A SEQUENTIAL STRUCTURAL EQUATION MODELING OF PATIENT SATISFACTION AND COMPLIANCE TO TREATMENT

Bagbe A.[1], Obilade T.O.[2] and Olatayo T.O.[3]

[1]Department of Mathematical Sciences, Statistics unit, Olusegun Agagu University of Science and Technology, Okitipupa. Ondo State.

[2]Department of Mathematics and Statistics, Obafemi Awolowo University, Ile-Ife. Osun State.

[3]Department of Mathematical Sciences, Faculty of Science, Olabisi Onabanjo University, Ago-Iwoye. Ogun State.

Correspondence: tinumii05@yahoo.com

ABSTRACT: With the renewed concern about health care quality, there is a need for improved surveillance tools and focus on special age groups. While Structural Equation Model (SEM) is an important tool for surveillance, prediction and measuring intervention impact, the need to focus on reduction in bias necessitates the modification of SEM with Sequential Structural Equation Model (SSEM) to study some specific groups of health care delivery. This study formulated a model on patient satisfaction and compliance to treatment using SSEM of two stopping times with some exogenous, endogenous and mediating variables that generally influence health care delivery. SSEM modelling of Patient Satisfaction (PS) and Compliance to Treatment (CT) involves four latent variables (factors) and some manifest (dependent) variables. Statistical Packages for Social Sciences (SPSS) and Linear Structural Relationship (LISREL) 8.80 were adopted for the analysis. The study established that the fitted indices for the second stopping time meet the threshold rules in all cases when various fitting indices were used, and the fitted model result revealed an insignificant influence of PE on HS [R^2 =0.012, F = 3.199, P >.05]. This indicates that PE contributed insignificantly to HS. Therefore, this study concluded that the procedure of sequential stopping time for hypothesised relationship showed that SSEM is useful in the drive towards quality patient health care and satisfaction. Hence, this confirmed that demographic variables are significant to patient experience.

KEYWORDS: Compliance to Treatment, LISREL, Patient Satisfaction, Sequential Structural Equation Models, SPSS.

INTRODUCTION

Structural Equation Modeling (SEM) techniques are today considered a major component of applied Multivariate statistical analysis. They are used by biologists, Economists, Educational researchers, Medical researchers and a variety of other social and behavioural scientists. SEM is a series of statistical methods that allow complex relationships between one or more independent variables and one or more dependent variables (Hayduk, 1987; Bollen, 1989; Byrne, 1989; 1994, 2000; Bollen & Long, 1993; Gwo-Jen & Fan-Ray, 2015). SEM is a combination of factor analysis and multiple regressions.

Though there are many ways to describe SEM, it is most commonly thought of as a hybrid between some form of analysis of variance (ANOVA)/regression and some form of factor analysis. Structural equation models (Blalock, 1971; Bentler & Weeks, 1980) are extensions of the usual regression models potentially involving unobservable random variables that are not error terms.

The notation of the LISREL (Joreskog 1973, Wiley 1973, Bentler and Weeks, 1980) is employed Infact; the Bentler -Weeks model is a regression model expressed in matrix algebra as

$$\eta_i \eta_i = \beta \, \eta_i \, \beta \, \eta_i + \Gamma \, \xi_i \Gamma \, \xi_i + \zeta_i \zeta_i$$

$$X_i X_i = \Lambda_x \xi_i \Lambda_x \xi_i + \delta_i \delta_i \qquad\qquad (1)$$

$$Y_i Y_i = \Lambda_y \Lambda_y \, \eta_i \eta_i + \varepsilon_i \varepsilon_i$$

Where

$\eta_i \, \eta_i$ = m x 1 vector of latent endogenous variables

$\xi_i \xi_i$ = n x 1 vector of latent exogenous variables

$X_i X_i$ = q x 1 vector of manifest indicators for $\varepsilon_i \varepsilon_i$

$Y_i \, Y_i$ = p x 1 vector of manifest indicators for $\eta_i \eta_i$

$\zeta_i \zeta_i$, $\delta_i \delta_i$, $\varepsilon_i \varepsilon_i$ are vectors of error terms.

