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Full Length Research Paper

Motivation and career aspirations of female students studying science at Achimota School in Accra, Ghana

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This paper examines science education for girls in Achimota School, a second cycle institution in Accra, in terms of their motivations for pursuing science and future aspirations. It explores parental backgrounds and how they impacted on the motivations and aspirations of the girls. The survey method was adopted in this study, which involved a sample of 65 girls in the first and second years. The analysis of data revealed among others, that most of the respondents had educated parent(s), some of whom had science background. However, whereas, parents and for that matter family relations provided a source of motivation to pursue science at Senior High School (SHS), other important sources of motivation are self and teachers. The study however found that girls who intend to pursue science beyond SHS are not necessarily those whose parents studied science and that given the opportunity girls can pursue science to realize their career goals. To this extent, the paper recommends among others, that there should be provision of adequate facilities for the teaching of science in Senior High Schools. This will ensure that Science Teachers are better able to make the teaching of science as practical as possible in order to sustain the interest of students in general and female students in particular.

Key words: Motivation, aspiration, science education, girls' education, Achimota School.

INTRODUCTION

Education is an important ingredient in the development of any nation. This is because education enlarges people's choices in life thereby, enabling them to have access to essential resources for a decent standard of living. Kwapong (1995) and Anamuah–Mensah (1995) note that there can be no meaningful development of a nation without emphasis on education. The World Bank (1990) estimates that, an increase of one year in the average years of education could possibly result in a 3% increase in Gross National Development. In the view of Addae-Mensah (2000:3) the greatest need of a country's socio-economic development is the right type of manpower and not just the availability of natural resources. He further notes that, "… a country's greatest asset is not the gold or oil or diamonds in its soil. It is the quality of its manpower, and that, manpower development is heavily dependent on the provision of education from the basic to the highest level".

To this end, Ghana's development blueprints in recent years (the Ghana Poverty Reduction Strategy, 2002 – 2005 and the Growth and Poverty Reduction Strategy, 2006 - 2009) identified human resource development as a key growth pillar, particularly improvement in science and technology education, an emphasis which is in line with recent education reform policies at the basic and second cycle levels. Anamuah–Mensah (2004) has observed that science and technology education is the engine that propels the journey towards development. Thus, effort to encourage science and technology education is an indispensable component of education and therefore an important factor in Ghana's bid to develop.

In view of the importance of science and technology education to the socio–economic development of Ghana,

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the entire human resource potential of the country should be vigorously tapped, including the feminine citizenry, which constitutes about fifty–one percent (51%) of the Ghanaian population. Females have, and continue to play key roles in the application of science and technology in Ghana. For this reason, Anamuah–Mensah (2000) argues that, it is expedient to include the feminine citizenry into the science and technology education drive in the country. For instance, between 1995 and 2000, participation of girls in science education at Senior High School level increased by 111% in four sampled schools (Andam et al., 2005).

Educational policies and gender gaps in Ghana since 1980

In the early part of the last century, an argument against the involvement of girls in science was put forward by Felter (1906) that girls should not be taught science at the basic or elementary level because the expenditure of nervous energy in the mastery of analytic concepts is harmful to their health. This position has been found untenable and today, it is generally recognized across the globe that the participation of females in science education is beneficial not only to females themselves but to the society as a whole. For this reason, many countries including Ghana have embarked on the promotion of females' participation in science education.

Since the 1980s, Ghana has pursued policies aimed at bridging the gap between boys' and girls' participation in science and technology education. At the senior high school level, there is some mainstreaming that allows students to specialize in science, technology, visual arts, general arts, home economics or business (Anamuah–Mensah, 2000). Currently, boys and girls do the same subjects at the Junior High School (JHS) level, science, mathematics, pre–technical skills, etc. At the Senior High School (SHS) level, core science and mathematics are taken by all students in addition to their elective subjects. The cumulative effect is that girls' participation in science has improved over the last few decades, especially at the SHS level. Despite the improvement, females are still under-represented in science disciplines in Ghana. While there is no policy in Ghana restricting girls from opting for science related subjects, only a few do so.

