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## Predicting adolescents' quality of life using discriminat analysis

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### ABSTRACT

Psychosocial functioning and depression is associated with a wide range of impacts on adolescents' quality of life. In Nigeria, studies assessing the importance of psychosocial functioning and depression in distinguishing between the categories of quality of life and classifying adolescents into these categories have been limited in literature. This study investigated the domains of psychosocial functioning and child depression that significantly distinguish between the categories of quality of life and also classify into these groups. Data for 2019 adolescents aged 10-19 were obtained in a Benue State cross-sectional study. Preliminary analyses on their socio-demographic information were performed using descriptive statistics. Differences between categories (groups) of Quality of Life (low, moderate and excellent) on the basis of the attributes of the adolescents in terms of their psychosocial functioning and depression status, indicating which attributes contribute most to group separation were investigated using discriminant analysis. Chi-square analysis was used to assess the association between socio-demographic characteristics of the adolescents and levels of Quality of Life. The inter-relationships between the domains of Quality of Life and the adolescents age, position in the family, domains of psychosocial functioning and child depression status was assessed using correlation analysis. Prosocial behaviour ( $F=82.41$ ,  $p<0.001$ ) and ineffectiveness ( $F=31.19$ ,  $p<0.001$ ) were strong significant discriminating variables that predict adolescents' levels of total quality of life. Adolescent's psychosocial functioning and depression status relates with their physical health, psychological health, social relationship, environmental health and total quality of life.

**Keywords:** Adolescents, Psychosocial Functioning, Quality of Life, Child Depression, Discriminant Analysis

## **1. INTRODUCTION**

The terms ‘quality of life’ and ‘well-being’ are often used to measure different realms of an individual’s satisfaction with existence and experience in an attempt to understand how social, individual, and emotional factors influence behaviour and lifestyle.<sup>1</sup> The World Health Organization’s Quality of life (WHOQoL) assessment defines quality of life as “the individuals’ perception of their position in life in the context of the culture in which they live and in relation to their goals, expectations, standards, and concerns”<sup>2(p.3)</sup> Adolescence is a time of opportunity to prepare for healthy and productive adulthood, and to reduce the likelihood of problems in the future. It is also a time of risk when health problems that have serious immediate consequences can occur or when problem behaviours that could have serious adverse effects on health in the future are initiated.

Adolescents have challenges; in particular, health care for this age group tends not to be receiving priority attention in Nigeria such that many adolescents are affected about matters concerning their health and survival. There is high level of ignorance about authentic problems of adolescents in society and how they feel about their quality of life.<sup>3</sup> If life is not satisfactory for adolescents, they may engage in many dangerous activities which they will take to adulthood when it is difficult to change. According to UNICEF, of the 22.3% that are adolescents in Nigeria, 42.2% are left under inadequate care.<sup>3</sup> Majority of Nigerian parents of these adolescents are poor with 71% of the population living on less than one dollar a day and 92% on less than two dollars a day.<sup>4</sup> The weakened Public Health Care (PHC) system with low coverage of key interventions has resulted in the persistence of high disease burden and mortality rate; HIV/AIDS remains a major issue of concern among children and adolescents who are left not catered for in Nigeria with a prevalence rate of 4.4%.<sup>4</sup> Majority of adolescents are still walking on the streets and national income is getting lower where these adolescents could have helped if they are helped to grow well into responsible adults. With a Gross national income (GNI) per capita of 2,069 dollars, Nigeria lags behind countries like Equatorial Guinea (17,608 dollars), Botswana (13,049 dollars) and Gabon (12,249 dollars).<sup>5</sup> Some adolescents may be more vulnerable to distress than others and as such the impact on their quality of life may also be understudied.<sup>6</sup> Nafarious youthful activities are widespread in Nigeria which has created a lot of concern to the society, government and other stake holders.<sup>7</sup>

Adolescents represent one fifth of the global population; healthy, competent adolescents who enter the work force can raise the economic productivity of a country.<sup>8</sup> There is growing recognition of the economic benefits of investing in the healthy development of adolescents’ quality of life, and the economic costs of not doing so. The evident high level of ignorance about authentic problems of adolescents in society justifies that proper attention be paid to detect and identify vividly their level of quality of life and the peculiar problems relating to low quality of life of this population group. “Understanding adolescent perception of health issues and well being is of vital importance to understanding how adolescents engage with their health and quality of life and this can result in both short-term and long-term population health gains if detected early enough”.<sup>9(p.6)</sup> There has been an increasing awareness of the need to pay special focus on the adolescent’s health and quality of life.<sup>10</sup> Investing in the quality of life of adolescents earlier helps prevent the estimated 1.4 million deaths that occur globally every year due to road traffic injuries, violence, suicide, HIV and pregnancy related causes.<sup>8</sup> Predicting and detecting their quality of life with the help of this study can fill the

gaps in literature and increase adolescents' hope for the future thereby reducing deaths, violence, suicide, HIV and other related effects of low quality of life. These findings could be taken into account in policy making to provide better and more specific supports and interventions for them which will reduce juvenile delinquency and as a result create better adulthood and high life expectancy.<sup>11</sup>

## **2. METHODS**

This present study was carried out among secondary schools in Benue state, Nigeria. The study was a state wide survey conducted among students in Benue state, Nigeria. Data were collected from different secondary schools in Benue state. Students with age range of 10-19 years in Benue state secondary schools were recruited into the study. In the selected schools, classes were randomly selected and every student who voluntarily consented and signed the consent form after reading carefully what the content entails was given a self administered questionnaire written in English language to independently fill.

### **Ethical approval**

For this study, apart from the approvals gotten from all the schools that were involved in the study and the school principals standing as guardians for the students who participated in the study, ethical approval was gotten from the University of Ibadan Institutional Review Board with the number **UI/EC/12/0235**. It was also gotten from the Benue State Ministry of Health Ethical Committee with reference number **MED/216/VOL.1/56**.

### **Research instruments**

*Socio-Demographic Questionnaire:* Socio-demographic characteristics measured include adolescent's age, gender, education, area of residence, ethnic group, family type, family status, and so on. Adolescent's information about his/her parents was also collected.