$E(\zeta_i \zeta_i) = E(\delta_i \delta_i) = E(\varepsilon_i \varepsilon_i) = 0$, $V(\zeta_i) = \Psi$, $V(\delta_i) = \Theta_\delta$, $V(\epsilon_i) = \Theta_\epsilon$, $V(\zeta_i) = \Psi$, $V(\delta_i) = \Theta_\delta$, $V(\epsilon_i) = \Theta_\epsilon$

$\Gamma, V_X \Gamma, V_X \, \Lambda_X \Lambda_X$, $V_Y V_Y$, and $\Lambda_Y \, \Lambda_Y$ are matrices of constants with the diagonal of $\beta\beta$.

Sequential Analysis is a statistical procedure commonly used in clinical trials to compare treatment. It also finds a better way to prevent or treat a disease being diagnosed and also monitors one major thing that affects the outcome measure of a patient, which is the compliance of such patient to treatment.

One of the advantages of the sequential approach is ethical reasons which minimise the number of subjects treated with ineffective treatment. It also makes a new treatment available to the public more quickly and ensures the procedures are followed correctly.

Sequential Structural Equation Modeling (SSEM) is the application of sequential analysis to SEM in order to check the better fit model from the first stopping time and the second stopping time of the data collected. It is necessary to take samples sequentially until it is satisfied that all biases have been eliminated.

From the empirical review of related literature, none of the studies looked at patients' experience, quality of care and compliance to treatment in Nigeria and any other part of the world.

The majority of the studies applied the survey method to gather data, and many articles accessed applied only descriptive analysis. It will demonstrate the application of the sequential structural equation model for establishing the content to which factors such as demographic variables, health status and compliance predict the outcome measure for the quality of health care services.

Therefore, this study aims to examine comprehensively the relationship between demographic variables, experience, health status, satisfaction with the quality of health care and compliance with treatment.

MATERIALS AND METHODS

Collection and Exploration of Data

A questionnaire comprising of Sixty- one (61) questions was designed for this research. It was administered in two (2) stopping times to capture the work's sequential nature. The data for this research were collected from four (4) different hospitals across four (4) states in Southwestern Nigeria namely State Specialist Hospital, Okitipupa, Ondo State, Olabisi Onabanjo University Teaching Hospital (OOUTH), Sagamu, Ogun State, University College Hospital (UCH), Ibadan and Ladoke Akintola Teaching Hospital, Asubiaro, Osun State, Nigeria.
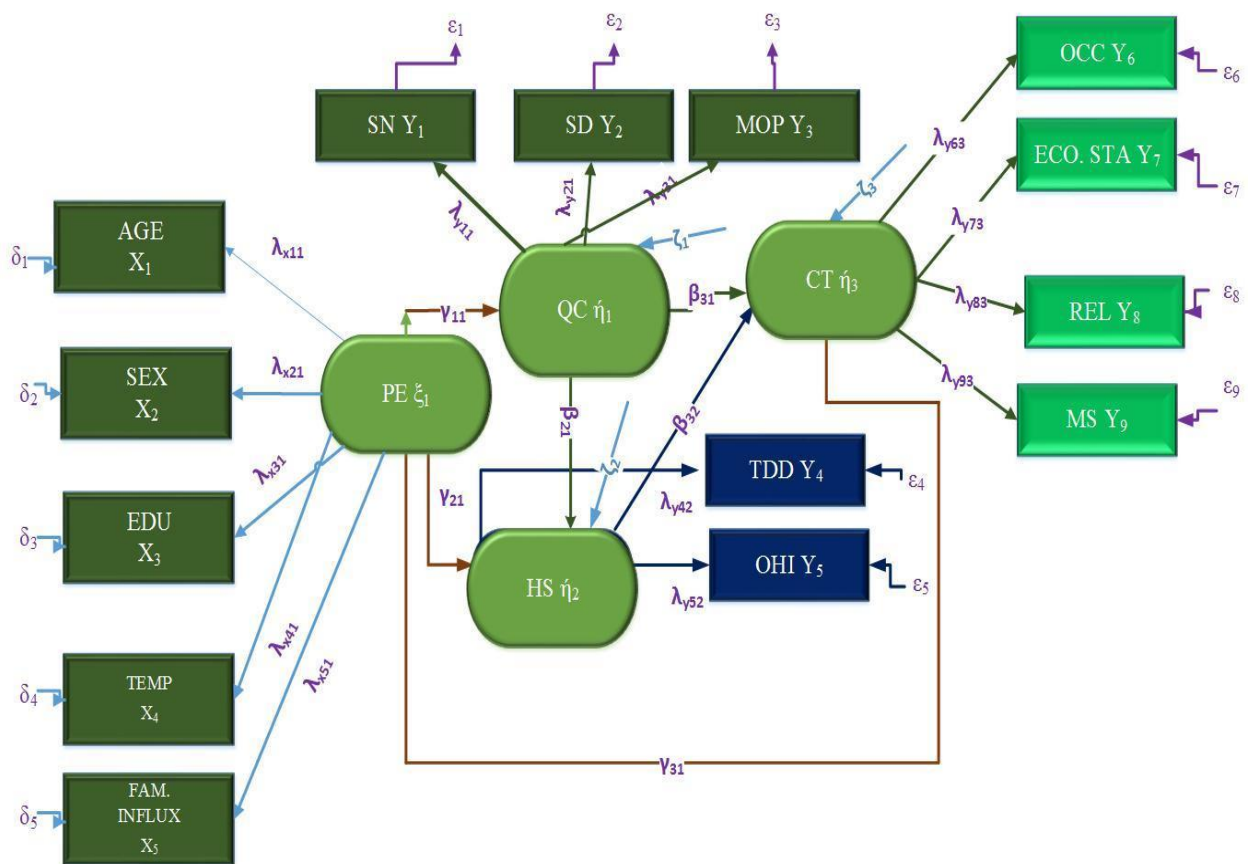
The form of Structural Equation Models