In 1987, the Ghana Education Service started Science Clinic, a programme that sought to bring change in the perception, performance and participation of girls in Science. Through the concerted effort of parents and teachers this clinic had a great impact on girls. The aim was to create awareness and to increase and sustain girls' participation in science and technology education. Against this background, the present study seeks to understand the motivation and aspirations of girls in the study of science at the second cycle level of education in Ghana. The idea is to investigate how the participation of the girls in science education influences their aspirations as far as career choices are concerned, using the Achimita School in Accra. Four main research questions underlie this study, avis:

1. Is the choice of science education by females at Achimota School influenced by their family backgrounds?
2. Are female participants in science education at Achimota School motivated by factors related to their career aspirations?
3. How far do females studying science at Achimota School intend to go with the study of science?
4. What kind of career choices have female science students at Achimota School made for themselves?

Wading through the literature: an exploration into female participation in science education

In 2000, Anamuah-Mensah imputed that science and technology education is important in the drive towards development, especially, in developing countries. This is because science and technology information enable nations to adequately cope with global issues and to be competitive players in the global market (Anamuah-Mensah, 2000). Recognizing this, Ghana accepted recommendations of the first conference of African governments in Senegal Dakar in 1974 (CASTAFRICA I) in which African countries were encouraged to give priority to the training of scientists and technologists to spearhead the wheel of development in Africa. The recommendations also called for the revision of curricula at all levels to prioritize science and technology. Subsequently, the study of science was introduced in primary schools through to secondary schools in Ghana as a subject to be taken by all students, while technology is taken in the form of vocational or technical subject at junior high and senior high schools.

In the particular area of female participation in science education, Foster (2005) has observed that an enabling environment, gender role models, self efficacy and socialization are important factors that attract females into the study of science and engineering. The family members, female role models and confidence in mathematics and science are factors that influence females in the engineering group to choose it as a career, indicating that, the study of science provides career opportunities for females. Elaborating further, Foster notes that gender stereotype is a key factor in the choice of science related careers. Boys are exposed more to outdoor activities like mechanical tasks, sports, etc. than girls. Moreover, verbal persuasion from people like parents, teachers and peers encourage males and females in their career pursuits and apparently males are more encouraged than females because of societal beliefs on achievements. This goes to say that, society generally expects more males than females to get involved in science, thus unconsciously

motivating females less. In a similar vein, Foster (2005) mentions that few females choose careers in science because such careers are less accessible to them. She further argues that low self-esteem, lack of role models, low parental expectations, stereotypes of scientists and lack of hands on experience in science, contribute to the development of negative attitudes to mathematics and science in girls. Sharf (1997) also holds the view that women in general show more interest in artistic, clerical and social occupations than men and have less interest in scientific and technical education. Sharf points out that this situation reflects values held in society that women should enter occupations such as teaching, nursing, and social work. Thus female career choices reflect the values of the society they are part of. These social values continue to exist and therefore there is the need for counselors to help women develop occupational interests in science and mathematics.

In a study on female participation in science and technology and mathematics education in Nigeria and national development, Aguele and Agwa (2007) note that the interest of female students in pursuing science education diminishes towards the university level due to variety of factors that are primarily rooted in religious and cultural beliefs about the role of women in society. They also observe inequality at the primary and secondary levels, on arguments about biological build up of women, birth order, as well as marriage and attitudes of teachers to girls. Aguele and Agwa suggest that in order to improve upon the participation of women in Science, Technology and mathematics and to empower them economically and integrate them into the mainstream of national development, there should be restructuring of undergraduate curricular to include more investigative learning, technology, laboratory experience and collaborative work and they should be provided an opportunity to engage in hands on real life projects. Also, programmes that socialize students into science, technology and mathematics should be instituted. Female graduates in science courses should be provided automatic employment opportunities in order to create more opportunities for them to contribute to national development and serve as further incentives and role models for young girls.

Dlamini et al. (2004) have also observed in Swaziland that economic, personal, educational, family and social reasons account for the choice of science education at high school and tertiary levels among females. The choice is further rooted in factors like place of birth, location of high school attended and the type of school attended (Government or Private). In elaborating on the place of birth of female as a factor influencing their choice of science and technology programmes, they note that girls born in rural areas are less likely to choose science and technology as compared to their urban counterparts due to the varying environment and availability of facilities in schools.