*Strengths and Difficulties Questionnaire (SDQ):* A self-rated Strengths and Difficulties Questionnaire (SDQ) was used to assess adolescent's psychosocial outcomes. The SDQ (an established instrument) asks 25 questions.<sup>12</sup> The questions are rated on a three-point likert scale that ranges from "Not true, somewhat true and certainly true". This covers five domains: emotional symptoms, conduct problems, hyperactivity, peer problems and prosocial behaviours. For each of the five domains, the scores could range from 0 to 10. The summation of the emotional symptoms, conduct problems, hyperactivity, peer problems and prosocial behaviours were then computed to yield the total difficulties per participant which could range from 0 to 50. A higher score indicates greater difficulty.

*Children's Depression Inventory (CDI) Questionnaire:* The Children's depression inventory (CDI) questionnaire also asks 27 questions rated on a three-point likert scale (ranging from "Not at all, sometimes and always") that comprises four domains which are negative mood/physical symptom, negative self esteem, ineffectiveness, and interpersonal problems.<sup>13</sup>

*Quality of Life Questionnaire:* The adapted WHO Quality of life-BREF was also used to assess adolescents' quality of life. It has 24 items rated on a three-point likert scale divided

between four domains: physical health, psychological, social relationship and environmental domain with rates that range from “Not at all, sometimes and always”.

### **Data management and analysis**

*Data Management:* Having removed all possible identifiers, socio-demographic characteristics like age, sex, area of residence, tribe, family type, family status, position in the family, number of father’s children, father highest level of education, father’s occupation, mother highest level of education and mother’s occupation were obtained from the questionnaires. Outcomes of the domains of the adolescents’ quality of life: physical health, psychological health, social relationship and environmental health; domains of Child Depression Invention (CDI): negative mood symptom, negative self esteem, ineffectiveness, interpersonal problems and domains of Strength and Difficulty Questionnaire (SDQ): emotional symptoms, conduct problems, hyperactivity, peer problem, prosocial behavior were also obtained.

*Missing and Out of Range Data:* Data on a total of 2202 adolescents were initially obtained. However, it was observed that 139 (6.3%) of the adolescents were not up to 10 years of age and 44 (2%) were more than 19 years old. Data on these set of adolescents were completely deleted from the dataset. Also data with missing values were also excluded from the dataset. This resulted in a final total number of 2019 adolescents whose data were eventually used for this study.

*Transformation of Child Depression Invention (CDI) Scores:* T-scores were calculated for the raw scores of all the domains of Child Depression Invention (CDI) per participant to transform the total raw scores for each domain to T-scores. This was done to standardize the raw scores across the adolescents in order to allow them to be ranked fairly with CDI T-score of 65 or above identifying potentially clinically depressed individuals.

$$\text{T-score} = 50 + 10 (x - \text{mean}) / (\text{standard deviation})$$

where x is the raw score of the domains of child depression invention.

*Transformation of quality of life Scores:* Using the quality of life section of the questionnaire each raw score summation for each domain was transformed to a 0-100 scale using WHO Quality of life-BREF (2005) formula below

$$\text{Transformed score} = (\text{Actual raw score} - \text{Lowest possible raw score}) / (\text{Possible score range}) \times 100$$

where “Actual raw score” is the participants composite score, “Lowest possible raw score” is the lowest possible composite score and “Possible score range” is the difference between the maximum possible composite score and the lowest possible composite score. The transformed scale for the total quality of life was calculated by summing the transformed scores of the four domains and dividing by four.

### **Data analysis**

Descriptive statistics, including frequencies, mean and standard deviation were calculated for socio-demographic characteristics, the domains of Strength and Difficulties

Questionnaire (SDQ) and the domains of Children's Depression Inventory (CDI) while chi square statistic was used to check for the significance of the relationship between socio-demographic characteristics of the adolescents and their quality of life.

Correlation analysis was also used to check for the significance of the interrelationships between the domains of Quality of Life with the domains of Strengths and Difficulties Questionnaire (SDQ), the domains of Quality of Life with the domains of Children's Depression Inventory (CDI) and the domains of quality of life with age, position in family and number of father's children.

*Discriminant Analysis:* Discriminant analysis was used to predict the adolescents' quality of life using the metric socio-demographic variable (age, number of father's children and position in the family), Strengths and Difficulties Questionnaire (SDQ) domain (emotional symptoms, conduct problems, hyperactivity, peer problem, prosocial behaviour) scores and Children's Depression Inventory (CDI) domain (negative mood symptom, negative self esteem, ineffectiveness, interpersonal problems) scores as predictor variables. The domains of quality of life: physical health, psychological health, social relationship, environmental health and total quality of life were categorized into low, moderate and excellent and were used as the outcome variables.

A discriminant score is a weighted linear combination (sum) of the discriminating variables. The maximum number of discriminant functions is the number of groups minus one. For this project, since there are three groups or categories of quality of life (low, moderate and excellent), two discriminant functions were produced. Function 1 distinguished low from moderate and excellent and function 2 distinguish between moderate and excellent. Discriminant analysis was performed using SPSS version 18. Group statistics table was used to examine whether there are significant differences between groups on each of the dependent variables (F's) to check if it is worthwhile to continue with the analysis and the predictive variable with the highest 'F' showing to be the strongest discriminator among the others. The assumption of variance-co-variance matrices was also checked using log determinant and Box M's table to make sure it is not violated. Eigen values were assessed to be large in order to be sure that the discriminant functions were strong ones. Wilks' lambda was used to assess the significance of the discriminant functions with associated Chi-square statistic testing the null hypothesis that the function has no discriminating ability at alpha being 0.05. Fisher's linear discriminant function was developed as a predictive model classifying new cases. (For each case, the response for each variable is multiplied by the coefficient and the products are added for each category of the outcome variable). An adolescent will be predicted to be in the group that has the highest sum. Classification Table was used to check the percentage of correct prediction using the existing data of the adolescents as a testing tool on the predictive model built by the analysis.

### **3. RESULTS**

#### **Descriptive statistics and the relationship of socio-demographic characteristics of the adolescents with their respective quality of life**

In table 1, the total number of the studied population was 2019: 54.3% were male while 45.7% were female. The mean age of the adolescents was 14.7 years. The ethnic composition of the adolescents was Tiv (57.8%), Idoma (7.2%), Igede (19.1%) and others (15.9%). About

a half of these adolescents live in rural area and more than a half of them were from monogamous family. The table showed that 11.6% of the adolescents' fathers have no formal education.