The framework adopted for this research is the general SEM version represented by three matrix equations:

$$\eta_{(m x 1)}\eta_{(m x 1)} = B_{(m x m)}\,\eta_{(m x 1)} + \Gamma_{(m x n)}\xi_{(m x 1)} + \zeta_{(m x 1)}$$
$$B_{(m x m)}\,\eta_{(m x 1)} + \Gamma_{(m x n)}\xi_{(m x 1)} + \zeta_{(m x 1)}$$

$$x_{(p x 1)}y_{(p x 1)} = \Lambda_{y_{(p x m)}}\,\eta_{(m x 1)} + \varepsilon_{(p x 1)}\Lambda_{y_{(p x m)}}\,\eta_{(m x 1)} + \varepsilon_{(p x 1)} \qquad (2)$$

$$x_{(q x 1)}x_{(q x 1)} = \Lambda_{x_{(q x n)}}\xi_{(n x 1)} + \delta_{(q x 1)}\Lambda_{x_{(q x n)}}\xi_{(n x 1)} + \delta_{(q x 1)}$$

Based on the established studies described in the literature review, the conceptual framework for the research on patient satisfaction and compliance to treatment was represented in figure 1.

It assumes patient experience as an exogenous latent construct combined with such endogenous latent construct as the quality of care, health status and compliance to treatment. The constructs are presumed to be determined by the manifest variables of the Latent Exogenous Patient Experience, the Latent Endogenous Quality of Care, Health Status and Compliance with treatment. The details of the model showing the connection between the constructs and the manifest variables are depicted in Figure 1.

Figure 1: Path Model of Patient Satisfaction and Compliance to treatment

From figure 1, the structural equations could be written as

$$\eta_{1=}\eta_{1=}\ \gamma_{11}\,\xi + \beta_{21}\eta_2\gamma_{11}\,\xi + \beta_{21}\eta_2 + \zeta_1\zeta_1 \qquad (3)$$

$$\eta_{2=}\eta_{2=}\ \gamma_{21}\,\xi + \beta_{12}\eta_1\gamma_{21}\,\xi + \beta_{12}\eta_1 + \zeta_2\zeta_2 \qquad (4)$$

$$\eta_{3=}\gamma_{31}\,\xi + \beta_{32}\eta_1 \qquad\qquad \eta_{3=}\gamma_{31}\,\xi + \beta_{32}\eta_1 + \beta_{31}\eta_1\beta_{31}\eta_1 + \zeta_3\zeta_3 \qquad (5).$$