They also contend that girls from co-educational schools choose science and technology less compared with those in single sex schools. Engineering and mathematics were found to be potential programmes for girls when aptitudes are developed in the early educational levels. It is in high school where girls may be further encouraged to take the science and technology path by possibly providing affirmative bursary to girls who show aptitudes to succeed.

Dlamini et al. (2004) further indicate that, participation of girls in science and technology subjects at primary school level (grades 1 to 7) and secondary level (grades 8 to 12) is similar to that of boys mainly because both are compelled to take these subjects. However, participation of girls in science in post secondary and tertiary levels (colleges or university) was low and this was due to stereotyping the participation of girls and boys in secondary school science and technical subjects. Home Economics was for girls and woodwork, metalwork and technical drawing for boys. The study further observed that there were inherent problems that hindered the involvement of girls in science education. These include girls' negative attitude towards their intellectual capacity to do science and the perceived irrelevance of science in their lives after school as well as special constraints and difficulties faced by girls and the greater involvement of girls in house hold chores. These difficulties were linked to "personal convictions". Among their recommendations were that career guidance teachers play a major role in showing girls how to choose subject combinations in high school which suites their aptitudes whilst family members encourage girls to take up scientific programmes.

In another study, Stromquist (1989) observed that in Botswana, girls attend significantly fewer hours of class per day than boys, which is the result of the demanding household and other economic roles that women and girls undertake and which distracts girls from their studies. The study also states that the financial well being of the family greatly affects the participation of female students. In a survey of 1,700 husbands and wives in urban and rural areas in Egypt, the two most consistent factors that affected students' enrollment were the educational aspirations of the father and those of the mother (Cochrane et al., 1986). Another survey by Yeoman (1985) of a sample of 346 female dropouts found that 83% of them felt that parental interest and encouragement was a major factor in the retention of girls in school. Thus the role of parents in the participation of girls in science education can not be over emphasized. Parents have unique advantage over anyone else (not even teachers can be compared) because of the position they find themselves. They can provide a more stable, convenient and continuously positive influence that could augment and complement what the school fosters on their children (Makgato and Mji, 2006; Steinberg et al., 1992). Makgato and Mji (2006) further argue that, parents are very important stakeholders who affect and

Table 1. Sample distribution.

Category	Form Size	Female Population	Sample	Percentage
Form One	180	52	29	44
Form Two	203	65	36	56
Total	384	117	65	100

play critical roles in improving learners' performance at school.

Stromquist (1989) also cited a survey on higher education in 13 Asian countries that found that women accounted for more than 50% of enrollment in the fields of education and humanities in 6 countries, in the fields of law and social sciences in 4 countries and in the field of medicine in 3 countries. What this means is that, very few females study science and technology. To further elaborate, Stromquist stated that in Sudan, 43% of graduating females over a decade ago were in liberal arts, in contrast to 14% in medicine and 14% in sciences. It is in very few circumstances that, women select agriculture or engineering fields. A study based on 551 university students and graduates in Tanzania in 1979 found that only 1% of the female students compared with 16% of the males were enrolled in higher technical-related colleges.

According to Abbe and Momodu (1999), women's education positively correlates with several national and international goals and aspirations, some of which include economic productivity, social development, social equity and sustainable development. Low participation of women in education generally and science in particular therefore hinders the rapid actualization of these goals and aspirations. Women who are excluded from science education limit their earning power and employment prospects and therefore have adverse effects on national development.

MATERIALS AND METHODS

Brief profile of the study area

The Achimota School is an elite Senior High School in Ghana. It was established in 1927 by Sir Frederick Gordon Guggisberg, the then Governor of the Gold Coast (now Ghana), Dr. James Kwegyir Aggrey and Rev. Alexander Gordon Fraser. The school has changed names from Prince of Wales College, Achimota College and now Achimota School. An alumnus/alumna of Achimota is known as an AKORA. Over the years, Achimota School emerged as one of the most prestigious academic institutions in Ghana, producing many notable African personalities including several Heads of State, politicians, academics, scientists, doctors, lawyers, artistes and industrialists. The school's Hall of Fame boasts such dignitaries as Dr. Kwame Nkrumah, Pan-African leader and First President of The Republic of Ghana, Jerry John Rawlings, also a former Head of State of Ghana, Prof. John Evans Atta Mills, former Vice President and current President of Ghana, Alhaji Sir Dauda Jhawarra, first Head of State of The Gambia and Robert Mugabe, the president of Zimbabwe.

