

**A PATH ANALYSIS OF STUDENTS AND SCHOOL PERFORMANCE INDICATORS AS DETERMINANTS OF PRE- SERVICE MIDWIVES' ACHIEVEMENT IN NORMAL MIDWIFERY COURSE**

**Adeniran Ganiyat Odunola and Emeke Elizabeth Adenike**

<sup>1</sup>Department of Nursing, College of Health Sciences, Osogbo, Ladoke Akintola University of Technology Ogbomosho, Nigeria.

<sup>2</sup>Institute of Education, University of Ibadan.

---

**ABSTRACT:** *The quality of maternity care of a nation could be determined by the quality of her midwives. The most important factor of given quality maternity care is improving the pre-service education of the midwives. A well trained midwife is an asset to her nation as this is not debatable in any society, as midwives are expected to practice in any health care setting. Based on this assumption this study investigated the causal effect of school type, entry qualification, teacher student ratio, academic self-concept, academic support seeking, teacher quality, and achievement in obstetric Anatomy and Physiology as determinants of pre- service midwives' achievement in Normal Midwifery in Nigeria. Ex-post factor research type and purposive sampling technique were used. Five hundred and fifty-nine student midwives and seventy-three teachers from eight schools of Midwifery in Lagos zone of Nigeria participated in the study. Six research instruments namely; Teacher Quality ( $r= 0.80$ ), Academic Self Concept ( $r=0.84$ ), Academic Support Seeking ( $r= 0.74$ ), Achievement tests on Anatomy and Physiology ( $r= 0.79$ ), Normal Midwifery ( $r= 0.80$ ), and School records were used. Path analytic technique was used to answer four research questions. Seven predictor variables were hypothesized, two had direct while five exerted indirect influences on students' achievement in normal midwifery. It is recommended that midwifery education should be a post basic training and students should be encouraged, motivated to learn Obstetric Anatomy and Physiology because of its importance to midwifery practice.*

**KEYWORDS:** Academic-Achievement, Normal Midwifery Course, Performance Indicators, Pre-Service Midwifery

---

## **INTRODUCTION**

The importance of pre-service midwifery education cannot be overemphasized as it relates to the individual and the society. The importance to the society is not debatable; hence midwives are expected to practice in any setting. It is against this backdrop that the International Confederation of Midwives (ICM), World Health Organization (WHO) and Federation of International Gynaecology and Obstetrician (FIGO) definition of a midwife recognizes the midwife as a responsible and accountable professional who works in partnership with women to give necessary support, care and advice during pregnancy, labour and postpartum period. The midwife conducts births on the midwife's own responsibility; provide care for the newborn and infant on preventive measures, promotion of normal birth and detection of complications in mother and child. The care includes accessing of medical care or other appropriate assistance and the carrying out of emergency measures. (ICM, 2010).

In pre-service midwifery education in Nigeria, there are core midwifery courses such as Obstetric Anatomy and Physiology, Normal Midwifery and Complicated Midwifery to mention a few. These core courses are basic and fundamental and it is on these courses that the competencies of a midwife are based. One of the core courses that is being considered in this study is the Normal Midwifery. Normal Midwifery course emphasizes health of the family during child bearing years by paying particular attention to the normal needs of the mother, father, fetus, infant and other siblings as a family unit.

Emphasizing the importance of midwifery to the society the ICM takes leadership role among others in defining a midwife's scope of practice, promotes standards and guidelines that defines structure and context of midwifery pre-service education programme. The competencies for basic midwifery practices that a midwife should possess as highlighted by ICM are as listed:

- Competency in social, epidemiologic and cultural context of maternal and newborn care.
- Competency in pre-pregnancy care and family planning.
- Competency in provision of care during pregnancy.
- Competency in provision of care during labour and birth.
- Competency in provision of care for women during the postpartum period.
- Competency in post-natal care of the newborn
- Competency in facilitation of abortion – related care.

The competency in midwifery according to ICM (2010) is a combination of knowledge, professional behavior and specific skills that are demonstrated at a defined level of proficiency in the context of midwifery education and practice. All the competencies mentioned are all encompassing in the normal midwifery course of pre-service midwifery education in Nigeria. It is therefore necessary to search into determinants of pre-service midwife achievement in the core midwifery course of Normal Midwifery as knowledge acquired could be used as proxy to determine the competencies of pre –service education of midwifery students. Many variables could be attributed as determinants of student midwives' achievement in Normal Midwifery but those considered in this study are School type, entry qualification, teacher – student ratio, academic support - seeking, teacher quality and academic self-concept.

## **LITERATURE**

In Nigeria, there are two ways of entry into midwifery profession. It could be either 18 months for registered nurses or 36 months for senior secondary school leavers. The variation in the entrants into the profession is to have enough skilled birth attendants as recommended by the WHO and ICM.

Establishments of Schools of Midwifery fall into two categories of private (mission, individual) Government or public (State or Federal Governments). The owners of the schools either run basic (36 months) or post basic (18 months) midwifery programme. The classification of the ownership of the schools and the type of programme being run made the midwifery education

programme to fall into four school types (post- basic or basic or government or private) All the Federal Government Schools run post basic programme while the State Government, private or mission Schools either run basic or post basic programme. School type a variable in this study has significant effect on students achievement as found by Obong, 2005, Ajayi 2006, Philiat and Wanjohi 2011, Emeke and Adeniran 2013. Contrary to the findings of these researchers Alimi, Ehinola and Alabi( 2012) found no significant difference in the academic performance of students in public and private senior secondary schools in Nigeria.

The basic entry qualification into either of these programmes is five credits at not more than two sittings to include English Language, Mathematics, Biology, Chemistry and Physics. Gbore (2013), Zezekwa and Mudavanhu (2011) in different studies found that entry qualification is a good predictor of achievement among university students, which is contrary to the studies of Obionna and Salawu 2007; Mlambo 2011; Emeke and Adeniran 2013.)

A prime factor in determining students' achievement in any course of study which could be negative or positive is the **quality of the teacher**. It was found that teacher quality with the indices of teacher's teaching experiences and qualifications exert a greater influence on academic achievement (Emeke and Adeniran, 2013; Gbore 2013).

