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FEMALE STUDENTS LOW ENROLMENT IN SCIENCE SUBJECTS AND ITS MENACE IN SOME SELECTED SECONDARY SCHOOLS IN FAGGE ZONAL EDUCATION OFFICE OF KANO STATE-NIGERIA

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ABSTRACT: *This study aimed to investigate the Female Low Enrolment in Science Subjects and its Menace in some Selected Secondary Schools in Fagge Zonal Education of Kano State. The survey was conducted among science-based Senior Secondary School two (SSS2) female students in five randomly selected senior secondary schools in the zone to ascertain the causes and improvements of low females' students' enrolment in science subjects. Twenty-five test item questionnaires based on six (6) factors of socio-cultural, parental, teachers, self, school environment and marital suspected to be capable of causing low enrolment in science subjects were formulated and used for the study. Two hundred and twenty (220) questionnaires were administered and one hundred and eighty (180) were returned. The data was analyzed with the aid of simple percentages as a statistical method. Results showed that of all the factors investigated, only parental, school environment and marital factors were implicated as the major factors for low female students' enrolment in science subjects in the selected schools. The socio-economic status of parents, time allotment to household chores by married students, gender insensitivity, illustrations in science textbooks have also contributed to low enrolment of female students in science subjects. Contrary to expectations, socio-cultural, self and teacher factors were not major contributing factors to low female students' enrolment in science subjects in schools in the zonal education office. In spite of the identified factors causing low enrolment of female students in science subjects in the study area, improvements in the enrolment can be achieved by payment of allowances to female science students to serve as motivation, enlightenment of both the parents and their female students on the importance of science to national development and provision of good science laboratories and facilities.*

KEYWORDS: Menace, Enrollment, Questionnaire, Science, Low, Female.

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INTRODUCTION

It is worrisome to note that the government's laudable policy of providing equal educational opportunities to all Nigerian children has not been substantially implemented, especially in the area of science, technology and mathematics education (Eze, 2007). At all levels of education in Nigeria, there are indications that females are grossly underrepresented, in terms of enrollment, participation and achievement in science, technology and mathematics (Okeke, 1990; Maduabum, 2006; Anaekwe & Nnaka, 2006). This low enrollment of girls in science, technology and mathematics subjects at secondary school levels has been established by a wealth of research over the past two decades (Okeke, 1987; Erinosho, 1998; Fakorede, 1999).

In view of the importance of science education to national development, sustainable development can only be meaningful when both male and female inhabitants of a nation have rudimentary knowledge of science (Wasagu, 2007). To enhance this therefore, there is the need to promote and encourage female participation in science. This can be done through a functional science and technology education which engenders scientific and technological literacy.

Indeed, girls and women stand out clearly as an educationally disadvantaged group as sixty one percent (61%) of the total female population are illiterates compared to 37.7% illiterate male population (UNICEF, 1993). The statistics of female education have given rise to serious concern on the state of female education in Nigeria. Olarewaju (2002) stated that, despite the fact that Nigeria is one of the countries that emphasize the training of girls and women as a means of achieving economic growth and development, girl-child education still lags behind that of boys. It is universally accepted that the social and technological advancement of a nation is to a large extent dependent upon the educational development of its female folk (Omanchi, 2005). It is, therefore, imperative for all stakeholders in education to urgently and seriously address the issue of female education in the 21st century. This is because in a fast developing country like Nigeria, the present status of female education calls for serious concern in view of the strong opinion that “to educate a woman means to educate a female and indeed a nation” (Eyetsemitan, 2001). When women are not adequately educated, half the society is paralyzed economically.

Emphasizing the need to get more women in science, Euler-Ajail (cited by Nwanna-Nzewunwa, 2000) stated that it is essential that women are encouraged to study science and technology so that they will have access to a profession which demands a scientific and technological background. The low percentage of women in science has led to widespread research aimed at proffering solutions to this phenomenon with a view to introducing more women into the scientific and technological fields (Nkpone, 2001). Therefore, this study aimed to investigate the Female Low Enrolment in Science Subjects and its Menace in some Selected Secondary Schools in Fagge Zonal Education of Kano State.