The school is a boarding school, typical of many second-cycle institutions in Ghana. The campus facilities comprise two chapels, three dining halls, two gymnasia, very extensive sports playing fields, a cricket oval, basketball court, tennis and squash courts, and an arboretum. Located close to the campus are the Achimota Golf Course, a post office, a police station, a village for the School's employees, a large farm, and a 45-bed hospital that serves the School's students, employees and their families, as well as the communities surrounding the school. With its well laid-out grounds and about 4.4 miles of private roads, the school is surrounded by a forest reserve and boasts of several architecturally interesting colonial buildings. There are 14 single-sex halls of residence (called houses) located on either the East campus or West campus. The School offers academic programmes in the Arts, Sciences, Visual Arts and Home Economics. It has an Art School, a Music School, and a Home Science department. At present, the school has over 1,600 students, 1:1 gender ratio.

Methodological issues

The population for this study was all female science students in Achimota School at the time of the field work (April/May 2009). This included females in Forms one and two who were offering science. At the time of collecting the data, there were no Form three students on the school compound because they had completed their final examinations and had left for home. Only Form one and two students were available in the school. The total population of female science students in Forms one and two was 117. These were spread over ten science classes, five each for Form one and Form two. The study adopted the survey method and a sample size of sixty-five (65) female science students was taken for the study. The sample size of 65 represented about 42% of the study population and therefore was sufficiently a representative of the population. Table 1 shows the distribution of the sample, which was done to ensure proportional representation of students in Form one and Form two.

The list of females in the various science classes was used as a sample frame and respondents/samples selected randomly before the questionnaires were administered. Between 4–6 respondents were selected from each of the five Form one classes and between 6–9 respondents selected from each of the five Form two classes. The selections were also based on the number of females in the classes. A structured questionnaire with mainly closed-ended questions was used in collecting data from the selected respondents. Each respondent was given a questionnaire to respond to, thus the questionnaires were self administered.

RESULTS AND DISCUSSION

Socio-demographic characteristics of respondents

Majority (67.7%) of the respondents were between ages16 - 17 years, followed by 24.6% between ages 14 -

15 years and 6.2% between ages 18 - 19 years. Only 1.5% was between 12 - 13 years. This means most of the respondents were within the expected age for SHS education. Since Form three students were not included in the sample, those above the age bracket of 18 - 19 years were older than expected. This, we suspect, may have been due to repetition or inability to commence class one at age six. The 1.5% respondent aged between 12 - 13 years also means that, such students were younger than the expected age for SHS education. This, we explain, to be due to early commencement of school or promotion and therefore getting to SHS earlier than expected.

As far as religious background was concerned, the data show that majority of the respondents (95.4%) were of the Christian faith with only 4.6% of the Islamic faith. Since data on the entire students' population of Achimota was not available for this study, we are unable to conclusively say that this is a reflection of the situation in the entire school. Neither are we able to say that it reflects the situation in the Accra Metropolitan Area (AMA) where the school is located.

The data on the ethnic background of the respondents indicate that, the Akan are in the majority, constituting 46.2%, followed by the Ewe who constitute 26.2% and the Ga-Dangbe who constitute 10.8%. Others are Guan (7.7%), Mole-Dagbon (6.2%) and other ethnic groups (3.1%). In Ghana, the population of the Akan is higher than all other ethnic groups and therefore it is not surprising that they are in the majority in the sample. The Ewe is more than the indigenous group (Ga-Dangbe). It may be argued that since Accra is the capital of Ghana and has attracted people from all over the country, it is cosmopolitan and therefore the indigenes have been crowded by other ethnic groups.

We explored the basic schools respondents attended before enrolling into senior high school. The data indicate that, 73.8% of the respondents attended private schools and 26.2% attended public schools. Senior high schools in Ghana are categorized into grades A, B, C, etc with grade A being well endowed, and hence perform better academically. Achimota School is a grade 'A' school and therefore entrance requirement is high. For this reason, students who get admission to the school must have attended good primary and Junior High Schools to enable them attain higher grades in order to secure admission to Achimota School. Moreover, the type of primary/JHS attended reflects not only the socio-economic background of the students, but also the motivation to study science at the SHS level. In Ghana, there are public schools and private schools. Public schools are state sponsored and have no profit motive, but private schools are individually or institutionally owned and are mostly profit oriented. Thus, it is mostly the middle and upper income earners who are able to send their children to private schools, leaving the public schools for the low income earners mainly.