Teacher –student ratio measured by the number of teachers to students in a school is a factor in this study. According to Mitchell (1989), a lowered pupil- teacher ratio leads to higher achievement. It is found to be significant in determining student academic achievement. ( Suryadama, et al 2004; Engin-Demir, 2009).

Academic Self Concept a variable in this study refers to a person's self-evaluation regarding specific academic domains or abilities. (Trautwein, et al 2006.) Many researchers (Cockley, 2000; Marsh, 2004; Awad, 2007; Tan and Yates, 2007; Ahmed, et al 2010; Musa Matovu, 2012), found that academic self-concept is positively related to academic achievement.

A variable that plays a significant role in the academic achievement of student midwives is Academic Support Seeking. Kozantis, et al (2007) are of the view that as students ask teachers for help, teachers can play a significant role in the development of students' classroom involvement and motivation. Emeke and Adeniran (2013) found this variable to be significant in determining student midwife's achievement in Anatomy and Physiology.

### **Obstetric Anatomy and Physiology**

The course builds on students' already acquired knowledge of anatomy and physiology with special application to midwifery. The physiological indices of how the body functions are used to explain pathological processes that may occur. The role of the midwife in the identification of anatomical landmarks in the mechanism of child birth is emphasized. Among the curriculum objectives of this course are that the student will be able to:

- (i). relate the structural adaptation of the organs of reproduction to their functions in normal and pathological conditions.
- ii). Utilize the knowledge of Anatomy and Physiology in the care of clients during pregnancy labour and puerperium (N&MCN, 2006).

## **Normal Midwifery**

The course gives the students opportunity to apply an in-depth knowledge of the reproductive system to the practice of normal midwifery. It emphasizes health of the family during child bearing years by paying particular attention to the normal needs of the mother, father, foetus, infant and other siblings as a family unit.

The objectives of this course according to N& M C N (2005) are that the student will be able to:

- i). describe the process of prenatal care, labour and puerperium.
- ii). apply Nursing process in the care of women during pregnancy, labour and puerperium.
- iii). appreciate the cultural and socio-economic factors that affect child bearing process.
- iv). discuss the need for family and community involvement in the child bearing process.

### **Statement of the Problem:**

Students' achievement has been extensively studied and poses challenges in academic literature as various variables such as gender, teacher's education, teaching styles, class environment, school environment, class size at primary and secondary levels of education, but there is a dearth of studies at higher levels of education especially professional education like midwifery education in our contemporary society. As a result of this, the study sought to investigate the extent to which variables of school type, entry qualification, student teacher ratio, academic support seeking and teacher quality determine achievement of student midwives in normal midwifery in Nigeria by testing an eight variable model for providing an explanation of student midwives achievement in Normal Midwifery.

## **Research Questions**

Based on the stated problem, the investigators sought to provide answers to the following research questions:

1. What is the most meaningful causal model for providing an explanation of the performance of students in the three core midwifery courses i.e. Anatomy and Physiology, Normal Midwifery and Complicated Midwifery?
2. What are the directions as well as the estimates of the strengths of causation (path coefficients) of the variables in the model?
3. What are the direct and indirect effects of the variables on the students' achievement in the three core courses as predicted by the causal model?
4. What proportions (%) of the total effect are
  - (i) Direct?
  - (ii) Indirect?

## METHODOLOGY

A non-experimental type and ex-post facto research considered these variables for the study:

- a) Exogenous variables:
  - i) School Type      (ii) Teacher Quality
- b) Endogenous Variables
  - i) Teacher-student ratio      (ii) student entry qualification      (iii) Academic Self- Concept
  - (iv). Academic support-seeking      (v) Achievement in Anatomy and Physiology
  - (vi). Achievement in Normal Midwifery.

**Population, Sampling Technique and Sample:** This is final year student midwives in the Schools of Midwifery in Nigeria and their teachers. Sample was drawn from the Lagos zone. The Lagos zone is the largest zone with the largest number of Schools of Midwifery (21 Schools) that comprises of 5 basic and 16 Post basic. The Schools are either own by the Federal or State Government, Mission or individual. Out of the eleven states and 21 schools in the zone, eight states and eighteen schools were purposively sampled. Schools that were not included in the study were either temporarily closed down or did not have students in the final year or were on practical experience during the period of data collection. The states included in the study are Delta, Edo, Ekiti, Kwara, Lagos, Ogun, Osun and Oyo. The participated institutions were 14 post basic and 4 basic schools of Midwifery.

### Instruments for Data Collection

The instruments used were Teachers' Perception of Student Midwives Academic Support-Seeking Questionnaire (TPSMASSQ), Student Midwives Academic Self Concept on Normal Midwifery, (SMASCNM), and Teacher Quality Questionnaire on Normal Midwifery (TQQNM). Others are Achievement Test in Anatomy and Physiology (ATAP) and Achievement Test in Normal Midwifery (ATNM). The Alpha coefficients for TPSMASSQ, SMASCAP and TQQAP, were: 0.74, 0.84 and 0.80 respectively; while the KR 20 coefficient was 0.79 and 0.8 for the Achievement Test in Anatomy and Physiology and Achievement Test in Normal Midwifery respectively.

**School Records:** Analysis of records in the school on students' grades in SSSCE, School type, was obtained from available records in the schools. Photocopies of the students' grade in SSSCE were done to verify the information given by the students in the questionnaire. The number of students was got by interacting with the Principal and other staff in the School.

### Data Collection Procedure

The researcher personally visited the eighteen schools and administered the six instruments directly on the students and the teachers in the selected schools after seeking permission from the school authority. The students were met in the classroom and the researcher was introduced by the School Principal. The researcher explained the purpose of the study to the students and solicited for their support. The students that volunteered to participate in the study were given copies of the questionnaire to take home and this was collected the following day. The achievement test items in the core courses were given serially by administering Anatomy and

Physiology test items first, followed by Normal Midwifery test items. The time allotted for each of the achievement test items was one hour. The total time spent on the two courses was two hours. The students were thanked for their cooperation. The collection of data lasted six weeks.

**Data Analysis**

The data were analyzed using path analysis. Path analysis afforded the researcher to study the pattern of causation among the nine variables in the model as postulated by Pedhazur (1982). A total of eight (8) backward regression analyses were run using SPSS computer programme to obtain the path coefficients, zero order correlations and significance of the hypothesized model.