Table 2 shows that gender had no bearing with quality of life. But there was a high significance between the other socio-demographic characteristics and quality of life. The table shows that the proportion of the adolescents with low quality of life in the rural area (22.4%) was significantly higher than those in the urban areas (9.1%) ( $\chi^2 = 87.99$ , d.f. = 2, Sig. (2 -sided) <0.0001) while the proportion of the adolescents with low quality of life who were from monogamous homes (13.5%) was significantly lower than those from polygamous homes (19.5%) ( $\chi^2 = 16.71$ , d.f. = 2, Sig. (2 -sided) <0.0001). Also, the proportion of the adolescents with low quality of life whose fathers had no formal education (36.6%) was significantly higher than those whose fathers had tertiary education (5.7%) ( $\chi^2 = 163.35$ , d.f. = 8, Sig. (2 -sided) <0.0001).

### **Inter-relationships of included measures**

Table 3 shows the inter-relationships between the domains of Quality of Life and the domains of Strength and Difficulties Questionnaire (SDQ). Higher scores on all the domains of QoL (PHD, PSD, SRD and END) were significantly correlated with higher scores on one another. On the other hand, higher PHD scores were significantly correlated with lower scores on all the domains of SDQ (ESS, CPS, HAS, PPS) except PSS where higher scores on PHD were significantly correlated ( $r = 0.30$ ,  $p < 0.001$ ) with higher PSS scores. Also, higher PSD scores were significantly correlated with lower scores on all the domains of SDQ except PSS where higher scores on PSD were significantly correlated ( $r = 0.29$ ,  $p < 0.001$ ) with higher PSS scores. In addition, while higher scores on SRD were significantly correlated with higher scores on both CPS and PSS, scores on the SRD were not significantly correlated with both HAS and PPS domains of the SDQ. Furthermore, higher scores on all the domains of SDQ were significantly correlated with higher scores on one another except PSS where higher scores on the other domains of SDQ (CPS, HAS and PPS) were correlated with lower scores on PSS.

Table 4 shows the inter-relationships between the domains of Quality of Life and the domains of Children's Depression Inventory (CDI). Higher scores on all the domains of QoL (PHD, PSD, SRD and END) were significantly correlated with higher scores on one another. On the other hand, higher scores on PHD, PSD and END were significantly correlated with lower scores on all the domains of CDI (NMS, NSE, INS and IPP) with ineffectiveness significantly having the highest strength of correlation ( $r = -0.23$ ,  $p < 0.001$ ). Also, while higher SRD scores were significantly correlated ( $r = -0.06$ ,  $p < 0.001$ ), ( $r = -0.07$ ,  $p < 0.001$ ) with lower scores on both INS and IPP respectively, scores on the SRD were not significantly correlated with both NMS and NSE domains of the CDI. Furthermore, higher scores on all the domains of CDI were significantly correlated with higher scores on one another.

Table 5 shows the inter-relationships between the domains of Quality of Life and 'age, number of father's children and position in the family'. Higher scores on all the domains of QoL (PHD, PSD, SRD and END) were significantly correlated with higher scores on one another. On the other hand, higher PHD scores were significantly correlated with lower NFC and PTF but with higher AGE ( $r = 0.07$ ,  $p < 0.001$ ). Also while higher PSD scores were significantly correlated with lower NFC and PTF, scores on the PSD were not significantly

correlated with AGE. Although AGE is not significantly correlated with PTF, higher NFC scores were significantly correlated with higher PTF scores

### **Assessing Discriminators of Adolescents' Physical Health**

Using the Domains of (SDQ), hyperactivity was found to be the strongest significant discriminator variable of the adolescents' level of physical health ( $F = 67.41$ ,  $p < 0.001$ ) while age and position in the family were not significant discriminators. The discriminant function that distinguished low physical health from moderate and excellent physical health (function 1), was found to significantly have very high discriminating ability ( $W = 0.89$ ,  $\chi^2 = 224.58$ ,  $p < 0.001$ ). But the discriminant function that distinguished between moderate and excellent physical health (function 2), was found not to have significant discriminating ability. The three predictive models (low, moderate and excellent) for classifying new cases were also shown. Using the existing data on the adolescents' level of physical health as a testing tool on the predictive models, it was observed that 60.6% of the adolescents who actually had low physical health were correctly predicted to have low physical health, 23.1% of the adolescents who had moderate physical health were correctly predicted and 69.5% of those with excellent physical health were correctly predicted to have excellent physical health (Table 6).

Table 7 shows the assessment of the discriminators of the adolescents' levels of physical health using the domains of (CDI). Ineffectiveness was found to be the strongest significant discriminator variable of the adolescents' level of physical health ( $F = 44.2$ ,  $p < 0.001$ ) while age and position in the family were not significant discriminators. The discriminant function that distinguished low physical health from moderate and excellent physical health (function 1), was found to significantly have very high discriminating ability ( $W = 0.94$ ,  $\chi^2 = 122.07$ ,  $p < 0.001$ ). But the discriminant function that distinguished between moderate and excellent physical health (function 2), was found not to have significant discriminating ability. The three predictive models (low, moderate and excellent) for classifying new cases were also shown. Using the existing data on the adolescents' level of physical health as a testing tool on the predictive models, it was observed that 44.4% of the adolescents who actually had low physical health were correctly predicted to have low physical health, 28.3% of the adolescents who had moderate physical health were correctly predicted and 64% of those with excellent physical health were correctly predicted to have excellent physical health.

### **Assessing Discriminators of Adolescents' Psychological Health**

Prosocial symptom was found to be the strongest significant discriminator variable of the adolescents' level of psychological health ( $F = 59.98$ ,  $p < 0.001$ ) while conduct problem was not a significant discriminator, using the domains of (SDQ). The discriminant function that distinguished low psychological health from moderate and excellent psychological health (function 1), was found to significantly have very high discriminating ability ( $W = 0.91$ ,  $\chi^2 = 166.46$ ,  $p < 0.001$ ). But the discriminant function that distinguished between moderate and excellent psychological health (function 2), was found not to have significant discriminating ability. The three predictive models (low, moderate and excellent) for classifying new cases were also shown. Using the existing data on the adolescents' level of psychological health as a testing tool on the predictive models, it was observed that 59.8% of the adolescents who actually had low psychological health were correctly predicted to have low psychological

health, 21.2% of the adolescents who had moderate psychological health were correctly predicted and 64.7% of those with excellent psychological health were correctly predicted to have excellent psychological health (Table 8).

