's education for better academic achievement and school supervisors, school principals, and education supervisors should advise families on how to properly use their resources to support their children's academic achievement in any level of education.

Keywords: *family, socioeconomic status, family type and Mathematics achievement*

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1. Introduction

In the current era of globalization and technological revolution, education is considered as a crucial step for every human activity and it is considered as the lifeline for efficient and suitable stable development of human society. Education helps to develop individual personality by making knowledgeable, competent, capable and skilful [1] It plays a vital role in the development of human capital and is linked with an individual's well-being and opportunities for better living [2]. This means, that education is considered as a first step for every human activity and development of a nation at large. As a result, educators and researchers have long been interested in investigating variables contributing effectively to the quality of performance of learners [1].

According to Chandra and Azimuddin [3], SES of the family is the most important variable in determining the academic achievement of students. SES, as explained by Saifi and Mehmood [4], is a combined measure of an individual's or family's economic and social position relative to others, based on income, education and occupation. A family's SES is based on family income, parental education level, parental occupation and social status in the community (such as contacts within the community, group associations, and the community's perception of the family). Parental involvement takes many forms including good parenting in the home, the provision of a secure and stable environment, intellectual stimulation, parent-child discussion, good models of constructive social and educational values and high aspirations relating to personal fulfilment and good citizenship); contact with schools to share information; participation in school events; participation in the work of the school; and participation in school governance [5].

The discussion on what may be the socioeconomic influences on mathematical achievement emerged from general social science research and educational research. Therefore, what has become visible about the topic is found in general reports on educational systems around the world, as much as in mathematics educational research literature. Thus any talk about the topic in the realm of mathematics is bound to general discussions about social and educational disparities for different types of students [6]. Existing research both in general education and in mathematics education has constructed the positive correlation between a lower positioning of groups of students concerning the valued norm of societies, and the results of the school

mathematical experience measured in terms of achievement. Poverty, rurality, ethnicity, gender, language, culture, and race, among others, have been defined as the variables that constitute socioeconomic influences on mathematical achievement [7].

In Ethiopia, the expansion of education has long been viewed as an important means for changing the socio-economic condition of the people. For a long time, education has been seen as a panacea for bringing cultural transformation in the society. However, enrollment has increased at a lower rate for the last three decades. Since 1974, the participation rate has shown an improvement to a certain degree. Now this spiral progress in school enrollment has enabled a total of 6,223,961 students at both primary and secondary levels and 52,305 students at higher institutions. The pouring out of several students into the labour market could be an encouraging performance [8]. Despite this, the rapid expansion of education has resulted in high pupil-teacher ratios, a shortage of teachers with specialized training, overcrowding of schools scarcity of educational materials and poor educational management. This in turn has affected the overall quality of education and its efficiencies.

In Ethiopian society, the educational outcomes of children vary with the socioeconomic background of their parents. Home is the first school of children. The home environment at influences a child's school education with his/her aspirations towards a good citizen for the future. As the children of today will be the nation builders of tomorrow, it is significantly essential to run the children's educational programmes very sincerely and effectively [9]. Through scientific-designed and fruitfully implemented educational programmes children can be made equipped with the necessary knowledge, skills and moral values. The family has also an important role in the all-round development of school children. Parents or guardians have to take a great responsibility in promoting societal knowledge, behavioural aspects, attitudes etc. The facilities and environments provided to a student to study are the basis for his success [10]. Socio-economic status can play both positive and negative roles in the future life of a student. It is against that background that the study attempted to assess the effect of family socioeconomic status on the Mathematics achievement of students in secondary schools in Dessie City Ethiopia.