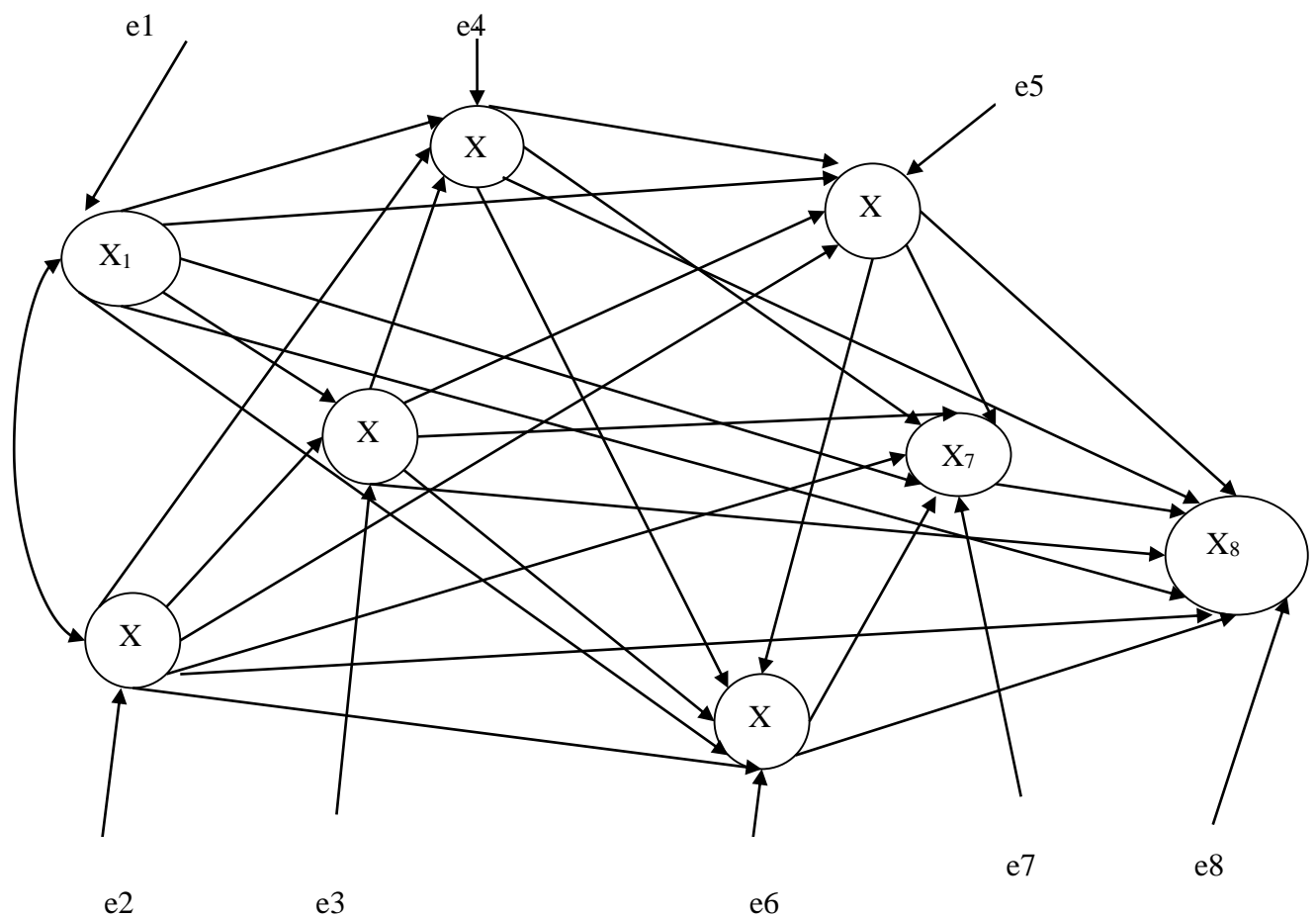


Figure 1.

**Correlation among variables X1 (i=1,2,3,4,5,6,7, and 8).**

X<sub>1</sub>= School type

X<sub>2</sub>= Teacher quality

X<sub>3</sub>=Entry qualification

X<sub>4</sub>= Teacher student ratio

$X_5$ = Academic self-concept

$X_6$ = Academic support seeking

$X_7$ = Achievement in Anatomy and Physiology  
Midwifery.

$X_8$ = Achievement in Normal

The hypothesized recursive path model was built and derived from previous studies, temporal order and theory as suggested by Mertler and Vannatta (2005). It is assumed in this study that the presented hypothesized model is not the only possible version.

In identifying the paths in the model seven regression analyses were run in order to compute the path coefficients for the model. Since there is a separate programme for path analysis, seven regression analyses of standardized scores was used to obtain beta weights whose significance was tested and meaningfulness determined.

Figure 1 shows the hypothesized recursive path model, and significant paths of the model were identified after exploring all the hypothesized linkages by forming a set of structural equations labeled 3.1 to 3.6

The equations are

$$R = .367$$

$$Z_3 = P_{31}X_1 + P_{32}X_2 + e_3 \dots\dots\dots 3.1$$

$$Z_4 = P_{41}X_1 + P_{42}X_2 + P_{43}X_3 + e_4 \dots\dots\dots 3.2$$

$$Z_5 = P_{51}X_1 + P_{52}X_2 + P_{53}X_3 + P_{54}X_4 + e_5 \dots\dots\dots 3.3$$

$$Z_6 = P_{61}X_1 + P_{62}X_2 + P_{63}X_3 + P_{64}X_4 + P_{65}X_5 + e_6 \dots\dots\dots 3.4$$

$$Z_7 = P_{71}X_1 + P_{72}X_2 + P_{73}X_3 + P_{74}X_4 + P_{75}X_5 + P_{76}X_6 + e_7 \dots\dots\dots 3.5$$

$$Z_8 = P_{81}X_1 + P_{82}X_2 + P_{83}X_3 + P_{84}X_4 + P_{85}X_5 + P_{86}X_6 + P_{87}X_7 + e_8 \dots\dots\dots 3.6$$

The hypothesized model was trimmed by erasing the insignificant paths in order to produce the parsimonious model with 12 surviving paths at  $\leq 0.05$  level of significance.