Table 9 shows the assessment of the discriminators of the adolescents' levels of psychological health using the domains of (CDI). Negative mood symptom was found to be the strongest significant discriminator variable of the adolescents' level of psychological health ( $F = 21.86$ ,  $p < 0.001$ ). The discriminant function that distinguished low psychological health from moderate and excellent psychological health (function 1), was found to significantly have very high discriminating ability ( $W = 0.96$ ,  $\chi^2 = 68.19$ ,  $p < 0.001$ ). Also, the discriminant function that distinguished between moderate and excellent psychological health (function 2), was found to significantly have very high discriminating ability ( $W = 0.99$ ,  $\chi^2 = 13.97$ ,  $p = 0.03$ ). The three predictive models (low, moderate and excellent) for classifying new cases were also shown. Using the existing data on the adolescents' level of psychological health as a testing tool on the predictive models, it was observed that 47.6% of the adolescents who actually had low psychological health were correctly predicted to have low psychological health, 29.3% of the adolescents who had moderate psychological health were correctly predicted and 59.3% of those with excellent psychological health were correctly predicted to have excellent psychological health.

### **Assessing Discriminators of Adolescents' Social Relationship**

Prosocial symptom was found to be the strongest of the three significant discriminator variables of the adolescents' level of social relationship ( $F = 24.07$ ,  $p < 0.001$ ), using the domains of (SDQ). The discriminant function that distinguished low social relationship from moderate and excellent social relationship (function 1), was found to significantly have very high discriminating ability ( $W = 0.96$ ,  $\chi^2 = 71.70$ ,  $p < 0.001$ ). But the discriminant function that distinguished between moderate and excellent social relationship (function 2), was found not to have significant discriminating ability. The three predictive models (low, moderate and excellent) for classifying new cases were also shown. Using the existing data on the adolescents' level of social relationship as a testing tool on the predictive models, it was observed that 47.5% of the adolescents who actually had low social relationship were correctly predicted to have low social relationship, 24.3% of the adolescents who had moderate social relationship were correctly predicted and 57.1% of those with excellent social relationship were correctly predicted to have excellent social relationship (Table 10).

Table 11 shows the assessment of the discriminators of the adolescents' levels of social relationship using the domains of (CDI). Interpersonal problem was found to be the strongest of the three significant discriminator variables of the adolescents' level of social relationship ( $F = 6.76$ ,  $p < 0.001$ ). The discriminant function that distinguished low social relationship from moderate and excellent social relationship (function 1), was found to significantly have very high discriminating ability ( $W = 0.98$ ,  $\chi^2 = 46.54$ ,  $p < 0.001$ ). Also, the discriminant function that distinguished between moderate and excellent social relationship (function 2), was found to significantly have very high discriminating ability ( $W = 0.99$ ,  $\chi^2 = 14.27$ ,  $p = 0.03$ ). The three predictive models (low, moderate and excellent) for classifying new cases were also shown. Using the existing data on the adolescents' level of social relationship as a testing tool on the predictive models, it was observed that 48.3% of the adolescents who actually had low social relationship were correctly predicted to have low social relationship, 27.9% of the adolescents who had moderate social relationship were correctly predicted and 48.7% of those

with excellent social relationship were correctly predicted to have excellent social relationship.

### **Assessing Discriminators of Adolescents' Environmental Health**

Prosocial symptom was found to be the strongest significant discriminator variable of the adolescents' level of environmental health ( $F = 67.56$ ,  $p < 0.001$ ) while position in the family was not a significant discriminator using the domains of (SDQ). The discriminant function that distinguished low environmental health from moderate and excellent environmental health (function 1), was found to significantly have very high discriminating ability ( $W = 0.88$ ,  $\chi^2 = 242.30$ ,  $p < 0.001$ ). Also, the discriminant function that distinguished between moderate and excellent environmental health (function 2), was found to significantly have very high discriminating ability ( $W = 0.98$ ,  $\chi^2 = 38.98$ ,  $p < 0.001$ ). The three predictive models (low, moderate and excellent) for classifying new cases were also shown. Using the existing data on the adolescents' level of environmental health as a testing tool on the predictive models, it was observed that 60.4% of the adolescents who actually had low environmental health were correctly predicted to have low environmental health, 31% of the adolescents who had moderate environmental health were correctly predicted and 63.3% of those with excellent environmental health were correctly predicted to have excellent environmental health (Table 12).

Table 13 shows the assessment of the discriminators of the adolescents' levels of environmental health using the domains of (CDI). Negative mood symptom was found to be the strongest significant discriminator variable of the adolescents' level of environmental health ( $F = 21.36$ ,  $p < 0.001$ ) while position in the family was not a significant discriminator. The discriminant function that distinguished low environmental health from moderate and excellent environmental health (function 1), was found to significantly have very high discriminating ability ( $W = 0.95$ ,  $\chi^2 = 104.64$ ,  $p < 0.001$ ). Also, the discriminant function that distinguished between moderate and excellent environmental health (function 2), was found to significantly have very high discriminating ability ( $W = 0.98$ ,  $\chi^2 = 45.43$ ,  $p < 0.001$ ). The three predictive models (low, moderate and excellent) for classifying new cases were also shown. Using the existing data on the adolescents' level of environmental health as a testing tool on the predictive models, it was observed that 41.9% of the adolescents who actually had low environmental health were correctly predicted to have low environmental health, 34.2% of the adolescents who had moderate environmental health were correctly predicted and 60.6% of those with excellent environmental health were correctly predicted to have excellent environmental health.

### **Assessing Discriminators of Adolescents' Quality of Life**

Prosocial symptom was found to be the strongest significant discriminator variable of the adolescents' level of Quality of Life ( $F = 82.41$ ,  $p < 0.001$ ), using the domains of (SDQ). The discriminant function that distinguished low Quality of Life from moderate and excellent Quality of Life (function 1), was found to significantly have very high discriminating ability ( $W = 0.86$ ,  $\chi^2 = 284.84$ ,  $p < 0.001$ ). Also, the discriminant function that distinguished between moderate and excellent Quality of Life (function 2), was found to significantly have very high discriminating ability ( $W = 0.98$ ,  $\chi^2 = 45.75$ ,  $p < 0.001$ ). The three predictive models (low, moderate and excellent) for classifying new cases were also shown. Using the existing data on

the adolescents' level of Quality of Life as a testing tool on the predictive models, it was observed that 57.2% of the adolescents who actually had low Quality of Life were correctly predicted to have low Quality of Life, 30.8% of the adolescents who had moderate Quality of Life were correctly predicted and 66.2% of those with excellent Quality of Life were correctly predicted to have excellent Quality of Life (Table 14).