1.1. Problem Statement

Achievement records show that the less achievement of students in mathematics at the school level. There are several factors such as home environment, instructional materials, individual differences, peer groups, parents' attitudes socio-economic status etc are responsible for the achievement in mathematics of school-going children. Among those factors socio-economic status is an important factor that may affect the achievement in mathematics [11]. This research has analyzed mathematics achievement based on socio-economic-related variables such as father education, father occupation, family size, family type and family Income. The question of how a student learns mathematics through the provided situation was the vital question of the research. This study sought to answer the following research question; Does socioeconomic status influence the achievement of students in mathematics? This study focused only on family type as socio-economic status which affects student's achievement in Mathematics

This study sought to achieve the following research hypothesis:

H_{O1}: There is no significant influence between family type and mathematics achievement in secondary schools in Dessie City Ethiopia

2. Methodology

The study was conducted in Dessie town which is part of South Wollo, Ethiopia. South Wollo administrative zone, one of the twelve administrative zones in Amhara National Regional State (ANRS), is located in the Southeastern part [12]. In the 2013 academic year, 247,483 students (47.8% male and 52.2% female) took the regional examination. Of these students, 203,237 of them scored a pass mark (81.5% male and 82.1% female). The proportion of females was a bit higher than their male counterparts.

The target populations for this study were 245 students from grade 8 students from Dessie city administration, teachers 167 teachers and 10 principals from the selected schools. Students were selected using a semi-stratified sampling method After having the list of private and government junior secondary schools from the Dessie city administration educational office, 10 schools (5 government and 5 private) out of 29 were selected using a simple random method. From these selected schools, one section from each sampled school was selected randomly; and finally, all students of the selected sections were included in the study. Thus, the total population was 420 persons.

In addition, the study used the following formula proposed by using Yamane [13] to determine the sample type because that is too large wastes scarce resources and could expose more participants than necessary to any related risk. Thus, the study used the Yamane formula to calculate a sample size because it is the most appropriate for this study.

Using Yamane formulae

$$n = \frac{N}{1+(N)\left(e^2\right)}$$

Where:

n = sample size

N = the population size

e = the acceptable sampling error (5%) at a 95% confidence level

Thus; n = / (1+420) $(0.05)^2$

n=204.8=205 respondents

In this study, the researcher used questionnaires, interviews and documentary review. Closed–ended questions were used where the answers were divided into categories such as discrete, distinct and relatively few. It is easier for respondents to answer because they had only to choose categories. In that way, a chance for irrelevant answers is limited to the minimum because appropriate answer categories were provided. The main respondents were students and teachers who were given the

questionnaire as they have enough time to respond to the questions based on specific objectives but the interviews were given to the principals of those ten schools.

The data collected were tabulated and analysed using SPSS version 20. Different statistical methods were employed for analysis purpose including cross-tabulation, percentage, independent samples t-tests, Spearman's rho correlation and one-way ANOVA have been applied to examine the influence of family type SES in the academic achievement of grade 8 students in the regional examination. Independent samples t-test was used to analyze mean differences based on different SES of parents.

3. Findings and Discussion

In this study, the research sampled 205 respondents from selected secondary schools in Dessie city administration. The data collected from the respondents were analyzed in tabular form with simple percentages for easy understanding. A total of 195 questionnaires were distributed to students and teachers. Among the 195 questionnaires only 145 were returned equals to 74.3% of respondents who participated in the study.

What is the influence of family type (single and two-parent families) on students' achievement in mathematics?

Table 1. Mean and standard deviation of students' family type on achievement in mathematics

Family type	N	M	Std
Single parent families	45	55.56	10.41
Two Parent Families	55	56.03	11.36

Source: Field research, 2023

The mean and standard deviation for the influence of student's family type on students' achievement is shown in Table 1. The result in this table shows that students from single-parent families had a mean achievement score of 57.56 with a standard deviation of 10.41, while students from two-parent families had a mean achievement score of 56.03 with a standard deviation of 11.36. Students from two-parent families therefore had higher mean scores in mathematics than the students from single-parent families.

From the table, the result showed that the calculated t-valve (1.50) was less than the critical t-valve (1.96) at a 0.05 level of significance. Therefore, the null hypothesis was rejected. This shows that there is a significant influence between family type and students' achievement in mathematics.