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METHODOLOGY

Research Design

The design of this study was a questionnaire survey type. This was to enable the researcher to gather information from a large population about the causes and remedies of low enrollment of female students in science subjects in senior secondary schools in fagge zonal education office kano state. This design was adopted because there are records of academic performances available in schools, Area Inspectorate Offices and examination bodies.

Population of the Study

There are about fifty-seven secondary schools. Forty-seven (47) schools have senior secondary school (SSS) classes, SSS1-SSS3. Out of these, two (2) are for girls (Aisha Shehu Girls Secondary School and Kings Girls College). One for boys only (Government College, Vice Adamu) and forty-four are co-educational. The population for the study comprises all the secondary schools in the area, the teachers and the students all form part of the population.

Sample and Sampling Technique

Senior secondary schools (SSS) two female students were selected for this study because they have just finished senior secondary (SS) one and have the right to make their choice for careers. Five schools were randomly selected; these schools include Queen Comprehensive Secondary School, Kurna, Haido Girls Secondary School, Fagge, Government Secondary School, Katsina Road, Government Secondary School, Tudun Bojuwa and Muqaddami Girl Secondary School, Fagge. For each school, forty students were randomly selected using simple random techniques. A sample of two hundred students participated in this study.

Description of the Instrument of the Study

The instrument of research used for this study was a twenty-five item questionnaire for students. The questionnaire consisted of three sections. Section “A” sought information on personal bio-data of the respondent such as age and class. Section “B” provides information on possible causes of female low enrollment in science subjects while section “C” contains information on how to improve upon the low enrollments of female students in science subjects in senior secondary schools. Five options were provided against each of the items in which the respondents were expected to tick only one of the options that contained their decisions. They were also to tick appropriately, whether Strongly Agree (SA), Agree (A), Undecided (UND), Disagree (D) and Strongly Disagreed (SD).

Validation of Instrument

The questionnaire was carefully constructed by the researcher and submitted to the project supervisor for vetting and approval to ascertain content validity. The questionnaire was therefore considered valid after vetting and is useful in the investigation of causes of female low enrollment in science subjects.

Reliability of Instrument

For reliability, the instrument was pre-tested of which it was considered reliable.

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Method of Data Collection

The questionnaires were personally administered with the help of teachers in all the selected schools and collected by the researcher. Since all the respondents are educated, the researcher did not have the pains of explaining in detail the information required from the respondents. All the respondents were allowed to fill the questionnaire, as it is appropriate to them.

Method of Data Analysis

In order to answer the research questions, simple percentage was the statistical method used and the results presented in tables in chapter four.

RESULTS

Data Analysis, Presentation and Interpretation

Research Question One: Do socio-cultural factors cause low enrollment of female students in science subjects?

The response of students on the influence of socio-cultural factors on the enrollment of female students in science subjects in senior secondary schools in the zonal education office is presented as percentages in Table 1. On the socio-cultural factors, the respondents rejected the notion that female education in science does not lead to national growth. They also rejected the belief that women are the weaker sex and should not be exposed to technical education, which leads to hard labor. The respondents do not believe that technical/science education is meant only for boys. However, they agreed that girls are more involved in domestic work than boys as shown in Table 1.

PERCENTAGE FREQUENCIES OF SOCIO-CULTURAL FACTORS ON FEMALE STUDENTS ENROLMENT IN SCIENCE.

Table 1

	Test item	No. of respondents	SA (%)	A (%)	UND (%)	D (%)	SD (%)	Remarks
1	Female education in science does not contribute to national growth.	180	11.1	5.6	_	22.2	61.1	Reject
2	Women are the weaker sex and should not be exposed to technical education which leads to hard jobs.	180	5.6	9.4	2.2	41.1	41.7	Reject

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3	Technical/science education is more suitable for boys than girls.	180	22.2	11.1	_	11.1	55.6	Reject
4	Girls are involved in domestic work more than boys.	180	55.6	33.3	_	5.6	5.6	Accept
	TOTAL		94.5	59.4	2.2	80	164	Reject.