In order to validate and verify the usefulness of the model the original path coefficient was reproduced in the new model using normal equations. A minimal difference between the original and the reproduced correlations implies that the parsimonious model is good and that the original data are consistent with the new model.

#### Assumptions of the study:

It is assumed that the type of school (basic or post basic), teacher quality and student indicators:

- i. are variables necessary for students' performance in Normal Midwifery course.
- ii. will enhance student midwives' achievement in Normal midwifery course
- iii. the hypothetical recursive path model is not the only possible version.

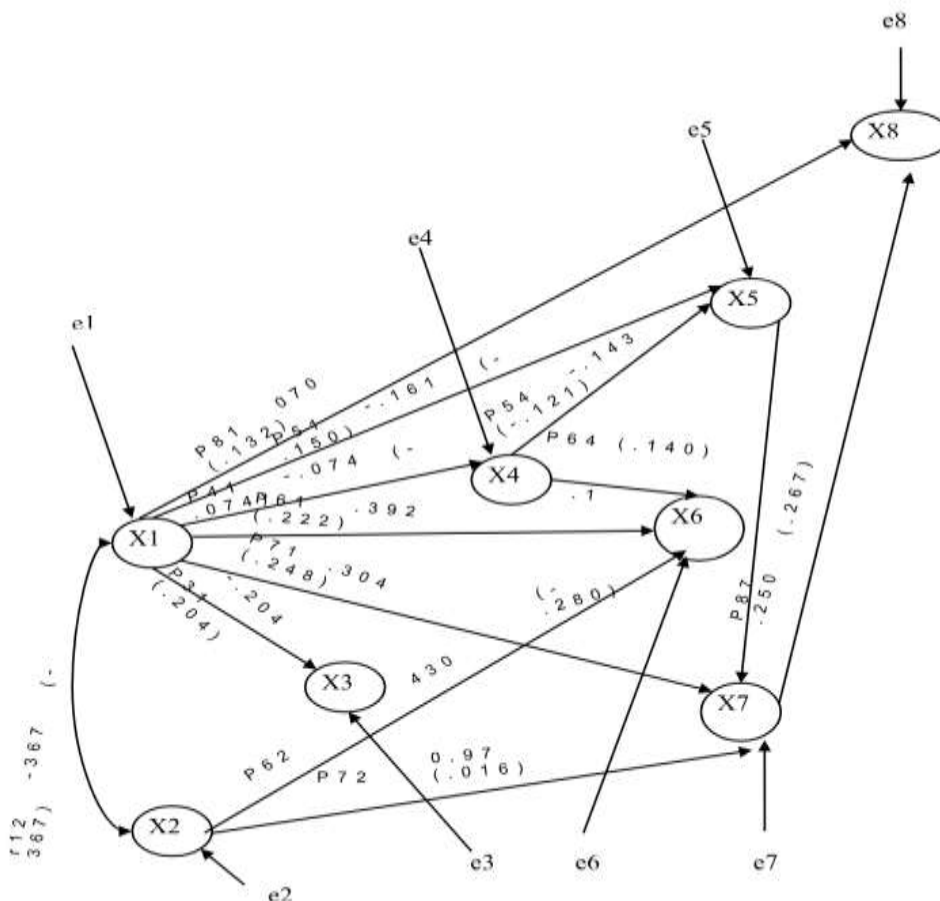
## RESULTS

### Research Question 1

What is the most meaningful causal model for providing an explanation of the performance of student midwives in the Normal Midwifery?

### Results

The parsimonious model in Figure 1 refers. The path coefficients and zero order correlation coefficients were written on each pathway with the correlation coefficients in parentheses as shown in Figure 2. Testing the significance of the path coefficients for achievement in Normal Midwifery resulted in data, showing 12 paths that met the criteria of significance (at 0.5 levels) and meaningfulness. In trimming the paths in the causal model, paths are considered significant at 0.05 alpha and meaningful if the absolute value of the path coefficient is at least 0.05 (Land, 1969). Based on these criteria, the significant paths for Normal Midwifery is as shown in Figure 2 with 12 surviving paths.



**Figure 2: The New Path Model Showing path coefficient and zero order correlation coefficient in parentheses**



X1 = School Type

X5 =Academic Self Concept

X2=Teacher Quality

X6=Academic Support Seeking

X3=Entry Qualification

X7=Achievement in Anatomy and Physiology.

X4= teacher student ratio

X8= Achievement in Normal Midwifery

To verify the efficacy of causality among variables 1, 2, 3, 4,5,6,7 and 8 (Figure 1), the original correlation data was reproduced using the computed path coefficients on the more parsimonious model. The original and reproduced correlation matrix is as shown in table 2 and the discrepancies between them are as shown in table 3. It is evident from table 3 that discrepancies between the original and the reproduced correlations are very minimal and it is -.021 ( $P < 0.05$ ), .0148 ( $P < 0.05$ ) and .007 ( $P < 0.05$ ). These indicate that the patterns of correlation in the observed data are consistent with the more parsimonious model. The new model is therefore considered tenable in explaining the causal interaction between the predictor variables (1-7) to the Normal Midwifery course). Figure 1 therefore shows the most meaningful causal explanation involving the student indicators (entry qualification, academic self-concept and academic support seeking) and school indicators of teacher quality, teacher student ratio, and school type and achievement in anatomy and physiology as determinants of achievement in normal midwifery course.

**Table 1. Paths and Standardized Path Coefficient for Normal Midwifery**

Paths	Standardized Path Coefficient
P81	0.070**
P82	-.043
P83	.037
P84	.015
P85	-.045
P86	.023
P87	.250**
P71	.304**
P72	.097**
P73	.071
P74	-.013
P75	.124**
P76	.067
P61	.392**
P62	-.430**
P63	.015
P64	.168**
P65	-.021
P51	-.161**
P52	.033
P53	.055
P54	-.143**
P41	-.074**
P42	.070
P43	.019
P31	-.204**
P32	.067
P21	-.367

To verify the efficacy of the paths for students' achievement in Normal Midwifery (figure 1), the original correlation data was reproduced using the computed path coefficients on the more parsimonious model. The original and reproduced correlation matrix and the discrepancies between them are as shown in tables 2, 3 and 4 respectively. From table 3, it is evident that discrepancies between the original and the reproduced correlations are very minimal and it is .0148 ( $P < 0.05$ ). This indicates that the patterns of correlation in the observed data are consistent with the more parsimonious model. The new model is therefore considered tenable in explaining the causal interaction between the predictor variables (1-7) and the criterion variable (Normal Midwifery var.8). Figure 2 therefore shows the most meaningful causal model involving the student indicators (entry qualification, academic self concept, academic support seeking and Achievement in Anatomy and Physiology) and school indicators of (teacher quality, teacher student ratio, and school type) as determinants of achievement in Normal Midwifery.