The result showed that the mean achievement score of students from two-parent families is higher than that of the single-parent family. The t-test analysis showed that there is a significant influence of family type on students' achievement in mathematics. This may be due to the school environment, the natural tendency for students to interact and gain experience from their older students in the school. This result agreed with the findings of Dell [14] showed that the good performance of learners with nuclear families was due to economic support, family support, parental motivation and home study environment.

3.1.2. Correlation Analysis

The findings of the correlations between the independent variables and the dependent variables are summarized and presented in Table 3.

According to the findings reported in Table 3, the Pearson correlation analysis showed that family type affects mathematics achievement (r=0.610, p=0.000) and is positively and significantly related to students 'Mathematics achievement in selected secondary schools in Dessie City in Ethiopia. The correlation was deemed to be statistically insignificant since the p-value was less than 5%.

These findings are relevant to Gooding who stated that families affect children's learning behaviours and academic achievement in Mathematics in important ways, as they are the primary and most significant environments that the children are exposed to. He shows that families may play even more important roles in student's academic achievement than schools and communities. Since then, the line of empirical research on family background and children's achievement has found that the family social socioeconomic status may affect children's academic achievements more than the impact of schools.

Table 2. T-Test comparison of mean achievement in mathematics of students from single and two-parent families

Family type	N	M	Std	df	t-call	t-crit	Sig
Single parent families	45	55.56	10.41	544	1.50	1.96	0.000
Two Parent Families	55	56.03	11.36				

Source: Field research, 2023

Table 3. Correlation between variables

		Family type	Mathematics achievement
Family type	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	145	
Students 'Mathematics achievement	Pearson Correlation	.610**	1
	Sig. (2-tailed)	.000	
	N	145	145

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

3.1.3. Multiple Regression

The study used multiple regression to test the following hypothesis:

H_{01} There is no significant influence between family type and students' mathematics achievement in secondary schools in Dessie town in Ethiopia.

Table 4. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.767[a]	.589	.572	.64306

a. Predictors: (Constant), family type

The table above indicates the model summary and gives the value for multiple R, and the adjusted R is 0.767[a] whereas the R square is 0.589. This shows that the predictor of socio-cultural status (family type) is constant. This is frequently used to describe the goodness of fit or the amount of variance explained by a given set of predictor variables and its value is 57 % of the variance in the dependent variable is explained by independent variables in the model. The results are shown in Table 5.

Table 5. Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.124	1	5.124	31.564	.000[b]
	Reresidual	12.986	80	.162		
	Total	18.110	81			

a. Dependent Variable: Family type
b. Predictors: (Constant), Mathematics Achievement

In an attempt to test the significance of the model, the study used ANOVA. From Table 5 the P-value is 0000[b] which is less than 0.05 thus the model is statistically significance in predicting how the teaching approach in teaching Mathematics affects students 'attitudes. The F critical at a 5% level of significance is 31.564, and this shows that the overall model was significant. There exists a significant relation between the dependent variable (family type) and the independent variable (Mathematics achievement).

4. Conclusion and Recommendations

4.1. Conclusion

From the above discussion, the study concluded that the socioeconomic status of the family has a significant influence on academic achievement in mathematics. Parental highest educational level is the most influential factor in the mathematics achievement of school learners. The important family socioeconomic status that has a significant role in the determination of educational Mathematics achievement is family type. Parents' level of education holds greater sway than their occupation type. When organizing tutorial sessions and extracurricular activities, educators should take into account the diverse backgrounds of their students.

4.2. Recommendations

The following recommendations were made based on the findings of the current study. Firstly, the government should sensitize families on the need and importance of supporting their children's education for better academic achievement. Secondly, school supervisors, school principals, and education supervisors should advise families on how to properly use their resources to support their children's academic achievement at any level of education. Thirdly, the government should balance the effect of affirmative action in education by providing equal chances for both female and male students even though the education of females, in particular, contributes to various aspects of their lives such as increased longevity, family health and nutrition, reduced fertility rates and reduced related child mortality rates.

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