Women as Minorities in Science (Physics) and Technology: Implications on Family Growth and Development in Nigeria

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ABSTRACT

The Population of Nigeria shows that there are more women than men in the country. It was on this premise that the study was carried out to determine the number of women in public employment, their distribution and impact on the family growth and development. Three research questions guided the study. A total of 2342 respondents constituted the sample of the study. The descriptive survey design was applied in caring out the study. This was to obtained information on the distribution of women in the different professions considered in this study and its impact on the family growth and development. Two researcher made instruments: Professional distribution of women and impact of women on family growth and development were used for data collection. The data were analysed using frequency and percentages. The instruments were validated by an expert in measurements and evaluation, two experts in physics education and two experts in vocational education. The reliability of the instruments was 0.83 and 0.87 respectively.

The result of the study revealed that, women were the minorities in all the professions under the study, there was low impact of women on family growth and development and there was urgent need to encourage women to take up paid employment. The implication of the findings of this study is that, the low population of women in all the sectors can have negative impact on the family growth and development. Based on the result of the study, it was suggested that the society should embark on mass mobilization of women to take up paid employment and contribute to both the society and family growth and development.

Keywords--- MDG, Gender Science, Development

I. INTRODUCTION

In the beginning, God first created Adam. And later, He said that "it is not good for the man (Adam) to be alone, I will make him a helper" (See Genesis 2 Vs 18). Consequently, Eve, a woman, was created to him. But one is tempted to wonder: why a woman? Why did God not create another man to add to Adam if, indeed, the justification for creating Eve is to give Adam a helper?

Since no one can question God, one can only hypothesize, for purpose of this study that perhaps the divine intention may have arisen out of His plans for co-habitation of beings of opposite sexes i.e. man and woman living and working together. It is evident from God's original plan that the intention of His creating them (Adam and Eve) was to ensure the perpetuation of this Pair that is equal number of man-Adam and woman-Eve. And in strict obedience to the Divine order 'to multiply,' the estimated human population of the world has multiplied to about 6.83 trillion, made up of about 3.44 trillion males and 3.39 trillion females (UNO, 2008).

The composition of the world population negates this divine plan (i.e. more man than woman). The situation is more different in Nigeria, with a population of 170,123,740,600 representing 48.95% males and 55.33% females (CIA World Fact book, 2012). This shows more women than men. This parity in population distribution validates the need for this study on women as minorities in science (physics) and technology: Implications on family development in Nigeria.

The MDGs aim at promoting gender equality and empowering women (UNO, 2008). It therefore, follows that for effective and efficient attainment of MDGs, equitable harnessing and maximization of the human resources of the 6.83 trillion people irrespective of sex is necessary. In the view of Kornhauser (1999), since women have high creative power and equal intellectual assets with men, they (women) should be equally distributed in science (physics) and technology related professions to fast track sustainable development of the human society.
In tandem with this, MDGs, intercontinental and national treaties, policies and programmes abound that are focused on promoting gender equity in professional distribution in science (physics) and technology, two examples of which are:

1. The proposals to the 1994/5 working group of the United Nations Commission on Science and Technology for Development (UNCSTD) which enjoined all governments to agree to adopt a Declaration of Intent on Gender, Science and Technology distribution for Sustainable Development. The Declaration of Intent identified six basic principles of equity regarding gender and science distribution (UNCSTD, 2012).

2. Protocol to the African charter on Human and Peoples' Rights on the Rights of Women in Africa, which in its Article 12(2) specifies that State Parties shall take specific positive actions to promote employment for women (and men) at all levels and in all disciplines, particularly in the fields of science and technology (www.achpr.org/instruments/women-protocol).

The common emphasis among these policy specifications is promotion of gender parity in the distribution of employees in science (physics) and technology related employment.

The basic unit of human development is the family. A family is composed of the man, woman and children who are related by birth or marriage, or even adoption. In most cases, a family is initiated through marriage between at least a man and a woman with the aim of producing children. In a family, there are shared responsibilities between the man and the woman for the smooth running and growth of the home. The man generally has the leadership role, while that of the woman is supportive (Proverbs 31Vs 14-18).

World Bank (2010) reports that 51% of the women participate in labour against 49% of the men. It is shown that out of the seven of the World Bank's groupings of countries in the world, it is only in Middle East/North and South Asia that the proportion of men that participate in labour is higher than that of the women, which is 80% and 68% respectively. In the least developed nations group such as Nigeria, women constitute as high as 65% of the population participating in labour.

The foregoing implies, among other things, that from creation, women were not only charged with the responsibility of providing the family food but have to work more for the overall growth and development of the family, and therefore, the larger society. Women's knowledge and skills for this responsibility, is initially transmitted minimally from mothers and other elderly women to the younger girls at home, and later in life through formal education at which they may specialize in various areas of study such as in sciences and technology considered in this study.