SOURCE: FIELD WORK, 2022

Overall and in considering the total percentage from the Disagreed side (244) and the total from the Agreed side (153.9), socio-cultural factor is not a contributor to the cause of low enrollment of female students in science subjects in senior secondary schools in Fagge Zonal Education Office, Kano State.

Research Question Two: Are parents responsible for their ward enrollment in science subjects?

Table 2 shows the percentages of students' responses on how parental factors influence enrollment of female students in science subjects. Parental factor is implicated as a factor responsible for low enrollment of female students in science subjects in senior secondary schools in Fagge Zonal Education Office, Kano State. This is confirmed by the fact that the respondents agreed that most parents do not encourage their female students to read science subjects probably because they see science as courses as being meant for boys. The socio-economic status of parents are accepted as contributing to low enrollment of female students in science subjects as seen from the table below.

PERCENTAGE OF FREQUENCIES OF PARENTAL INFLUENCE ON STUDENTS ENROLMENTS IN SCIENCE

Table 2

	Test item	No. of respondents	SA (%)	A (%)	UND (%)	D (%)	SD (%)	Remarks
1	Most parents do not encourage their female children to read science Subjects	180	55.6	22.2	_	11.1	11.1	Agreed
2	Most parents see science subjects as being for boys only.	180	66.7	27.8	_	2.8	2.8	Agreed
3	Socio-economic status of parents may affect the enrollment in choice of science subjects.	180	54.4	33.3	_	6.7	5.6	Agreed
	TOTAL		176.7	83.3		20.6	19.5	Agreed

SOURCE: FIELD WORK, 2022

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Research Question Three: Are science teachers responsible for the low enrollment of female students in science subjects?

The percentages of students' responses on how teachers factor affect female students' enrollment in science subjects in senior secondary schools in Fagge Zonal Education Office Kano State are presented in Table 3. The respondents accepted that science subjects are well taught and understood and that their sciences teachers are their favorite teachers. They however believe that in classroom and laboratory exercises, science teachers engage boys more than girls. Apart from this negative attitude of the science teachers towards girls, the overall result (the summation of the agreed/disagreed) shows that teachers are not responsible for low enrollment of female students in science subjects in senior secondary schools in Fagge Zonal Education Office, Kano State.

PERCENTAGE FREQUENCIES OF TEACHER FACTOR ON FEMALE STUDENTS ENROLMENT IN SCIENCE

TABLE 3

	Test item	No. of respondents.	SA (%)	A (%)	UND (%)	D (%)	SD (%)	Remarks
1	Science subjects are usually well taught and understood	180	58.3	27.8	_	11.1	2.8	Agreed
2	In classroom and laboratory exercises, science teachers engage boys more than the girls	180	66.7	22.2	_	5.6	5.6	Agreed
3	My science teacher is my favorite teacher.	180	83.3	16.7	_	_	_	Agreed
	TOTAL	180	203.3	66.7	_	16.7	8.4	Agreed

SOURCE: FIELD WORK, 2022

Research Question Four: How do personal attitudes of students (female) influence the enrollment of students in science subjects?

Table 4 presents the percentages of respondents on how self-factor influences female students' enrollment in science subjects in the study area. The overall result of self-factor shows that it is not a major factor responsible for low enrollment of female students in science subjects in senior secondary schools in Fagge Zonal Education Office, Kano State as can be seen from the table below.

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PERCENTAGE FREQUENCIES OF SELF-FACTOR ON FEMALE STUDENTS ENROLMENT IN SCIENCE SUBJECTS

TABLE 4

	Test item	No. of respondents.	SA (%)	A (%)	UND (%)	D (%)	SD (%)	Remark
1	I don't like science subjects	180	11.1	11.1	11.1	11.1	55.6	Reject
2	Science subjects are difficult to understand	180	77.8	16.7	_	5.6	_	Agree
3	I think that science subjects are meant for boys	180	11.1	5.6	5.6	16.7	61.1	Reject
	TOTAL	180	100	33.4	5.6	16.7	61.1	Reject

SOURCE: FIELD WORK, 2022

Research Question Five: How does marital status affect enrollment of female students in science subjects?