### Research Question 2:

What are the directions as well as the estimate strengths of causation (path coefficients) of the variables in the model?

### RESULTS

The directions of the causal paths of the variables in the model are shown in the pathways which are (i) Significant (ii) meaningful and (iii) have a link with the criterion variable. The paths are shown in Table 1.

**Table 2: Original and Reproduced Correlation Matrix for Variables 1,2,3,4,5,6,7, and 8.**

Variables	School Type	Teacher Quality	Entry Qualification	Teacher Student Ratio	Academic Self Concept	Academic Support Seeking	Achievement in Anatomy & Physiology	Achievement in Normal Midwifery
School Type	1.000	.367	-.204	-.074	-.150	.222	.248	.132
Teacher Quality	.367	1.000	-.135	-.002	-.025	-.287	.016	-.016
Entry Qualification	.204	-.074	1.000	.034	-.025	-.287	.027	.031
Teacher Student Ratio	.074	-.027	.015	1.000	-.121	.140	-.074	.031
Academic Self Concept	.152	-.056	.031	-.122	1.000	-.086	.080	-.038
Academic Support Seeking	.223	-.276	-.046	.150	.039	1.000	.031	.070
Achievement in Anatomy & Physiology	.251	.008	-.052	-.035	.083	.097	1.000	.267
Achievement in Normal Midwifery.	.132	.027	-.027	-.013	.010	.039	.067	1.000

N.B. Entries above the diagonal are the original correlation Coefficient.

Entries below the diagonal are the reproduced correlation Coefficient.

**Table 3:** Discrepancies between the Original and Reproduced Correlation Values for variables 1,2,3,4,5,6,7, and 8.

Correlation	Original Value	Reproduced Value	Differences
r12	.367	.367	.000
r13	-.204	-.204	.000
r14	-.074	-.074	.000
r15	-.150	-.152	-.002
r16	.222	.223	-.001
r17	.248	.251	.003
r18	.132	.132	.000
r23	-.135	-.074	-.061
r24	-.002	-.027	.025
r25	-.025	-.056	.031
r26	-.287	-.276	-.011
r27	.016	.008	.008
r28	-.016	.027	-.043
r34	.034	.015	.019
r35	-.025	.031	-.056
r36	-.287	-.046	-.241
r37	.027	-.052	.079
r38	.031	-.027	.058
r45	-.121	-.122	.001
r46	.140	.150	-.010
r47	-.074	-.035	-.039
r56	-.086	.039	-.125
r57	.080	.083	-.003
r58	-.038	.010	-.048
r67	.031	.097	-.066
r68	.070	.039	.031
r78	.267	.269	-.002

NB. Total Difference = 0.415

Mean = .0148

**Table 4: Analysis of Significant Pathways in Normal Midwifery**

Pathways through which xi (1-7) caused variations in the dependent variable  $x_8$  at  $p < 0.05$

Normal Equation	Direct Path	Indirect Paths
R13		1: p31
R14		1:p41
R15		3: e.g. p51,p54 r14
R16		5:e.g p61.p62,r12,p64r14
R17		7: e.g. p71,p72r12, p75r15
R18	P18	8:e.g.p81, p87r17
R23		1:e.g.p31r21
R24		1:e.g.p41r21
R25		4:e.g.p51r21,p54r24
R26		5:e.g.p61r21,p62,p62r24
R27		7:e.g.p71r21, p72,p75r25
R28		10:e.g.p81r21, p87r27
R34		2:e.g.p41r31
R35		4:e.g.p51r31,p54r34
R36		9:e.g.p61r31, p62r32,p64r34
R37		12:e.g.p71r31, p72r32,p75r35
R38		16:e.g.p81r31, p87r37
R45		2:e.g.p51r41,p54
R46		5:e.g.p61r41, p62r42,p64
R47		7:e.g.p71r41, p72r42, p75r45
R48		10:e.g.p81r41, p87r47
R56		10:e.g.p61r51, p62r52, p64r54
R57		10:e.g.p71r51,p72r52.p75
R58		15:e.g.p81r51, p87r57
R67		28:e.g.p71r61,p72r62,p75r65
R68		35:e.g.p81r61, p87r67
R78	P78	9:e.g.p81r71,p87
Total	2	236

The actual values of the indirect paths were obtained simply by multiplying the beta weights of the component single path.

Table 4 shows 238 significant and meaningful pathways through which all the predictor variables caused variation in the criterion variable. Out of the 238 pathways, only 2 are direct while 236 are indirect. The results on Table 4 however, shows that out of the school indicators, School type ( $b=.070$ ) and achievement in Anatomy and Physiology ( $b=.250$ ) had highest direct and indirect effects on students' achievement in Normal Midwifery. It is worthy to note that other variables of teacher quality, entry qualification, teacher student ratio, academic self concept and academic support seeking do not have direct effect on the students' achievement in Normal Midwifery as revealed by this study.

**Research question 3:** What are the direct and indirect effects on the students' achievement in Normal Midwifery course as predicted by the causal model?

**Table 5****Causal Effects of the Predictor Variables 1-7 on Achievement in Normal Midwifery**

Variables	Total Effect(TE) A	% B	Direct Effect (DE) C	% D	Total Indirect Effect(TIE) (a-c)=e	% F
School Type	.132	27.67	.070	22.80	.062	36.47
Teacher Quality	-.016	-3.35	-.043	-14.00	.027	15.88
Entry Qualification	.031	6.50	.037	12.05	-.006	-3.53
Teacher-Student Ratio	.031	6.50	.015	4.88	.016	9.41
Academic Self Concept	-.038	-7.96	-.045	-14.65	.007	4.11
Academic Support Seeking	.070	14.67	.023	7.49	.047	27.64
Achievement in Anatomy & Physiology	.267	55.97	.250	81.43	.017	10.00
Absolute Total	.477	–	.307	–	0.17	–
% Of proportions	–	100	64.36%	100	35.64%	100

Significant at 0.05 level and meaningful

- Total Effect =Original correlation Coefficient
- Direct Effect = Path Coefficient
- Indirect Effect =Total Effect – Direct Effect

**RESULTS**

The total effects (direct and indirect) of all seven (7) predictor variables consisting of students and school indicators) and criterion (student achievement in Normal Midwifery) are shown in table 6. The total effects of all the predictor variables on the criterion variable (students' achievement) obtained from regression analysis of the data collected from this study is .477. This was decomposed into direct and indirect components and is presented in Table 5. The direct effect is .307 (64.36%) while the indirect effect is 0.17(35.64%)

**Research Question 4:** What proportion (%) of the total effect is

- Direct ?
- Indirect ?