The Structural equations can be transformed into matrix form with ''0''coefficient in $\beta's\beta's$ are constraints in the model, and this becomes:

$$\eta = \beta\eta + \Gamma\xi + \zeta\eta = \beta\eta + \Gamma\xi + \zeta \qquad (6)$$

$$X = \lambda_x\xi + \delta\lambda_x\xi + \delta \qquad (7)$$

$$Y = \lambda_y\eta + \varepsilon\lambda_y\eta + \varepsilon \qquad (8)$$

Sequential Structural Equation Model

Considering the Structural and measurement equation model from equations (6), (7) and (8) with no intercepts and

with expected values zero. Independently for i = 1, ..., N

$$\eta = \beta\eta Y\Lambda + \Gamma\xi\,X + \zeta\eta = \beta\eta Y\Lambda + \Gamma\xi\,X + \zeta$$

$$X = \Lambda_X\xi + \delta X = \Lambda_X\xi + \delta \qquad (9)$$

$$Y = \Lambda_y\eta + \varepsilon Y = \Lambda_y\eta + \varepsilon$$

where $\xi\xi,\ \zeta\zeta,\ \delta\delta\ and\ \varepsilon and\ \epsilon$ are independent of each other with $V(\xi) = \Phi V(\xi) = \Phi,$

$V(\zeta) = \Psi V(\zeta) = \Psi, V(\delta) = \Theta_\delta V(\delta) = \Theta_\delta$ and $V(\epsilon) = \Theta_\epsilon V(\epsilon) = \Theta_\epsilon.$

$\beta,\ \Gamma,\ \Lambda_X\ and\ \Lambda_Y\beta,\ \Gamma,\ \Lambda_X\ and\ \Lambda_Y$ are matrices of constants, with the diagonal of β zero.

The equation (9) can be re-written as

$$X = \Lambda_x \xi + \delta X = \Lambda_x \xi + \delta$$

$$Y = \Lambda_Y (I - \beta)^{-1} \Gamma \xi + \Lambda_Y (I - \beta)^{-1} \zeta + \varepsilon$$

$$Y = \Lambda_Y (I - \beta)^{-1} \Gamma \xi + \Lambda_Y (I - \beta)^{-1} \zeta + \varepsilon \tag{10}.$$

Rewriting the first equation of model (1), the equation becomes

$$\eta_1 = \gamma_{11} \gamma_{21} \gamma_{31} \xi + \beta_{12} \beta_{32} \eta_1 + \beta_{31} \eta_1 + \zeta_1 \zeta_2 \zeta_3$$

$$\eta_1 = \gamma_{11} \gamma_{21} \gamma_{31} \xi + \beta_{12} \beta_{32} \eta_1 + \beta_{31} \eta_1 + \zeta_1 \zeta_2 \zeta_3 \tag{11}$$

If $\beta_{12} \beta_{32} = 1 \beta_{12} \beta_{32} = 1$, then (11) reduces to

$$\gamma \xi + \beta_{31} \eta_1 + \zeta_1 \zeta_2 \zeta_3 = 0 \qquad \gamma \xi + \beta_{31} \eta_1 + \zeta_1 \zeta_2 \zeta_3 = 0 \tag{12}$$

$$\gamma^2 \phi + \psi_1 + \beta_{31}^2 \psi_2 \quad \gamma^2 \phi + \psi_1 + \beta_{31}^2 \psi_2 = 0 \tag{13}.$$

The equation (13) implies that γ'^s and $\beta'^s \gamma'^s$ and β'^s has a covariance matrix.