Table 15 shows the assessment of the discriminators of the adolescents' levels of Quality of Life using the domains of (CDI). Ineffectiveness was found to be the strongest significant discriminator variable of the adolescents' level of Quality of Life ( $F = 31.19$ ,  $p < 0.001$ ). The discriminant function that distinguished low Quality of Life from moderate and excellent Quality of Life (function 1), was found to significantly have very high discriminating ability ( $W = 0.93$ ,  $\chi^2 = 134.30$ ,  $p < 0.001$ ). Also, the discriminant function that distinguished between moderate and excellent Quality of Life (function 2), was found to significantly have very high discriminating ability ( $W = 0.98$ ,  $\chi^2 = 40.66$ ,  $p < 0.001$ ). The three predictive models (low, moderate and excellent) for classifying new cases were also shown. Using the existing data on the adolescents' level of Quality of Life as a testing tool on the predictive models, it was observed that 42.8% of the adolescents who actually had low Quality of Life were correctly predicted to have low Quality of Life, 34.5% of the adolescents who had moderate Quality of Life were correctly predicted and 60.5% of those with excellent Quality of Life were correctly predicted to have excellent Quality of Life.

#### **4. DISCUSSION**

This study investigated the domains of psychosocial functioning and child depression that significantly distinguish between the categories of quality of life and also classify into these groups. The rural areas had more adolescents with low quality of life than the urban areas. These adolescents in the urban have the benefit of all the luxuries, education, technology and developments of urban life compared to the rural communities. This finding was consistent with the UNICEF, 2013 report of more adolescents having improved quality of life in the urban areas in Nigeria.<sup>3</sup> Also WHOQOL-BREF reported worse conditions of quality of life in the rural areas than in the urban.<sup>14</sup>

The case of a higher percentage of the adolescents who were from polygamous families having low quality of life was not a coincident. This can be well understood because these subjects would have to share the family income with every member of the polygamous family which would not be so in a monogamous family where there would be fewer members, thereby affecting their quality of life.

Also, the proportion of the adolescents with low quality of life whose fathers had no formal education was significantly higher than those whose fathers had tertiary education. This is also in collaboration with literature. Studies have shown that family income and educational attainment are measures that have been found to influence adolescents' life opportunities.<sup>15</sup>

In this investigation, it also appeared that higher levels of the domains of quality of life was correlated with lower levels of the domains of Children's Depression Inventory (CDI) with ineffectiveness significantly having the highest strength of correlation. In life, good quality of life is actually associated with low traces of negative mood, negative self esteem, ineffectiveness and interpersonal problems. This also agrees with what was found in literature

that depressed adolescents exhibit significant psychosocial deficits in adulthood, including early childbearing, social difficulties, lowered life satisfaction, and reduced global functioning.<sup>16-17</sup>

The study also revealed that there is correlation between the domains of Quality of Life and the adolescents' psychosocial functioning with prosocial behaviour being the domain of SDQ with the highest strength of relationship. This finding agrees with what was seen in literature that disadvantaged social statuses are generally associated with high levels of distress and high rates of disorder leading to low quality of life which means that advantaged social statuses will lead to high quality of life.<sup>18-19</sup>

Once the discriminating variables are identified, more interventions can be created to help increase the quality of life of adolescents. Among the (socio-economic) independent variables selected in this study as the discriminating variables that distinguish between categories of the domains of quality of life, position in the family does not seem to have much effect; concerning adolescents' physical health, it was found out that both hyperactivity and ineffectiveness are strong discriminating variables that predict the adolescents' levels of physical health while adolescents' position in the family does not determine their physical health. Active adolescents portray that they are healthy physically and can be very useful in the society unlike ineffective ones. This agrees with literature that active and effective adolescents who enter the work force can raise the economic productivity of a country.<sup>8</sup>

On the other hand, relating to adolescents' psychological health, it was found out that both prosocial behaviour and negative mood symptoms are strong discriminating variables that distinguish between the adolescents' levels of psychological health which was also in accordance to literature that disadvantaged social statuses are generally associated with high levels of distress and high rates of psychological disorder.<sup>18</sup> An adolescent with positive mood will tend to relate healthily in the social environment thereby boosting such individual's psychological health.

Furthermore, it was found that prosocial behaviour and Interpersonal problems are the strong discriminating variables that predict adolescents' level of social relationship. A prosocial adolescent will tend to relate more in the society, take part in different activities along with others around him/her, be outgoing and be concerned with outer affairs while an adolescent with interpersonal problem may end up being an introvert. This also relates with literature that a person's social and environmental health as well as quality of life is dependent on the exogenous (objective) facts of his or her life and the endogenous (subjective) perception he or she has of these factors and of himself or herself.<sup>20</sup>

In addition, concerning the adolescents' environmental health, it was found that prosocial behaviour and negative mood symptoms are the strong discriminating variables that help discriminate between the adolescents' levels of environmental health. A prosocial adolescent with positive mood will tend to relate more actively and healthily in the environment thereby boosting such individual's environmental health. This was in agreement with what was in literature that adolescent experimentation and environmental exploration is integral to the development of a healthy and individuated sense of self. It plays a vital role in the development of human capital and is linked with an individual's well-being and opportunities for better living.<sup>21-22</sup>

Lastly, concerning the adolescents' total quality of life; it was found out that prosocial behaviour and ineffectiveness are strong discriminating variables that help predict the adolescents' levels of total quality of life. Active or effective and prosocial adolescents could

go extra miles achieving a lot in life and having life full of satisfaction. This agrees also with literature that active and effective adolescents who enter the work force can raise the economic productivity of a country.<sup>8</sup>

All the discriminating variables help predict adolescents' quality of life but prosocial behaviour, hyperactivity, ineffectiveness, negative and interpersonal problems are the basic and strong discriminating variables that distinguish the levels of the domains of the adolescents' quality of life. If these variables are assessed in adolescents earlier enough in life, their quality of life may be predicted and detected in their adolescent stage and proper intervention would be put in place for them to give them hope about their future and reduce their anxiety which at times make them stray away, becoming loathsome to the society and country at large. Adolescent's quality of life come from a combination of individual, family, peer, and community factors of risk and resiliency. Owing to the unique confluence of biological, psychological, environmental and social forces, adolescence is often a stressful period of life. Adolescents in the rural areas suffer more from low quality of life than those from the urban areas. Adolescents psychosocial functioning and children's depression inventory can be monitored in order to improve adolescents' quality of life. Illiterate parents are another challenge facing adolescents in the rural areas, which would possibly reduce those adolescents' life opportunities since their motivators are not much enlightened educationally. It is obvious that an adolescent's psychosocial functioning and depression status relates with their physical health, psychological health, social relationship, environmental health and total quality of life in one way or the other. Having all these information about adolescents, discriminant analysis is a good technique in predicting adolescent's quality of life in that prompt intervention programme could be put in place to maintaining or improving adolescents' quality of life as the case may be.