Formal science (physics) and technology education for women is, therefore, indispensable for the growth and development of the human society. No wonder then a Ghanaian scholar, Dr. James Emmanuel Kwegyir-Aggrey, once said that "If you educate a man you educate an individual, but if you educate a woman you educate a family and a nation" (Brimmer, 2010). This exposition is because women education impacts positively on the health of the children, and by implication, that of the adults, and adult fertility. The fact that two of the eight Millennium Development Goals (MDGs) goals 3 & 5 focus specifically on women lends credence to this crucial role women play in some very important national development sub-sectors in which they actively participate. Few examples are:

Women play a significant role in agriculture, the world over. About 70% of the agricultural workers, 80% of food producers, and 10% of those who process basic foodstuffs are women and they also undertake 60 to 90% of the rural marketing; thus making up more than two-third of the workforce in agricultural production (FAO, 1985). In West Africa which Nigeria is part for instance, up to 80% of the labour force in all trade is female (FOS, 2013).

Women play a very integral part in the medical field. Some of the important roles women play in medicine are wet nurses, mid wives and caring for one another during pregnancy and in an ante-natal capacity throughout time. Traditionally, in most Nigerian families women are the first port of call for most people who are sick as they offer advice, provide such healthy remedies as first aid care and even hospitalization in most cases (Foong-ming, 2014).

Throughout the world, women make vital contributions to science (physics) and technology related industrial output. Women have traditionally played an important role in the SME sector, as owners, managers and workers. They dominate these three important subsectors:

(i) 80 per cent of the employees in textile, clothing and leather production,
(ii) 75 per cent in food, beverages and tobacco production, and;
(iii) Over 60 per cent in wood and wood processing.

Generally, Over 200 million women are employed across all industry sectors, with half of this number in developing countries (ILO, 2013). Their work not only sustains their families but also constitute a major contribution to socio-economic progress.

As women play these major roles in the science (physics) and technology related sub-sectors of national growth and development, they need the acquisition of abundant knowledge of science (physics) and technology. In other words, women and girls ought not to only be proportionately distributed in sciences (physics) and technology.
technology professions but should be more encouraged to
develop higher disposition(s) towards achieving higher in
the discipline, if sustainable growth and development of
Nigeria and the world is to be attained. These reviews
validate the need for this study on women as minorities in
science (physics) and technology: Implications on family
growth and development in Nigeria.

II. STATEMENT OF THE PROBLEM

Over the years, women in Nigeria have been
subjected to various forms of humiliation and deprivation
in employment in science (physics) and technology. As
workers in the public service in the country the researcher
observed that in every establishment, there would be lesser
number of women to men. In the family the women bears
most of the responsibilities, they care for the children, pay
fees, take them to the hospital, provide food and in most
cases pay the house rent. In cases where the women cannot
do this there would be fighting accompanied with divorce.
This study is therefore directed on women as minorities in
science (physics) and technology: Implications on family
growth and development in Nigeria. The women that are
employed in possibly science (physics) and technology
related professions are those that can possibly assist the
men in line with the original intent of creation. God
created Eve a woman to assist Adam a man.

III. PURPOSE OF THE STUDY

The main purpose of the study was on women as
minorities in science (physics) and technology: Implications on family growth and development in
Nigeria. Specifically, the study examined:
1. The extent of professional distribution of women
   in Nigeria.
2. The extent of contribution of women to family
   growth and development in Nigeria.
3. The difference between the percentage rating by
   men and women on the contribution of women to
   family growth and development in Nigeria

IV. RESEARCH QUESTIONS

The following research questions were answered
in this study.
1. What is the extent of professional distribution of
   women in Nigeria?
2. What is the extent of contribution of women to
   family growth and development in Nigeria?
3. What is the difference between the percentage
   rating by men and women on the contribution of
   women to family growth and development in Nigeria?

V. RESEARCH METHOD

A descriptive survey design was used in this
study to find out the distribution, contribution and the
implication of women as minorities in science (physics)
and technology to family growth and development in
Nigeria.

The population of this study consisted of all the
women of working age in the south-south and south-east
geo-political zone of Nigeria. It also covers all the women
of working age in all the science (physics) and technology
related professions in the country.

From the given population, a total of 2342
respondents were randomly sampled from the south-south
and south-east geo-political zone of Nigeria. This sampled
covers 1171 women and 1171 men. The choice of men and
women in this study was to give unbiased views for
women as minorities in science (physics) and technology:
Implications on family growth and development in
Nigeria.