$$\Sigma = \begin{pmatrix} \emptyset & \dfrac{\gamma\emptyset}{1 - \beta_{12}\beta_{21}} & \dfrac{\beta_{32}\gamma\emptyset}{1 - \beta_{12}\beta_{21}} \\ \dfrac{\gamma^2\emptyset}{(1-\beta_{21}\beta_{12})^2} + \dfrac{\psi_1}{(1-\beta_1\beta_2)^2} + \dfrac{\beta_{12}^2\psi_2}{(1-\beta_{12}\beta_{21})^2} & \dfrac{\beta_{32}\gamma^2\emptyset}{(1-\beta_1\beta_2)^2} + \dfrac{\beta_{12}\psi_1}{(1-\beta_1\beta_2)^2} + \dfrac{\beta_{21}\psi_2}{(1-\beta_{12}\beta_{21})^2} \\ & \dfrac{\beta_{21}^2\gamma^2\emptyset}{(1-\beta_{12}\beta_{21})^2} + \dfrac{\beta_2^2\psi_1}{(1-\beta_{12}\beta_{21})^2} + \dfrac{\psi_2}{(1-\beta_{12}\beta_{12})^2} \end{pmatrix}$$

The covariance matrix of equation (15) yields the following identifying equations

$$\phi = \sigma_{11}$$

$$\frac{\gamma\emptyset}{1 - \beta_1\beta_2} = \sigma_{12}$$

QUOTE

(14)

$$\frac{\gamma^2 \emptyset}{(1-\beta_1\beta_2)^2} + \frac{\psi_1}{(1-\beta_1\beta_2)^2} + \frac{\beta_1^2\psi_2}{(1-\beta_1\beta_2)^2} = \sigma_{22}$$

$$\frac{\beta_2\gamma^2\emptyset}{(1-\beta_1\beta_2)^2} + \frac{\beta_2\psi_1}{(1-\beta_1\beta_2)^2} + \frac{\beta_1\psi_2}{(1-\beta_1\beta_2)^2} = \sigma_{23} \frac{\beta_2\gamma^2\emptyset}{(1-\beta_1\beta_2)^2} + \frac{\beta_2\psi_1}{(1-\beta_1\beta_2)^2} + \frac{\beta_1\psi_2}{(1-\beta_1\beta_2)^2} = \sigma_{23}$$

$$\frac{\beta_2^2\gamma^2\emptyset}{(1-\beta_1\beta_2)^2} + \frac{\beta_2^2\psi_1}{(1-\beta_1\beta_2)^2} + \frac{\psi_2}{(1-\beta_1\beta_2)^2} = \sigma_{33} \frac{\beta_2^2\gamma^2\emptyset}{(1-\beta_1\beta_2)^2} + \frac{\beta_2^2\psi_1}{(1-\beta_1\beta_2)^2} + \frac{\psi_2}{(1-\beta_1\beta_2)^2} = \sigma_{33}$$

If $\gamma \neq 0 \ and \ \beta_{12}\beta_{21} \neq 1, \gamma \neq 0 \ and \ \beta_{12}\beta_{21} \neq 1$, the model has a unique solution:

$$\psi_2 = \frac{\sigma_{13}^2\sigma_{22}}{\sigma_{12}^2} - \frac{2\sigma_{13}\sigma_{23}}{\sigma_{12}} + \sigma_{33} \psi_2 = \frac{\sigma_{13}^2\sigma_{22}}{\sigma_{12}^2} - \frac{2\sigma_{13}\sigma_{23}}{\sigma_{12}} + \sigma_{33}$$

$$\psi_1 = -\frac{(\sigma_{13}^2\sigma_{22} - 2\sigma_{12}\sigma_{13}\sigma_{23} + \sigma_{12}^2\sigma_{33})(\sigma_{13}^2\sigma_{22} - 2\sigma_{12}\sigma_{13}\sigma_{23} + \sigma_{12}^2\sigma_{33} + \sigma_{11}(\sigma_{23}^2 - \sigma_{22}\sigma_{33}))}{\sigma_{11}(\sigma_{12}\sigma_{33} - \sigma_{13}\sigma_{23})^2}$$

$$\psi_1 = -\frac{(\sigma_{13}^2\sigma_{22} - 2\sigma_{12}\sigma_{13}\sigma_{23} + \sigma_{12}^2\sigma_{33})(\sigma_{13}^2\sigma_{22} - 2\sigma_{12}\sigma_{13}\sigma_{23} + \sigma_{12}^2\sigma_{33} + \sigma_{11}(\sigma_{23}^2 - \sigma_{22}\sigma_{33}))}{\sigma_{11}(\sigma_{12}\sigma_{33} - \sigma_{13}\sigma_{23})^2}$$