Most rural areas are being faced with increase in the number adolescents who are deprived of basic services which they need to survive and grow up well, in particular, food, education and life skills, health care, clean water and sanitation, protection from situations of abuse, denial of their basic liberties, and poverty, all these have strained their capacity to respond to the psychological, social, emotional and environmental needs. Having all these information about adolescents, prompt intervention programme should be put in place to maintaining or improving adolescents' quality of life as the case may be.

An important consideration in intervention strategies for these adolescents is their psychosocial functioning. For instance, psychosocial domains found to be related to adolescents' health and quality of life include self-esteem and anxiety, negative mood, ineffectiveness and depression which may pose a serious threat to socio-economic development, peace and security of a region if not addressed comprehensively. Conceptual framework for psychosocial support which will provide common understanding of the psychosocial challenges facing adolescents and the interventions that are required to ensure psychosocial wellbeing should also be put in place.

## **5. IMPLICATIONS FOR BEHAVIOURAL HEALTH**

The Agency for Healthcare Research and Quality defines priority populations as set of people with health care needs requiring special attention to reduce disparity in health care among these set of people.<sup>23</sup> Health care disparities refer to differences in health coverage,

access to care and quality of life between groups of people.<sup>24</sup> Ethnic minority children, adolescents and women, low income earners, those living in rural areas and people with low quality of life should be included in this priority. This research develops a more understanding of the specific set of people faced with some sort of disorders which will inform policy and practice changes to increase access and a necessary condition for improving integration of care and quality of life which will positively affect behavioural health.

While behavioural health disorders primarily affect adults, they also are prevalent among children and adolescents.<sup>25-30</sup> Behavioral health disorders can also have a profound social impact. Individuals with behavioral health conditions are more likely to live in poverty, have a lower socioeconomic status, and lower educational attainment.<sup>26</sup> For example, behavioral health conditions can raise absenteeism at school or work and hinder worker productivity resulting in reduced income.

Tracking disparities should include provisions to enhance data collection related to disparities, analysis and reporting 'access to improvement' data. Understanding adolescent perception of health issues and well being is of vital importance to understanding how adolescents engage with their health and quality of life and this can result in both short-term and long-term population health gains. Creating surveillance systems to understand demographic and behavioural health conditions of adolescents is a major step in addressing future public health problems.

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## **Appendix**

Table Abbreviations

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<b>Abbreviation</b>	<b>Full meaning</b>
PHD	Physical Health Domain
PSD	Psychological Health Domain
SRD	Social Relationship Domain
END	Environmental Health Domain
ESS	Emotional Symptom Scale
CPS	Conduct Problem Scale
HAS	Hyperactivity Scale
PPS	Peer Problem Scale
PSS	Prosocial Scale
NMS	Negative Mood Symptoms
NSE	Negative Self Esteem
INS	Ineffectiveness
IPP	Interpersonal Problems
AGE	Age
NFC	Number of Father's Children
PTF	Position in the Family
SDQ	Strength and difficulty
CDI	questionnaire Children's Depression Inventory

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**Table 1.** Sociodemographic Information

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Mean (SD)</b>	<b>Range</b>
<b>Gender</b>				
Male	1096	54.3		
Female	923	45.7		
<b>Age(Years)</b>			14. 7(2.05)	10-19
<b>Tribe</b>				
Tiv	1155	57.8		
Idoma	144	7.2		
Igede	383	19.1		
Others	317	15.9		
<b>Area Of Residence</b>				
Rural	902	47.5		
Urban	996	42.5		
<b>Family Type</b>				
Monogamy	1329	68.2		
Polygamy	621	31.8		
<b>Family Status</b>				
Parents Are Together	1471	74.6		
Parents Are Divorced	87	4.4		
Parents Live Apart	139	7.1		
Single Parent	274	13.9		
<b>Father's Level Of Education</b>				
No Formal Education	226	11.6		
Primary	237	12.2		
Secondary	468	24.1		
Tertiary	723	37.2		

Other Forms of Education	290	14.9
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**Father's Occupation**

Farming	661	33.5
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Trading	155	7.9
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Civil Servant	769	38.9
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Private Employee	149	7.6
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Other Types of Occupation	239	12.1
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**Mother's Level Of Education**

No Formal Education	293	15.2
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Primary	376	19.4
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Secondary	504	26.0
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Tertiary	541	28.0
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Other Forms of Education	221	11.4
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**Mother's Occupation**

Farming	638	32.5
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Trading	549	28.0
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Civil Servant	464	23.6
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Private Employee	130	6.6
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Other Types of Occupation	183	9.3
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**Table 2.** Association between Socio-Demographic Characteristics of the Adolescents and Levels of Quality of Life

<b>Variable</b>	<b>Low Quality of Life</b>	<b>Moderate Quality of Life</b>	<b>High Quality of Life</b>	$\chi^2$	<b>d.f</b>	<b>Asymp. Sig. (2-sided)</b>
<b>Gender</b>				1.02	2	0.60
Male	164(14.8%)	735(66.2%)	211(19.0%)			
Female	143(15.3%)	362(67.4%)	162(17.3%)			
<b>Area of residence</b>				87.99	2	<0.0001
Rural	211(22.4%)	615(61.5%)	118(12.5%)			
Urban	92(9.1%)	693(68.2%)	231(22.7%)			
<b>Tribe</b>				91.58	6	<0.0001
Tiv	170(53.3%)	815(68.4%)	231(22.7%)			
Idoma	13(8.7%)	97(65.1%)	39(26.2%)			
Igede	115(28.9%)	240(60.3%)	43(10.8%)			
Others	21(6.5%)	220(67.9%)	83(25.6%)			
<b>Family type</b>				16.71	2	<0.0001
Monogamy	184(13.5%)	908(66.8%)	267(19.6%)			
Polygamy	126(19.5%)	429(66.3%)	92(14.2%)			
<b>Family status</b>				44.99	6	<0.0001
Parents are together	188(12.65%)	1000(67.0%)	305(20.4%)			
Parents are divorced	16(17.2%)	67(72.0%)	10(10.8%)			
Parents live apart	35(24.0%)	95(65.1%)	16 (11.0%)			
Single parent	75(25.4%)	182(61.7%)	38(12.9%)			
<b>Father's highest level of education</b>				163.35	8	<0.0001
No formal education	90(36.6%)	137(55.7%)	19(7.7%)			
Primary	64(25.6%)	158(63.2%)	28(11.2%)			
Secondary	80(16.7%)	334(69.9%)	64(13.4%)			
Tertiary	64(8.7%)	484(66.1%)	184(25.1%)			