The research instruments used were two
researchers made questionnaires titled: Professional
Distribution of Women Questionnaire (PDWQ) and
Impact of Women on Family Growth and Development
Questionnaire (IWFGDQ). The instruments were made up
of seven and six items each respectively. The items were
ranked from VHE – Very High Extent, HE – High Extent,
AVE – Average Extent, LE – Low Extent and VLE – Very
Low Extent. To carefully addressed the opinion s of the
respondents to each of the items in the questionnaires.

The instruments were given to an expert in
measurements and evaluation, two experts in science
(physics) education and two experts in vocational
education. The experts went through the items and made
useful contributions which were incorporated in the final
development of the instruments.

In establishing the reliability of the instruments,
the researchers adopted the test retest method with an
interval of two weeks. Cronbach Alpa statistics was used
in computing the reliabilities of the instruments. The
reliability coefficients of 0.83 and 0.87 were obtained.

VI. RESULTS

The data were analysed using frequency and
simple percentage.

Research question one: What is the extent of professional
distribution of women in Nigeria?
Table 1: Frequency and percentage of professional distribution of women in Nigeria N = 2342

<table>
<thead>
<tr>
<th>S/No</th>
<th>Items</th>
<th>Responses</th>
<th>Verdict</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>VHE F</td>
<td>VHE %</td>
</tr>
<tr>
<td>1</td>
<td>Teaching (Secondary school and below)</td>
<td>200</td>
<td>8.54</td>
</tr>
<tr>
<td>2</td>
<td>Lecturing (Above Secondary level)</td>
<td>150</td>
<td>6.40</td>
</tr>
<tr>
<td>3</td>
<td>Medical (Doctors, Nurses, Pharmacist and other Paramedical staff)</td>
<td>242</td>
<td>10.33</td>
</tr>
<tr>
<td>4</td>
<td>Business (All paid employees in science and technology related professions other than the ones listed above)</td>
<td>180</td>
<td>7.69</td>
</tr>
<tr>
<td>5</td>
<td>Business (All self employers in science and technology related professions other than the ones listed in 1, 2, and 3 above)</td>
<td>170</td>
<td>7.26</td>
</tr>
<tr>
<td>6</td>
<td>Politics (Both elected and appointed with science and technology related major)</td>
<td>95</td>
<td>4.06</td>
</tr>
<tr>
<td>7</td>
<td>Sports (Local and International with science and technology related major)</td>
<td>82</td>
<td>3.50</td>
</tr>
</tbody>
</table>

F – Frequency  % - Percentage

Table 1, indicates that women are averagely distributed in the teaching, lecturing and medical professions and they are present in very low extent in other paid employment, self employment, politics and in sports in the south-south and south-east geo-political zone of Nigeria.

Research question two: What is the extent of contribution of women to family growth and development in Nigeria?

Table 2: Frequency and percentage of contribution of women to family growth and development in Nigeria N = 2342

<table>
<thead>
<tr>
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<th>Verdict</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>VHE F</td>
<td>VHE %</td>
</tr>
<tr>
<td>1</td>
<td>Family Bread Winners (The one that financed the family)</td>
<td>222</td>
<td>9.48</td>
</tr>
<tr>
<td>2</td>
<td>Single Mothers (This covers all divorcees, widows and those who raised children on their own violation)</td>
<td>202</td>
<td>8.63</td>
</tr>
<tr>
<td>3</td>
<td>Pay school fees (All categories of school financial requirements)</td>
<td>232</td>
<td>9.91</td>
</tr>
<tr>
<td>4</td>
<td>Set up income generating businesses for the family</td>
<td>106</td>
<td>4.53</td>
</tr>
<tr>
<td>5</td>
<td>Support the family in health related matters</td>
<td>308</td>
<td>13.15</td>
</tr>
<tr>
<td>6</td>
<td>Train the family members with</td>
<td>302</td>
<td>12.89</td>
</tr>
</tbody>
</table>
Table 2, indicates that women contributes to a low extent as family bread winners, to an average extent as single mothers, to a very low extent in paying school fees and setting up income generating businesses, to a low extent in supporting the family in health relating matters and to an average extent in training the family members with the knowledge gain from their professions.

Research question three: What is the difference between the percentage rating by men and women on the contribution of women to family growth and development in Nigeria?