$$\phi = \sigma_{11}$$

$$\gamma = \frac{\sigma_{13}^2\sigma_{22} - 2\sigma_{12}\sigma_{13}\sigma_{23} + \sigma_{12}^2\sigma_{33}}{\sigma_{11}(\sigma_{12}\sigma_{33} - \sigma_{13}\sigma_{23})}$$

$$\beta_{12} = \frac{\sigma_{12}\sigma_{23} - \sigma_{13}\sigma_{22}}{\sigma_{12}\sigma_{33} - \sigma_{13}\sigma_{23}}$$

$$\beta_{21} = \frac{\sigma_{13}}{\sigma_{12}} \beta_{21} = \frac{\sigma_{13}}{\sigma_{12}}$$

The Explicit Solution

The explicit solution of the SSE model for this study can be deduced from figure (1) with one latent independent variable $(\xi), (\xi),$ three latent independent variables $(\eta\eta)$, four manifest independent variables $(X_4 - X_5)(X_4 - X_5)$ and nine manifest dependent variables $(Y_4 - Y_n).$ $(Y_4 - Y_n).$ where $\xi, X_i, \delta, \zeta_4 \zeta_n \xi, X_i, \delta, \zeta_4 \zeta_n$ and $\zeta_n \zeta_n$ are random variables with expected value zero,

$Var(\xi) =$
$\phi_{11}, Var(X_i) = \phi_{22}, Cov(\xi, X_i) = \phi_{12}, Var(\delta) = \theta_\delta, Var(\varepsilon) = \theta_{(\varepsilon)} Var(\zeta_1) = \psi_1$ and
$Var(\xi) =$
$\phi_{11}, Var(X_i) = \phi_{22}, Cov(\xi, X_i) = \phi_{12}, Var(\delta) = \theta_\delta, Var(\varepsilon) = \theta_{(\varepsilon)} Var(\zeta_1) = \psi_1$ and
are independent of each other and are independent of $\xi \xi$ and $X_i X_i$. The regression coefficients $\gamma_{11}, \gamma_{21} \gamma_{11}, \gamma_{21}$ and $\gamma_{31} \gamma_{31}$ are fixed constants. The model implies that $(X_i, Y_i)(X_i, Y_i)$ has a covariance matrix:

$$\sum = \begin{pmatrix} \phi_{11} + \theta_\delta & \phi_{12} & \gamma_{11}\phi_{11} + \gamma_{21}\phi_{21} & \gamma_{21}\phi_{11} + \gamma_{31}\phi_{12} \\ & \phi_{22} & \gamma_{11}\phi_{21} + \gamma_{12}\phi_{31} & \gamma_{21}\phi_{12} + \gamma_{31}\phi_{22} \\ & & \gamma_{11}^2\phi_{11} + \gamma_{21}^2\phi_{22} + 2\gamma_{11}\gamma_{21}\phi_{12} + \psi_1 & \gamma_{11}\gamma_{21}\phi_{11} + \gamma_{11}\gamma_{22}\phi_{12} + \gamma_{21}\gamma_{31}\phi_{12} + \gamma_{21}\gamma_{31}\phi_{22} \\ & & & \gamma_{21}^2\phi_{11} + \gamma_{31}^2\phi_{22} + 2\gamma_{21}\gamma_{31}\phi_{12} + \psi_2 \end{pmatrix}$$

$$\gamma_{11} = \frac{\sigma_{23}\sigma_{24} - \sigma_{22}\sigma_{34}}{-\sigma_{14}\sigma_{22} + \sigma_{24}} \gamma_{11} = \frac{\sigma_{23}\sigma_{24} - \sigma_{22}\sigma_{34}}{-\sigma_{14}\sigma_{22} + \sigma_{24}} \tag{15}$$

$$\gamma_{21} = \frac{\sigma_{14}\sigma_{23} - \sigma_{12}\sigma_{34}}{\sigma_{14}\sigma_{22} - \sigma_{12}\sigma_{24}} \gamma_{21} = \frac{\sigma_{14}\sigma_{23} - \sigma_{12}\sigma_{34}}{\sigma_{14}\sigma_{22} - \sigma_{12}\sigma_{24}} \tag{16}$$

$$\gamma_{31} = \frac{\sigma_{23}\sigma_{24} - \sigma_{22}\sigma_{34}}{-\sigma_{13}\sigma_{22} + \sigma_{12}\sigma_{23}} \tag{17.}$$