Other Forms of Education	17(5.7%)	217(73.1%)	63(21.2%)			
<b>Father's occupation</b>				146.16	8	<0.0001
Farming	187(26.9%)	450(64.7%)	58(8.3%)			
Trading	23(14.3%)	113(70.2%)	25(15.5%)			
Civil servant	76(9.8%)	513(66.3%)	185(23.9%)			
Employee of private organization	12(7.9%)	99(65.1%)	41(27.0%)			
Other Types of Occupation	18(7.2%)	175(69.7%)	58(23.1%)			
<b>Mother's highest level of education</b>				232.36	8	<0.0001
No formal education	120(38.1%)	171(54.3%)	24(7.6%)			
Primary	77(19.5%)	282(71.4%)	36(9.1%)			
Secondary	61(11.9%)	366(71.3%)	86(16.8%)			
Tertiary	38(7.0%)	341(62.5%)	167(30.6%)			
Other Forms of Education	12(5.2%)	171(74.3%)	47(20.4%)			
<b>Mother's occupation</b>				148.39	8	<0.0001
Farming	177(26.3%)	437(64.9%)	59(8.8%)			
Trading	82(14.6%)	376(67.1%)	102(18.2%)			
Civil servant	32(6.9%)	321(68.7%)	114(24.4%)			
Employee of private organization	10(7.5%)	76(56.7%)	48(35.8%)			
Other Types of Occupation	17(8.8%)	132(68.0%)	45(23.2%)			

**Table 3.** Inter-Correlations between the Domains of Quality of Life and the Adolescents' Psychosocial Functioning

Scale	1	2	3	4	5	6	7	8	9
<b>1. PHD</b>									
<b>2. PSD</b>	0.55**								
<b>3. SRD</b>	0.42**	0.44**							
<b>4. END</b>	0.64**	0.62**	0.52**						
<b>5. ESS</b>	-0.21**	-0.09**	0.01	-0.07**					
<b>6. CPS</b>	-0.16**	-0.05*	0.05*	0.02	0.48**				
<b>7. HAS</b>	-0.27**	-0.18**	-0.02	-0.14**	0.48**	0.49**			
<b>8. PPS</b>	-0.14**	-0.09**	-0.03	-0.07**	0.43**	0.43**	0.39**		
<b>9. PSS</b>	0.30**	0.29**	0.19**	0.31**	0.03	-0.18**	-0.24**	-0.14**	-

PHD - Physical Health Domain  
 PSD - Psychological Health Domain  
 SRD - Social Relationship Domain  
 END - Environmental Health Domain  
 ESS - Emotional Symptom Scale  
 CPS - Conduct Problem Scale  
 HAS - Hyperactivity Scale  
 PPS - Peer Problem Scale  
 PSS - Prosocial Scale

\* - Correlation is significant at 5% level of significance

\*\* - Correlation is significant at 1% level of significance

**Table 4.** Inter-Correlations between the Domains of Quality of life and the Adolescents' Depression Status

Scale	1	2	3	4	5	6	7	8
<b>1. PHD</b>								
<b>2. PSD</b>	0.55**							
<b>3. SRD</b>	0.42**	0.44**						
<b>4. END</b>	0.64**	0.62**	0.52**					
<b>5. NMS</b>	-0.20**	-0.13**	-0.03	-0.12**				
<b>6. NSE</b>	-0.21**	-0.10**	0.01	-0.08**	0.62**			
<b>7. INS</b>	-0.23**	-0.13**	-0.06*	-0.11**	0.60**	0.60**		
<b>8. IPP</b>	-0.12**	-0.11**	-0.07*	-0.10**	0.27**	0.31**	0.32**	-

PHD - Physical Health Domain

PSD - Psychological Health Domain

SRD - Social Relationship Domain

END - Environmental Health Domain

NMS - Negative Mood Symptoms

NSE - Negative Self Esteem

INS - Ineffectiveness

IPP - Interpersonal Problems

\* - Correlation is significant at 5% level of significance

\*\* - Correlation is significant at 1% level of significance

**Table 5.** Inter-Correlations between the Domains of Quality of life and the Adolescents' Age, Number of father's children and Position in the family

Scale	1	2	3	4	5	6	7
<b>1. PHD</b>							
<b>2. PSD</b>	0.55**						
<b>3. SRD</b>	0.42**	0.44**					
<b>4. END</b>	0.64**	0.62**	0.52**				
<b>5. AGE</b>	0.07	0.06	0.07*	0.08**			
<b>6. NFC</b>	-0.08**	-0.08**	-0.02	-0.11**	0.06**		
<b>7. PTF</b>	-0.06*	-0.06*	0.01	-0.08*	0.03	0.62**	-

PHD - Physical Health Domain  
 PSD - Psychological Health Domain  
 SRD - Social Relationship Domain  
 END - Environmental Health Domain  
 AGE - Age  
 NFC - Number of Father's Children  
 PTF - Position in the Family

\* - Correlation is significant at 5% level of significance  
 \*\* - Correlation is significant at 1% level of significance

**Table 6.** Assessing Discriminators of Adolescents' Physical Health among the Domains of (SDQ)

<b>Respondent's characteristics</b>	<b>M<sub>1</sub></b>	<b>M<sub>2</sub></b>	<b>M<sub>3</sub></b>	<b>F</b>	<b>W</b>	<b><math>\chi^2</math></b>	<b><math>\chi^2(p)</math></b>
Constant	-34.06	-34.28	-35.21				
Age	3.41	3.40	3.45	1.72			
Number of father's children	0.21	0.21	0.19	3.53*			
Position in the family	0.13	0.11	0.11	2.02			
Emotional symptom	-0.11	-0.17	-0.33	35.88*			
Conduct problem	0.12	0.12	0.13	22.87*			
Hyperactivity	1.03	0.92	0.73	67.41*			
Peer problem	0.68	0.72	0.72	15.78*			
Prosocial Behaviour	1.23	1.40	1.57	53.40*			
<i>C</i>	60.6%	23.1%	69.5%				
<i>f<sub>1</sub></i>					0.89	224.58	<.001
<i>f<sub>2</sub></i>					0.99	6.78	0.45

M<sub>1</sub> - Low physical health model; M<sub>2</sub> - Moderate physical health model; M<sub>3</sub> - Excellent physical health model; W - Wilks' lambda; f<sub>1</sub> - Function 1; f<sub>2</sub> - function 2; C - % of correct prediction.