Academic performance in private basic schools in Ghana is better than in the public basic schools because parents are able to provide adequately for their children's education and ensure that they performed well. Sometimes, parents pay for extra tuition in the school or at home to adequately prepare their children for their final examinations, which enables them gain admission to a grade A school like Achimota School.

Parental backgrounds

To appreciate the motivation for the study of science among female students, we explored the parental background of the students. Majority of the respondents (93.8%) had both parents being alive; and 6.2% having only the mother alive. The implication here is that, majority of the females pursuing science education in Achimota School may have sufficient parental support from home and may also explain why majority of them attended private primary/JHS before proceeding to the SHS. Having both parents alive may also provide emotional, psychological and financial stability for the students because as is commonly said, 'two heads are better than one'. Majority (67.7%) of the students also lives with both parents; those living with their mothers alone constitute 23.1% and those living with their fathers alone also constitute 7.7%. Only 1.5% of the respondents did not live with any of the parents.

The educational background of respondents' parents shows that fathers were generally more educated than mothers even though the gap is not so wide. What this means is that the respondents have parents who were themselves educated and therefore understood the importance of educating their children, particularly females. In Table 2, we show that, 76.9% of fathers compared to 58.5% of mothers had attained tertiary education. One (1.5%) father had attained a doctoral (PhD) level education and one (1.5%) mother had also attained masters (MBA) level. While no father had educational level below Secondary/Commercial/ Technical School, there were 7.7% mothers with Middle/ JHS 3.1% of mothers with Primary education and 15% of mothers with no formal education.

As shown in Table 2, majority of the respondents' parents (both fathers and mothers) have higher level education. Thus these educated parents are expected to be better placed economically and intellectually to support their daughters to pursue science education. But what were the specific fields of education pursued by respondents' parents? An understanding of this was considered necessary because of its possible influence on the children's decision to pursue science education.

A total of 55.4% of the students (Table 3) had parents (father or mother or both) who had science-related education. This may have influenced the respondents to pursue science education. In the next section we

Table 2. Educational background of respondents' parents.

Category	Fathers		Mothers	
	Frequency	**Percentage**	**Frequency**	**Percentage**
None	0	0.0	1	1.5
Primary	0	0.0	2	3.1
Middle/JHS	0	0.0	5	7.7
Sec/Com/Tech School	13	20.0	18	27.7
Tertiary	50	76.9	38	58.5
MBA	0	0.0	1	1.5
PhD	1	1.5	0	0.0
No response	1	1.5	0	0.0
Total	**65**	**100**	**65**	**100**

Table 3. Parents with science background.

Category	Frequency	Percentage
None	29	44.6
Father only	30	46.2
Mother only	2	3.1
Both parents	4	6.2
Total	**65**	**100**

examine the motivation of the students to pursue science education.

Motivation of female students to pursue science education

Since the respondents in this study are teenagers under the care and guidance of parents and guardians, it is very probable that apart from their personal interest and intellectual acumen, which may predispose them to the study of science, other factors may have influenced their course of study at the SHS level. Their motivation for studying science is therefore discussed in this section. First we examined whether or not they have siblings who studied or are studying science. This, we thought, was necessary because having siblings pursuing science education may be a source of motivation for the decision to pursue science education.

Significantly, majority of the respondents (55.4%) had siblings who studied or were studying science. As noted in the previous section, majority of the respondents have parents with back-ground in science education. It is therefore not surprising that majority of respondents' siblings have or are pursuing science education. What this means is that the educational backgrounds of family members can serve as a major source of motivation for females in the choice of course of study at the SHS level.