## Results

The % proportion was calculated as shown below:

% of direct proportion is =  $\frac{\text{absolute total direct effect}}{a} \times 100$

$$= \frac{c}{a} \text{ multiply by } 100$$

% of indirect effect is =  $\frac{\text{absolute total indirect effect}}{a} \times 100$

$$= \frac{a-c}{a} \text{ multiply } \times 100$$

Proportion to the total effect of direct to indirect was calculated from Table 5. Therefore, the table shows the proportion of the total effects (100%): Direct effect is 64.36% and indirect effect is 35.64%.

## DISCUSSION

The result of the study showed that out of the hypothesized linkages for variables 1, 2, 3, 4, 5, 6, 7, and 8 (Figure 1) only twelve significant pathways survived in relation to the hypothesized paths. These were derived from seven structural equations for producing the most meaningful causal paths (Figure 2) involving students and school indicators as determinants of achievement in Normal Midwifery (a core midwifery course). The efficacy of the new paths verified by reproducing the original correlation matrix of the variables shows that the original correlation data is consistent with the new path. Hence, the new model is retained. It was found that variable 1 (school type) contributes 27.67% of the total effect on students achievement while Anatomy and Physiology (variable 7) has the greatest contribution of 55.97% and the least contribution to achievement in Normal Midwifery is teacher quality (-3.35%). Thus it is concluded that performance in Anatomy and Physiology is a good explanation for students' achievement in Normal midwifery,

Table 5 shows the total variation in the criteria measure that is accounted for by the 2 exogenous and 6 endogenous variables (when taken together) direct and indirect components accounted for 64.36% and 35.64% respectively. Again, since the magnitude of the beta weight is taken to be directly proportional to the degree of effect of the influencing variables, it could be seen from table 5 that only 2 variables namely school type (var1), and achievement in Anatomy and Physiology have direct causal influence on students' achievement in Normal Midwifery.

In considering school performance indicators, school type which is the first variable made the highest direct contribution to student midwives' achievement in Normal Midwifery. It accounted for 22.80 % of the total effect of the three school indicator variables.

There are many studies on school type and its effect on students' achievement. Obong, 2005; Ajayi, 2006; Phillias and Wanjohi, 2011; Emeke and Adeniran, 2013 found that school type has a significant direct influence on academic achievement. Obong considered school type in terms of ownership, i.e. federal, state and mission and found that federal schools performed better than the state or mission owned schools. In this study school type is considered as either basic or post basic types of midwifery schools. It was found in this study that post basic schools owned by the Federal Government, state Government and mission schools performed better than the basic schools owned by the Mission or State schools. This finding may be so because students in the post basic schools had earlier training in nursing, i.e. they are registered nurses. This shows that previous knowledge or exposure in nursing training has influence on the academic achievement of students because they are not just out of secondary schools. So experience or exposure which is not considered in this study has influence on the students' achievement. It could therefore be concluded that school type has significant effect on students' achievement.

The teacher quality (var2) has a negative direct influence on students' achievement in Normal Midwifery. It has a path coefficient of  $-0.043$  at 0.05 levels while its direct effect is  $-14\%$  of the total effects of the variable on achievement in Normal Midwifery. The indirect effect accounts for  $15.88\%$  of the total effect. In this study, teacher quality is examined from the perspective of qualification of teacher, teaching experience, teachers' clinical experience, teaching strategies adopted by teacher; all these are taken collectively as teacher quality. Huang and Moon as cited by Kosgei et al 2013 documented that teacher qualification accounted for approximately 40 to 60 % of the variance in average of students' achievement in assessment. It was found that this variable is the least significant of all the variables in the study which is contrary to the findings of Goldhaber (2002), Goldhaber and Anthony (2003), Gbore (2013), and Emeke and Adeniran (2013), on teacher quality as determinants of students achievement. The indices of teacher quality have been jointly studied in various studies (such as, Goldhaber and Brewer, 2000; Goe, 2007,) and the totality of these indices buttress the importance of the teacher quality as an indicator of students' achievement in Normal Midwifery course. Teacher quality in this study has no direct influence on student achievement in Normal Midwifery; hence teachers may be less effective in this particular course which might be based on the characteristics of the students. It also shows that there is likelihood of specific teacher practices like teaching strategies employed which might negatively or positively impact on students' achievement.

The third variable in school indicators is the teacher-student ratio. Student-Teacher ratio refers to the number of teachers in a school or university with respect to the number of students who attend the institution. McCrea (1996) found that the maximum student – teacher ratio recommended for education was 15: 1. Majority of studies (such as Murphy and Rosenberg 1998, Mitchell 1999, Harris and Plank, 2001; Becker, 2007) have found no significant effect of class size or teacher student ratio on student achievement usually only when classes have less than 20 students. In this study, teacher – student ratio has no significant effect on academic achievement in Normal Midwifery. Teacher –student ratio has a total effect of  $6.5\%$  with direct effect of  $4.88\%$  and indirect effect of  $9.41\%$ . This is contrary to the findings of Kaloki et al 2015; Engin-Demir 2009, and Suryadam et al 2004 found that teacher-student ratio is significant in determining academic achievement of students.