The model is identified in the parameter space where $\gamma_{11} = 0 \gamma_{11} = 0, \gamma_{21} = 0 \gamma_{21} = 0$ and $\gamma_{31} \gamma_{31} = 0 \gamma_{31}^2 \gamma_{21} = 0$

RESULTS

Descriptive Statistics of the First stopping and Second Stopping Time Data

The result gives the key descriptive statistics of some 16 variables of interest specifically it includes the mean, standard deviation, maximum, minimum and variance of the variable as it concerns the 250 and 400 subjects used. For the first stopping time exercise, it shows for example, that the subject has an average age of 60 years with a standard deviation of 8. 73333.

The youngest person is 42 years, while the oldest person is 82 years with a high skewness of 11.205. The descriptive statistics of the second stopping time also show the 16 variables of interest as it concerns 400 subjects used for the final stage. The youngest person is 42 years, and the oldest is 82 years, with a skewness of 10.344 and a standard deviation of 8.88386.

Results of the Description of the Demographic Variables

Sequential Structural equation modelling based on data from patient satisfaction and compliance to treatment was performed through LISREL 8.80 (Joreskog & Sorbom, 2005) based on 14 variables. The hypothesised model was divided into two stopping time of (N=250) and (N=400).

The first and second stopping time data showed that 75% are male and 25% female, which comprises 68.6% and 31.4% of males and females aged between 50 and 69 years. While second stopping time has 70% male and 30% female between the ages of 50-79years.

The education status of the patient revealed that 10.2 %, 18.6%, 51.4% and 17.5% had NCE, OND/HND, B.Sc. and others, respectively. Among the patients diagnosed with different diseases, 75% were male, and 25% were female.

The result on marital status showed that 67.5%, 17.7%, and 9.1% were married, divorced and separated, while 42.9%, 28.6% and 17.1% of the patients were Christian, Muslim and other religions, respectively.

Based on their education status, 8.2%, 15.3%, 56.5%, and 7.3% were NCE, OND/HND, BSc and other degrees, respectively, 75% and 25% of the patient diagnosed with different diseases were male and female.

Based on their marital status, 86.1%, 5.1% and 6.1% were married, divorced and separated. Also, 48.5%, 36.5% and 8.4% were Christian, Muslim and other religions, respectively.

Hypothesis Testing

Hypothesis 1: $H_0 H_0$ = there is no difference in the fit of the data for the first and second stopping time data

H_1 = there is difference in the fit of the data for the first and second stage of data

$$\chi^2 \chi^2 = \sum_{i=1}^{n} \frac{(/O_i - E_i/ - 0.5)^2}{E_i} \sum_{i=1}^{n} \frac{(/O_i - E_i/ - 0.5)^2}{E_i} = 24.5 \tag{17}$$

The $\chi^2\chi^2$ table with n-1 degree of freedom is 2-1 =1 degree of freedom and 5% level of significance gives $\chi^2_{n-1}\chi^2_{n-1}$ =3.84.

Since $\chi^2 > \chi^2_{n-1}\chi^2 > \chi^2_{n-1}$, hence we reject H_0H_0 and conclude that there is a difference in the fit of the first stopping time and second stopping time of the data collected.

Hypothesis 2: H_0H_0 = males are not the most vulnerable to diseases
H_1 = males are the most vulnerable to diseases

$. \chi^2 \chi^2 =$

$$\sum_{i=1}^{n} \frac{(/O_i - E_i/ - 0.5)^2)}{E_i} \sum_{i=1}^{n} \frac{(/O_i - E_i/ - 0.5)^2)}{E_i} = 99 \qquad (18)$$

Since $\chi^2 > \chi^2_{n-1}\chi^2 > \chi^2_{n-1}$, hence we reject H_0H_0 and conclude that males are the most vulnerable to diseases.