Specifically, respondents were asked to indicate why they chose to study science at SHS (Table 4). Almost half of them (49.2%) indicated that they chose to study science because they were more comfortable with science subjects. This is in contrast with the long held perception that science is difficult to comprehend and therefore girls normally shy away from studying science. This also suggests that with the right kind of motivation, girls could be comfortable with the study of science as much as their male counterparts. Thus, for girls who do not show interest in the study of science, it is not due to inherent difficulty in the studying of science but perhaps due to the manner in which science is presented and the way girls were socialized to perceive science education in the past. The second important reason why the girls chose to study science was the opportunities that science education offers. This is tied to what the respondents aspire to do in future. The review of literature suggests that science education is critical to the development of any society, especially developing ones. Thus, those who study science at the SHS level have a wide range of career options and can easily secure jobs. Moreover, because there are more people in the arts than the sciences, not the least in Ghana, there is less competition in the sciences as far as job opportunities are concerned.

Two (3.1%) respondents observed that they were forced to study science, most likely by their parents/family members because of the perceived opportunities science offers. Clearly, majority of the female students have good reasons for studying science at the SHS level. When. we inquired into who actually motivated them to study science, parents had the most counts (43.1%), followed by self (23.1%), teachers (13.8%), role models (9.2%), and siblings (7.7%). This shows that the girls generally have good guidance from family and teachers, which in the long run will have a positive effect on the future of the girls and also on the nation as a whole.

Parents and by extension family members therefore played key roles in the decision of the girls to study science at the SHS level. The fact that most of the parents were themselves educated (most of them in science) might have added impetus to the inspiration the girls received to study science. And though parents came

Table 4. Why studying science.

Category	Frequency	Percentage
Comfortable with science subjects	32	49.2
Offers more opportunities	28	43.1
Forced into it	2	3.1
Prestige	1	1.5
Thought it was easy	1	1.5
Don't really know why	1	1.5
Total	**65**	**100**

Table 5. Career path of female science students.

Category	Frequency	Percentage
Not applicable	13	20.0
Medicine	27	41.6
Nursing	5	7.7
Pharmacy	3	4.6
Civil engineering	3	4.6
Biology	3	4.6
Petrol chemical engineering	2	3.1
Chemical Engineering	2	3.1
Animal Science	2	3.1
Architecture	2	3.1
Electrical Engineering	1	1.5
Astrophysics	1	1.5
Dentistry	1	1.5
Total	**65**	**100**

out as the most important motivators, a significant number of the girls were self-motivated.

Career aspirations of female science students

According to Anamuah-Mensah (2000:7), the participation of females in education in general decreases sharply as one climbs the educational ladder. Based on this assertion therefore, the study explored whether or not the respondents would continue studying science after SHS. For every five female science students, we found four of them with the intention to study science beyond SHS. Thus, majority of the respondents (80.0%) continue to be comfortable with science and look forward to studying science at a higher level. A few students (20.0%) did not have any intention to continue studying science at a higher level. A number of reasons were advanced including the fact that science education was complex or difficult.

For those who indicated that they intend to study science after SHS, most of them want to study medicine (41.6%), followed by Nursing (7.7%), and Pharmacy, Civil Engineering and Biology (4.6% each). Petroleum Engineering, Chemical Engineering, Animal Science and Architecture followed with 3.1% each and 1.5% each indicated Electrical Engineering, Astrophysics and Dentistry (see Table 5).

The data therefore show that respondents who intended to pursue science after SHS have high aspirations as far as the study of science is concerned and they need to be encouraged. Some of them intend to venture into male dominated areas and this will go a long way to bridge the gap between males and females in terms of gender stereotyping. To ascertain the seriousness of the respondents with regards to their pursuit of science education, we asked whether they would change their course of study should they have the option to do so. Though majority (67.7%) said they would not change, a significant number of them (32.3%) intimated that, they would change if they had the option.

The study hypothesized that girls who have at least one parent with science background are more likely to study science beyond SHS than girls who did not. To test this hypothesis, we regrouped the background of respondents' parents in terms of their area of study (Table 3)

Table 6. Observed frequencies for cross-tabulation of parent(s) with science background and respondents' intention to continue studying science after SHS.

Background of parent(s)	Would you continue studying science after SHS?				Total	
	Yes		No			
	Frequency	%	Frequency	%	Frequency	%
No parent with science background	26	40.0	3	4.6	29	44.6
At least one parent with science background	26	40.0	10	15.4	36	55.4
Total	**52**	**80.0**	**13**	**20.0**	**65**	**100.0**

Table 7. χ^2-Test Statistics for Hypothesis Testing.