The fourth variable is the entry qualification. Students Entry Qualification has a direct effect of  $10.99\%$  and indirect effect of  $13.7\%$ . This has no direct causal link with the criterion variable

of Normal Midwifery. Results from Nigeria and overseas universities consistently indicate that secondary school results are very strong predictors of tertiary performance. (Okwilagwe, 2001; Kraus et al. 2005) The findings in this study show that entry qualification is not significant at 0.05 levels. It has a path coefficient of 0.071 and a total effect of 6.50% with direct effect of 12.05% and indirect effect of 3.53%. This finding supports the findings of Jeffery (1998), Merriel-Hutton (1998), Ofori (2000) and Obong, (2005) that student nurses' entry qualifications are not the most useful predictors of academic performance. Therefore, it should not be relied upon for selecting potential nurses. It could therefore be stated that in Normal Midwifery, entry qualification is not a good predictor of student midwives' achievement.

Self-concepts of students play an important role in the success or failure of a student in the learning process. Many studies (Huitt, 2004; Jordan and Porath, 2006; Riley and Shaffer, 2006) are of the view that major factor in determining whether a student passes or fails is self - concept. In this model, academic self-concept (var.5) has a total effect of -7.96%, with direct effect of 14.65% and indirect effect of 4.11%. Academic self-concept is not significant at 0.05 levels. The path coefficient of academic self-concept in this model is -.045 and not significant at 0.05 level. This does not lend support to the findings of researchers such as Bakari et al 2013, Ssu-Kuang et al 2013, found that academic self-concept is positively related to academic performance. Students with positive self-concept assess their own performance positively and are more successful in their achievement than negatively self-concept students. Guay, et al (2010) found that positive academic self-concept students are more autonomously motivated at schools. Factors that impact strongly on academic self- concept are likely to include poor performance or good performance at previous achievement.

Student Academic Support- Seeking a variable in the study has a total effect of 14.67%, direct effect of 7.49% and indirect effect of 27.64%. Academic Support Seeking according to Ofori(2000), Ofori and Charlton(2002), is a good determinant of student nurses achievement in a Psychology course. Students not seeking support in Normal Midwifery may likely be due to the assumption that the course is not difficult as implied by the course name.

The structure and physiological indices of how the body functions are used to explain pathological processes that may occur. Anatomy and Physiology (a core midwifery course) is a foundation, a pre requisite and a compulsory course in Midwifery because the application of the knowledge of anatomy and physiology is important to the midwife in the identification of anatomical landmarks in the mechanism of child birth. This course is also the foundation for Normal Midwifery. The researchers observed that many studies have examined the causes of maternal mortality and morbidity as well as students' achievement in other Nursing and Midwifery programmes without recourse to the student midwives' achievement in Normal Midwifery. It was found in this study that Anatomy and Physiology is a good predictor of students' achievement in Normal Midwifery as it has the greatest contribution (total effect) of 55.9%.

The study therefore examined critically the performance indicators of student midwives' achievements in Normal Midwifery by constructing and testing a seven variable model for providing an explanation of student midwives' achievement in Normal Midwifery.

**Implication to Research and Practice:** In order to improve quality maternity care by skilled attendant the implications are that:

1. Midwifery education should be a post basic training programme.



2. Students should be encouraged and motivated to learn obstetric Anatomy and Physiology because of its importance to midwifery practice.

**Future Research:** A study is to be carried out on student midwives' achievement in complicated midwifery course in midwifery education.

## REFERENCES

- Ahmed, W, Van Der Werf, G, Minnaert, A and Kuyper, H. (2010). Daily Emotions in Classroom: Intra-Individual Variability and Appraisal Correlates. *British Journal of Educational Psychology*, 80(4): 583-598.
- Ajayi , A (2006). The Influence of School Type and Location On Resource Availability and Pupils Learning Outcome In Primary Schools In Ekiti State, Nigeria. *Educational Thought*. 5(1): 170-176.
- Alimi, O. S., Ehinola , G.B and Alabi, F.O. (2012). School Types, Facilities and Academic Performance of Students in Senior Secondary Schools in Ondo State, Nigeria. *International Education Studies* 5(3) June 2012(44- Istics and the Acad 48)
- Awad, G, (2007). The Role of Racial Identity, Academic Self-Concept, and Self- Esteem in The Prediction of Academic Outcomes For African American Students. *Journal of Black Psychology*, 33, 188-207.
- Becker,Jr, R.T.( 2006). Student Achievement as a Function of Class Size and Pupil-Teacher Ratio. A Phd Thesis Submitted to Department of Leadership and Counselling At Eastern Michigan University.
- Cokley, K. (2000): An Investigation of Academic Self-Concept and Its Relationship to Academic Achievement in African American College Students. *Journal of Black Psychology*, 26, 148-164.
- Emeke E.A. and Adeniran G.O. (2013): A Path Analytic Study of Students and School Performance Indicators as Determinants of Student Midwives' Performance in Anatomy and Physiology. *British Journal of Education, Society and Behavioural Science* 3(1): 18-32, 2013.
- Gbore, I.O. (2013): Relationship between Cognitive Entry Characteristics and the Academic Performance of University Undergraduates in South West, Nigeria. *Journal of Educational and Social Research*. 3 (1) January, 2013.
- Goe, L. (2007). *The Link between Teacher Quality and Student Outcomes: A Research Synthesis*. Washington, DC. National Comprehensive Centre for Teacher Quality. Retrieved from [Http//Www.Ncctq.Org](http://Www.Ncctq.Org)
- Goldhaber, D. (2002). Mystery of Good Teaching; The Evidence Shows That Good Teachers Make sClear Difference in Student Achievement. The Problem Is That We Don't Really Know What Makes a Good Teacher-Education Next, (Spring 2002) Find Articles [Http://Www.Fundarticles.Com](http://Www.Fundarticles.Com) 12/1/2007.
- Goldhaber, D. and Anthony, E. (2003). *Teacher Quality and Student Achievement*. Educational Resources Information Center.
- Goldhaber, D. and Brewer, D. and Anderson D (1999). A Three-Way Error Components Analysis of Educational Productivity. *Education Economics* 7(3); 199-208. ( EJ 597060)
- Guay,F, Marsh , H.W., and Boivin (2003). Academic Self- Concept and Achievement: Developmental Perspective On Their Causal Ordering. *Journal of Educational Psychology*, 95, 124-136.