Table 3: Frequency and percentage rating by men and women on the contribution of women to family growth and development in Nigeria N = 2342

<table>
<thead>
<tr>
<th>S/No</th>
<th>Items</th>
<th>S Responses</th>
<th>Verdict</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Family Bread Winners (The one that financed the family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>111 (9.48)</td>
<td>123 (10.50)</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>111 (9.48)</td>
<td>123 (10.50)</td>
</tr>
<tr>
<td>2</td>
<td>Single Mothers (This covers all divorcees, widows and those who raised children on their own violation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>101 (8.63)</td>
<td>124 (10.59)</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>101 (8.63)</td>
<td>124 (10.59)</td>
</tr>
<tr>
<td>3</td>
<td>Pay school fees (All categories of school financial requirements)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>116 (9.01)</td>
<td>126 (10.76)</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>116 (9.01)</td>
<td>126 (10.76)</td>
</tr>
<tr>
<td>4</td>
<td>Set up income generating business for the family</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>53 (4.53)</td>
<td>106 (9.05)</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>53 (4.53)</td>
<td>106 (9.05)</td>
</tr>
<tr>
<td>5</td>
<td>Support the family in health related matters</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>154 (13.15)</td>
<td>151 (12.89)</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>154 (13.15)</td>
<td>151 (12.89)</td>
</tr>
<tr>
<td>6</td>
<td>Train the family members with the knowledge gain from their professions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>151 (12.89)</td>
<td>140 (11.96)</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>151 (12.89)</td>
<td>140 (11.96)</td>
</tr>
</tbody>
</table>

Table 3, indicates that there is no numerical differences in the percentage rating of women contributions to family growth and development in Nigeria by men and women in this study. The result shows that both men and women have the same percentage rating with very low extent of contributions as family bread winners, average extent as single mothers, very low extent in paying school fees and setting up income generating business for the family, low extent in supporting the family in health relating matters and an average extent in training the family members with the knowledge gain from their professions.

VII. DISCUSSION OF FINDINGS
The finding from responses of research questions one which sought to find out the extent of professional distribution of women in Nigeria indicates that women are averagely distributed in the teaching, lecturing and medical professions and they are present in very low extent in other paid employment, self employment, politics and in sports.

This finding is in agreement with the work of Foong-ming, (2014). These findings affirm that traditionally, in most Nigerian families women are the first port of call for most people who are sick as they offer advice, provide such healthy remedies as first aid care and even hospitalization in most cases.

Evidence from the responses from research question 2 on the extent of contribution of women to family growth and development in Nigeria indicates that women contribute to a very low extent in paying school fees and setting up income generating businesses, and to a low extent as family bread winners and in supporting the family in health relating matters and to an average extent as single mothers, and in training the family members with the knowledge gain from their professions.

This finding is in agreement with the work of Brimmer, (2010). These findings affirm the quotation from Dr. James Emmanuel Kwegyir-Aggrey, a Ghanaian scholar, that "If you educate a man you educate an individual, but if you educate a woman you educate a family and a nation".

Finally, the result of research question 3 on the difference between the percentage rating of men and women on the contribution of women to family growth and development in Nigeria. The result is in line with creative vision recorded in Proverbs 31 Vs 14-18. The result affirms that in a family, there are shared responsibilities between the man and the woman for the smooth running and growth of the home. The man generally has the leadership role, while that of the woman is supportive. Both the man and woman in this study realise that they complement each other in the task of growth and development.

VIII. IMPLICATIONS OF THE FINDINGS ON FAMILY GROWTH AND DEVELOPMENT IN NIGERIA

Findings in Table 1, indicates that women are averagely distributed in the teaching, lecturing and medical professions and they are present in very low extent in other paid employment, self employment, politics and in sports in the south-south and south-east geo-political zone of Nigeria. Since the women who are supposed to assist the men in all respect of finance are not evenly distributed in paid employment they are not able to play the creative roles of women in family growth and development in Nigeria.

Findings in Table 2, indicates that women contributes to a low extent as family bread winners, to an average extent as single mothers, to a very low extent in paying school fees and setting up income generating businesses, to a low extent in supporting the family in health relating matters and to an average extent in training the family members with the knowledge gain from their professions. The low level of women contributions will affect the growth and development of families in Nigeria negatively.

The findings in Table 3, indicates that there is no numerical differences in the percentage rating of women contributions to family growth and development in Nigeria by men and women in this study. The implication herein is there is a valid deviation of women from their creative roles of developing the families in Nigeria.

IX. CONCLUSION

The study of women as minorities in science and technology: Implications in family growth and development in Nigeria is very crucial in this period of national transformation. The results of the findings indicate that women are truly minorities in sciences and technology related employments/professions in Nigeria.

X. RECOMMENDATIONS

To correct the imbalances in the distributions of women as minorities in science and technology: Implications in family development in Nigeria as shown in the findings of this study, the following recommendations are made:

Nigerian government should urgently create employment for women in all sectors to balance the population of both men and women.

Since employment opportunity is synonymous with qualification, the government should encourage women to register and be trained in all disciplines in Nigeria.

REFERENCES