Cell No.	Observed Frequency (O)	Expected Frequency (O)	O-E	$(O-E)^2$	$(O-E)^2/E$
1-1	26	23.2	2.8	7.84	0.338
1-2	26	28.8	-2.8	7.84	0.272
2-1	3	5.8	-2.8	7.84	1.352
2-1	10	7.2	2.8	7.84	1.089
Total	**65**	**65**	**0**		**3.051**

into girls with at least one parent with science background and those who have parents with non-science background. This was cross-tabulated with responses to the question on whether the girls would want to pursue science after SHS. The observed frequencies from this cross-tabulation are presented in Table 6. Chi-square (χ^2) was used to test the likelihood for girls to study science beyond SHS with the focus on those who have at least one parent with science background and those who did not have any of their parents having science background.

A degree of freedom (df) of 1 was derived with the formulae k-1, where k means the number of outcomes (2 in this instance) and a χ2-critical value of 3.841 was derived from χ2-statistical table. The test statistics for the observed frequencies produced a χ2-obtained value of 3.051 (see Table 7), which is lower than the χ2-critical value of 3.841. We employed the decision rule that if the obtained value is less than the critical value, we would fail to reject the null hypothesis. Given the data available from this study, and at a significant level 0.05 (5%) and a degree of freedom of 1, we find the χ^2 obtained (3.051) to be less than the χ^2-critical value (3.841). There is therefore no evidence from this study to support the hypothesis that girls who have at least one parent studying science are more likely to study science beyond SHS What this suggests is that, whereas parents and for that matter family members may play key roles in motivating girls to pursue science education, there is no relationship between girls' pursuit of science beyond SHS and the background of their parents as far as science education was concerned. In effect, where the opportunity to pursue science education is given to girls in SHS, all of them, irrespective of the science background of their parents, have the capability to pursue science in SHS and beyond.

SUMMARY

Female science students in the study are largely within the expected age range for Senior High School. There are more Christians among the respondents than Muslims. And though Achimota Senior High School is located in the Greater Accra Region where Ga-Dangbe is the indigenous people, there are more Akan and Ewe than Ga-Dangbe in the school. Most of the respondents attended private primary/JHS compared to public Primary/JHS. Majority of parents of females who study science at SHS have themselves been educated, especially their fathers in science related fields. The educated parents serve as a source of inspiration or motivation for their daughters in pursuing science at the SHS level.

Hypothesis testing to establish the relationship between parental science background and daughters' pursuit of science education did not show a significant relationship between the two variables. This suggests that irrespective of the educational backgrounds of parents with regards to science education, all girls could pursue science education at SHS level provided they are given the opportunity and the right conditions created for the pursuit of science education in terms of teachers and resources needed for science education.

Since majority of the respondents have both parents being alive and living with them, we explained that, they continue to motivate the girls to study science because almost all of them are educated. Majority of the girls intend to study science at higher level in order to attain

their career aspirations. As far as career aspirations are concerned, female science students aspire to areas that are traditionally male dominated. This shows their potential to bridge the gender stereotypification of job roles between males and females.

Conclusion

Following the summaries and recommendations, we conclude that efforts by the state to encourage more females to go to school and to study science seem to be yielding some results. However, there is the need to intensify public education on the importance of science education to national development and especially the participation of females in science education. Moreover, the gap in academic performance between Public and Private Primary/JHS continue to exist after several educational reforms in Ghana. This has created a situation where more females from private schools tend to qualify to study science in SHS than students from public school. This trend must change if low income earning Ghanaians are to enjoy the benefits of formal education as much as the middle and high income earners. The study has also shown that in some cases, when females show less interest is studying science, parents force them to do so and this tends to increase their woes in science education. Parents need to identify the interests of their daughters in order to encourage them in those areas of interest. This will go a long way to prevent school dropouts among females in particular.

RECOMMENDATIONS

The study makes the following recommendations with the view of influencing policy direction towards improving participation of females in science education.

1. The provision of adequate facilities for the teaching of science in school. This will ensure that Science Teachers are better able to make the teaching of science practical as possible in order to sustain the interest of female student.
2. District Assemblies should consider offering scholarships to females who perform well at JHS to study science in SHS. In other words, scholarships at the district level should be skewed in favour of science education.
3. There should be continuous public education on the importance of science education, especially among females. This education should be carried out at the national, regional and district levels.

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