Table 5 presents the percentages of students' responses on the influence of marital factors on the enrollment of female students in science subjects. From the result of marital factors, the respondents do not agree that engaging in science affects the time they use for household chores. However, they agreed that science subjects require more time than arts subjects. Overall, marital factor is seen as contributing to the low enrollment of female students in science subjects in senior secondary schools in Fagge Zonal Education Office, Kano State.

PERCENTAGE FREQUENCY OF MARITAL STATUS ON ENROLMENT OF FEMALE STUDENTS IN SCIENCE SUBJECTS IN LAFIA LOCAL GOVT. AREA

TABLE 5

	Test item	No. of respondents.	SA (%)	A (%)	UND (%)	D (%)	SD (%)	Remark
1	Engaging in science would not allow me time to attend to other household works	180	11.1	11.1	5.6	16.7	55.6	Reject
2	Science subjects demand more time than arts subjects	180	77.8	22.2	_	5.6	_	Accept
	TOTAL	180	88.9	33.3	5.6	16.7	55.6	Accept

SOURCE: FIELD WORK, 2022.

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Research Question Six: Does school environment affect students' enrollment in science subjects?

Percentage of students' responses on how school environment influences female students' enrollment in science subjects in senior secondary schools in Fagge zonal Education Office kano state. are presented in Table 6. This shows that the school environment contributes to low enrollment of female students in science subjects as can be seen from the table below.

PERCENTAGE FREQUENCY OF SCHOOL ENVIRONMENT INFLUENCES FEMALE STUDENTS ENROLMENT IN SCIENCE SUBJECTS IN SENIOR SECONDARY SCHOOLS

TABLE 6

	Test item	No. of respondents.	SA (%)	A (%)	UND (%)	D (%)	SD (%)	Remark
1	Examples in science text books usually favor men	180	66.7	22.2	_	5.6	5.6	Agreed
2	There is no good science laboratory in my school	180	72.2	11.1	_	11.1	5.6	Agreed
3	My school has no enough qualified science teachers	180	77.8	16.6	_	_	5.6	Agreed
	TOTAL		216.7	49.9	_	16.7	16.8	Agreed

SOURCE: FIELD WORK 2O22

Research Question Seven:

How can the enrolment of female students in science subjects in secondary schools be improved?

Table 7 shows how improvement in the enrolment of female students in science subjects in secondary schools can be brought about. The result shows that all the suggested ways of improving the enrollment of female students in science subjects are considered necessary. Of all the improvement strategies, enlightenment of parents has the highest percentage followed by well-trained/qualified science teachers, school guidance counselors and good science laboratories in that order as can be seen below:

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PERCENTAGE FREQUENCY ON HOW TO IMPROVE FEMALE STUDENTS' ENROLLMENT IN SCIENCE SUBJECTS IN SECONDARY SCHOOLS.

TABLE 7

S/N	IMPROVEMENT STRATEGY	NO. OF RESP.	SA	A	UND	D	SD	Remark
4	School counselors can help female students to enroll in science subjects or courses.	180	83.3	16.7	_	_	_	Agreed
5	Engagement of female scientists as guest speakers for career weeks will encourage female students' participation in science.	180	77.8	22.2	_	_	_	Agreed
6	Excursion of female students to laboratories in industries will favor female enrollment.	180	66.7	33.3	_	_	_	Agreed
7	Granting of scholarship to female students may motivate them to read science subjects/courses	180	77.8	22.2	_	_	_	Agreed
	TOTAL		569.5	130.5				Agreed

SOURCE: FIELD WORK, 2O22

DISCUSSION OF THE FINDINGS

In this study, marital factor is seen as a contributor to the cause of low enrollment in science subjects in senior secondary schools in Fagge Zonal Education Office, Kano State. This agrees with Bios and Etim (2007) who said that the society imposes on women the dual-role of child rearing/home management and secular jobs. They opt for other careers outside sciences, which demand less time.

Parental factor is another factor, which is heavily implicated as a cause of low female enrollment in science subjects. This agrees with Bios and Etim (2007) who reported that most parents dictate what course(s) their children, especially the girl child, should study. This also agrees with Wasagu (2007) who identified parental factors as restricting girls' access to education.