Hypothesis 3:

H_0H_0 = people of age 60 years and above are not vulnerable to disease
H_1 = people of age 60 years and above are the most vulnerable to diseases. Hence, we accept H_1 and conclude that people aged 60 years and above are the most vulnerable to diseases.

Table 1: Descriptive Statistics of Variables of Interest.

Variables	Mean	Standard Deviation	Minimum	Maximum	Variances	Skewness
AGE	57.9575	8.88386	42.00	82.00	78.923	.209
SEX	1.3425	.47514	1.00	2.00	.226	.666
EDU	3.5975	.95539	1.00	5.00	.913	-.991
TEMP	11.7000	1.72116	5.00	16.00	2.962	-.587
CFINF	7.5575	.54995	6.00	8.00	.302	-.729
OFINF	5.6825	.50232	4.00	6.00	.252	-1.198
SN	1.3575	.47986	1.00	2.00	.230	.597
SD	10.8000	3.77500	6.00	43.00	14.251	5.175

MOP	3.1225	3.05628	1.00	42.00	9.341	10.344
TDD	2.9700	1.71945	2.00	10.00	2.956	2.264
THV	2.0200	1.13703	1.00	4.00	1.293	.670
OHI	1.1650	.55094	1.00	9.00	.304	8.107
ECOSTA	2.0000	.51543	1.00	3.00	.266	.000
OCC	3.3425	1.63918	1.00	5.00	2.687	-.448
REL	1.3825	.66128	1.00	4.00	.437	1.850
MS	2.1425	.43895	2.00	4.00	.193	3.186

DISCUSSION

Estimates of Regression Coefficient by Latent and Manifest Variables

The rating differences observed suggest that the Second Stopping time data are more significant than the First Stopping time data. The higher value of the regression coefficient of the manifest variable (age) in the Second Stopping time shows that the patient's experience has a lot to do in the course of treatment.

The educational background of the patient also contributes a lot to their experience, which means the more educated a patient is, the more experienced the patient will be.

The results indicated that compliance is an effective way of having good health.

Test of Model Fit

The path estimates of the tested model showed the relationship to be in the expected direction for the second stopping time data, and the t-values indicated that all paths were significant.

However, the fit indices were less satisfactory for the first stopping time data, meaning that large sample size was required for an effective and good model fit.

The Normed Fit Index (NFI) and Comparative Fit Index (CFI) are more stable at the second stopping time and are therefore preferred fit indices.

In well-fitting Models, the NFI and CFI should be greater than .90 and ideally close to 1.0. in this analysis, for the Second Stopping Data, the NFI was .96 and CFI was .97, both in the acceptable range.

Fitted Models of the Latent Construct and its Manifest Variable

The result revealed an insignificant influence of PE on HS [$R^2 = 0.012$, F = 3.199, P >.05]. This indicates that PE contributed insignificantly to HS.

The independent contribution showed that PE contributed insignificantly to HS (β = -0.0509; t = -1.76; P>.05

The analysis of variance revealed that there is an insignificant interaction effect of PE on HS [F = 3.199, P>.05]. The relationship between PE and QC revealed significant influence of PE on QC [R^2=0.006, F = 1.5069, P >.05]. This indicates that PE contributed significantly (50%) to QC.

The insignificant values for the first stopping time data insignificant values are due to the sample size. But for the second stopping time data, all paths are significant due to an improvement in the sample size.

CONCLUSION

The study concluded that the fitted model and the Goodness of fit model of the Second stopping time data of the Patient Satisfaction and Compliance to Treatment is better than the first Stopping time data based on the minimum values of the AIC (Akaike Information Criterion), BIC (Bayesian Information Criterion) and the residual values of the model.

The procedure of sequential stopping time for hypothesised relationship shows that SSEM is useful in driving quality patient health care and satisfaction. The study also established that demographic variables are significant to patient experience. The outcome measure of the quality of care, which complies with treatment, is very important to maintain a perfect health condition.

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