- Harris D, and Plank D.N. (2001). Does Class Size Reduction Come at The Expense of Teacher Quality? Policy Report No.4 The Education Policy Report Centre at Michigan State University. [Www.Epc.Msu.Edu](http://Www.Epc.Msu.Edu)
- Harter, S. (1998). The Development of Self-Presentations. In Damon,W.; Einsenberg, N,(Ed), Handbook of Child Psychology, 3(5), 553-717. New York: John Wiley and Sons
- Huiit,W. (2004). Self-Concept and Self- Esteem. Retrieved May 2006.
- Jeffreys, M.R. (1998). Predicting Non-Traditional Student Retention and Academic Achievement. *Nurse Educator* 23 42 – 48.
- Jordan ,E.A. and Porath, M.J. (2006). Educational Psychology; A Problem- Based Approach MA: Person Education, Inc.
- Kaloki, J.W. et al: (2015): Pupil- Teacher Ratio and its Impact on Academic performance on Public Primary Schools in Central Division, Machakos County, Kenya. *European Journal of Education Studies*. 1-32.
- Kitsantas, A. and Chow, A (2007). College Students Perceived Threat and Preference for Seeking Help in Traditional, Distributed and Distance Learning Environments. *Computers and Education* 48(3) 383-395.
- Konzanitis, A., Desbiens, J., And Chouimard, R. (2007). Perception of Teacher Support and Reaction towards Questioning: Its Relation to Instrumental Help Seeking and Motivation To Learn.
- Kosgei et al (2013). Influence of Teacher Characteristics on Students' Academic Achievement among Secondary Schools. *Journal of Education and Practice* 4(3) 2013.
- Krause, K. L; Hartley, R; James,R; and Mcinnis, C,(2005) .The First Year Experience In Australian Universities: Findings From A Decade of National Studies. Canberra : **DEST** Retrieved October 17, 2005, From [Http//Www.Cshe.Unimelb.Edu.Au](http://Www.Cshe.Unimelb.Edu.Au).
- Land K. C. (1969): Principles of Path Analysis in E.F Borgatta E.D Sociological Methodology 1969 San Francisco: Jersey-Bass; 1969.
- Marsh, H.W. (2003). A Reciprocal Effect Model of the Causal Ordering of Academic Self Concept and Achievement. Retrieved July 2007 From [Http://Www.Aare.Edu.An/03/Pap/Mar 03755.Pdf](http://Www.Aare.Edu.An/03/Pap/Mar 03755.Pdf).
- Marsh, H.W. (2004) Negative Effects of School- Average Achievement on Academic Self Concept: A Comparison Of The Big-Fish- Little Pond Effect Across. Australian States and Territories. *Australian Journal of Education*, 48, 5-26.
- Matovu M. (2012). Academic Self Concept and Academic Achievement among University Student: *International Online of Educational Sciences* 4(11) 107-116.
- Mccrea, L (1996). A Review of Literature: Special Education and Class Size. (ERIC Document Reproduction Services No .ED 407 387)
- Meriel – Hutton, B. (1998). Do School Qualifications Predict Competence in Nursing Calculations? *Nurse Education Today*. 18, 25 – 31.
- Mertlar, G.A. and Vannatta, R.A. (2005): Advanced and Multivariate Statistical Methods. Practical Application and Interpretation. 3rd Edition. Pyrizak Publishing.
- Mitchell, D. 1989. How Changing Class Size Affects Classrooms and Students. (ERIC Document Reproduction Service No. ED315841).
- Mlambo, V (2011): An Analysis of Some Factors Affecting Student Academic Performance in an Introductory Biochemistry Course at The University of the West Indies. *Carribbean Teaching Scholar*. 1(2) 79-92. November 2011,
- Murphy, D., and Rosenberg, B. (1998). Recent Research Shows Major Benefits of Small Class Size. *American Federation of Teachers*, 3, 1 – 3.
- Nursing and Midwifery Council of Nigeria (2006): Curriculum for Post Basic Midwifery Education in Nigeria.

- Obioma, G and Salau, M (2007): The Predictive Validity of Public Examination: A Case Study of Nigeria. A Paper Presented at The 33<sup>rd</sup> Annual Conference of International Association for Educational Assessment (IAE) Held in Baku, Azebij. September 16-21.
- Obong, G.B. (2005). School and Student Factors as Determinants of Achievement in Anatomy and Physiology Among 1<sup>st</sup> Year Student Nurses. An Unpublished Phd Thesis, University of Ibadan, Ibadan.
- Ofori R And Charlton (2002). A Path Models of Factors Influencing the Academic Performance of Nursing Students. *Journal of Advanced Nursing*.38 (5) 507.
- Ofori, R. (2000). Age and Domain Specific Entry Qualifications as Predictors of Student Nurses Performance in Biological, Social and Behavioural Sciences in Nursing Assessments. *Nurse Education Today*. 20, 298 – 310.
- Okwilagwe E.A. (2001) A Causal Model of Undergraduate Students' Academic Achievement Vol. 1 (1), Pp. 1 – 13. Evaluation Research. A Journal of ICEE, Institute of Education, University of Ibadan, Nigeria and The Nigerian Association of Programme Evaluations (NAPE).
- Phillias, O.Y, and Wanjohi W.C. (2011) Performance Determinants of Kenya Certificate of Secondary Education(KCSE) in Mathematics of Secondary Schools in Nyaimaiya Division, Kenya. *Asian Social Science* 7(2) 107-112.
- Suldo, S. M, Riley K. N, and Shaffer E.J. (2006) Academic Correlates of Children and Adolescents' Life Satisfaction. *School Psychology International* 27,567-582.
- Suryadaima, D., Suryahadi, A. Sumarto, S. and Rogers, F.H. (2004) The Determinant of Student Performance in Indonesian Primary Schools: The Role of Teachers and Schools. SMERU Research Institute.
- Tan , J. B. and Yates, S.M. (2007) A Rasch Analysis of the Academic Self-Concept Questionnaire. *International Educational Journal*, 8(2), 470-484.
- Trautwein, U, Ludtke, O, Koller, O and Baumert, J. (2006) Self-Esteem, Academic Self-Concept and Achievement: How The Learning Environment Moderates the Dynamics of Self -Concept *Journal of Personality and Social Psychology* 20, 334-349.
- Zezekwa, N and Mudavanhu Y (2011) The Effect of Entry Qualifications on Students' Performance in University Science Course: The Case of Bindura University of Science Education. *African Journal of Education and Technology*. 1(3) 32-39, 2011.