The third factor, which contributed to the cause of low enrolment in science subjects in senior secondary schools in Fagge Zonal Education Office Kano State, is the teacher factor. This is in agreement with Njoku (2006) who in his study discovered that instead of teachers motivating and encouraging the girls in science subjects, they tend to support them in their acquired passive attitudes towards science activities.

The last and not the least factor, which contributes to the enrolment of female students in science subjects is the school environment factor. Walford (1980) and Samuels (1981) in Erinosho (1994) observed that schools text and curriculum materials often carry sexual imagery

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in the example and illustrations. This has led to the passive nature of female students towards science subjects.

Socio-cultural factors do not contribute to the low enrollment of female students in science subjects. This is in line with Nwaokolo et al. (1998) who reported that in recent times, it has been realized and proven that the training given to the girl child leads to national growth.

Self-factor, as a contributing factor to low enrollment of female students in science subjects, was not accepted in this study. This is contrary to the report of Akpan (1986) who showed that girls have low enrollment in science because they feel science is a subject mainly meant for boys. This present result which neglects earlier reports could be explained by the fact that the respondents are already science students and so could not think that science subjects are meant for boys only or dislike science.

Although several factors have been known to be responsible for low enrollment of female students in science subjects, improvement strategies can be adopted to encourage female students' enrollment in science subjects. Of all the improvement strategies, parental enlightenment has the highest percentage. This agrees with Ezirim (2006) who said that parental enlightenment on the importance of science education would encourage and motivate their children to read science subjects/courses. A well-trained and qualified science teacher is another improvement strategy, which will encourage girls in science subjects. This also agrees with Nwaigwe (2001) who advocated that well trained and qualified science teachers should be provided to teach science subjects to pique girls' interest and motivation in science and technology classes.

Another improvement strategy, which will step up girls' enrollment in science subjects, is the positive encouragement of the school counselor. According to Nkwoma (2006), the assistance of guidance counselors at school can help girls to choose science, technology and mathematics subjects and courses.

Good science laboratory is another improvement strategy, which is in agreement with Nweke (2001) who said that science laboratories should be better equipped to make teaching and learning more meaningful and practical to meet students' needs.

CONCLUSION, EDUCATIONAL IMPLICATIONS OF THE STUDY AND RECOMMENDATIONS

Conclusion

From the study, it can be concluded that contrary to expectations, socio-cultural and self-factors were not major factors contributing to low enrollment of female students in science subjects in senior secondary schools in Fagge Zonal Education Office, Kano State. On the other hand, school environment, parents, marital and teacher factors were perceived as the major contributors to enrolment of female students in science subjects.

However, several steps have been identified in this study, which is capable of improving enrolment of female students in science subjects at the secondary school level if properly implemented.

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Educational Implication of the Study

This study implies that parents, teachers, educational administrators/planners, school guidance counselors and government will use the result of this study in curbing gender inequality in education and particularly in respect to science subjects.

Teachers will use the findings of this study to know the prevailing factors responsible for female students' low enrollment in science subjects and this will help them to guide students appropriately.

The study will help parents to guide their female children in their choice of careers. Parents will not impose any course or subject on their female children but will only guide them.

The study will also help educational administrators to be gender sensitive to help the girl-child in acquisition of science education either by giving scholarships to female students who enroll in science subjects. In addition, the government will use the study to develop strategies on how to get more girls enrolled in science subjects

Recommendations

For students in Fagge Zonal Education Office, Kano State not to lag behind in science and technology, the following recommendations are made based on the findings of this study:

1. Good science laboratories and facilities should be provided to improve female students' enrolment in science subjects in the schools.
2. Enlightenment of parents on the importance of science to national development is imperative.
3. Teachers should help girls just as they do to boys to encourage gender equality in education.
4. Career guardian and counseling units should be established where pupils and their parents are counseled on the benefits of science, technology, mathematics and careers in such fields.
5. Government should as a matter of policy offer automatic employment to female graduates in any science related field of endeavor to boost the morale of the younger ones in schools.
6. Scholarships should be provided for girls with potential in science, technology and mathematics subjects to pursue science and engineering courses, this will encourage more females.

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