\* Significant at 5% level of significance

**Table 7.** Assessing Discriminators of Adolescents' Physical Health among the Domains of (CDI)

<b>Respondent's characteristics</b>	<b>M<sub>1</sub></b>	<b>M<sub>2</sub></b>	<b>M<sub>3</sub></b>	<b>F</b>	<b>W</b>	<b><math>\chi^2</math></b>	<b><math>\chi^2(p)</math></b>
Constant	-32.10	-31.80	-31.27				
Age	3.52	3.52	3.59	1.72			
Number of father's children	0.11	0.10	0.09	3.53*			
Position in the family	0.25	0.23	0.22	2.02			
Negative mood symptom	0.50	0.54	0.45	34.54*			
Negative self esteem	-0.54	-0.65	-0.66	33.34*			
Ineffectiveness	0.59	0.54	0.43	44.20*			
Interpersonal problem	1.08	1.11	1.00	15.91*			
<i>C</i>	44.4%	28.3%	64%				
<i>f<sub>1</sub></i>					0.94	122.07	<.001
<i>f<sub>2</sub></i>					0.99	10.26	0.11

M<sub>1</sub> - Low physical health model; M<sub>2</sub> - Moderate physical health model; M<sub>3</sub> - Excellent physical health model; W- Wilks' lambda; f<sub>1</sub> - Function 1; f<sub>2</sub> - function 2; C - % of correct prediction; \* Significant at 5% level of significance

**Table 8.** Assessing Discriminators of Adolescents' Psychological Health among the Domains of (SDQ)

Respondent's characteristics	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	F	W	$\chi^2$	$\chi^2(p)$
Constant	-32.98	-34.67	-35.60				
Age	3.36	3.43	3.42	2.93*			
Number of father's children	0.22	0.20	0.19	4.57*			
Position in the family	0.14	0.10	0.10	3.71*			
Emotional symptom	-0.13	-0.18	-0.27	6.97*			
Conduct problem	0.06	0.15	0.24	1.57			
Hyperactivity	0.97	0.92	0.77	25.07*			
Peer problem	0.73	0.70	0.72	4.93*			
Prosocial Behaviour	1.24	1.44	1.64	59.98*			
C	59.8%	21.2%	64.7%				
$f_1$					0.91	166.46	<.001
$f_2$					0.99	7.59	0.37

M<sub>1</sub>- Low Psychological health model; M<sub>2</sub> - Moderate Psychological health model; M<sub>3</sub> -Excellent Psychological health model; W - Wilks' lambda;  $f_1$ - Function 1;  $f_2$  - function 2; C - % of correct prediction.

\* Significant at 5% level of significance

**Table 9.** Assessing Discriminators of Adolescents' Psychological Health among the Domains of (CDI)

Respondent's characteristics	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	F	W	$\chi^2$	$\chi^2(p)$
Constant	-31.39	-31.96	-31.22				
Age	3.47	3.55	3.57	2.93*			
Number of father's children	0.12	0.10	0.08	4.57*			
Position in the family	0.26	0.22	0.22	3.71*			
Negative mood symptom	0.54	0.56	0.40	21.86*			
Negative self esteem	-0.63	-0.67	-0.59	6.29*			
Ineffectiveness	0.56	0.52	0.48	13.59*			
Interpersonal problem	1.12	1.08	1.05	4.14*			
C	47.6%	29.3%	59.3%				
$f_1$					0.96	$\frac{68.1}{9}$	<.001
$f_2$					0.99	$\frac{13.9}{7}$	0.03

M<sub>1</sub> - Low Psychological health model; M<sub>2</sub> - Moderate Psychological health model; M<sub>3</sub> -Excellent Psychological health model; W - Wilks' lambda;  $f_1$  - Function 1;  $f_2$  - function 2; C -% of correct prediction.

\* Significant at 5% level of significance

**Table 10.** Assessing Discriminators of Adolescents' Social Relationship among the Domains of (SDQ)

<b>Respondent's characteristics</b>	<b>M<sub>1</sub></b>	<b>M<sub>2</sub></b>	<b>M<sub>3</sub></b>	<b>F</b>	<b>W</b>	<b>χ<sup>2</sup></b>	<b>χ<sup>2</sup>(p)</b>
Constant	-33.115	-34.589	-36.002				
Age	3.364	3.425	3.428	2.91*			
Number of father's children	0.190	0.215	0.181	0.40			
Position in the family	0.142	0.106	0.173	1.23			
Emotional symptom	-0.137	-0.181	-0.169	0.50			
Conduct problem	0.048	0.163	0.223	2.93*			
Hyperactivity	0.926	0.933	0.908	0.73			
Peer problem	0.728	0.703	0.696	0.09			
Prosocial Behaviour	1.337	1.406	1.583	24.07*			
<i>C</i>	47.50%	24.30%	57.10%				
<i>f</i> <sub>1</sub>					0.9 6	71.7 0	<.001
<i>f</i> <sub>2</sub>					0.9 9	11.7 1	0.11

M<sub>1</sub> - Low Social Relationship model; M<sub>2</sub> - Moderate Social Relationship model; M<sub>3</sub> - Excellent Social Relationship model; W - Wilks' lambda; f<sub>1</sub>- Function 1; f<sub>2</sub> - function 2; C - % of correct prediction.

\* Significant at 5% level of significance

**Table 11.** Assessing Discriminators of Adolescents' Social Relationship among the Domains of (CDI)

<b>Respondent's characteristics</b>	<b>M<sub>1</sub></b>	<b>M<sub>2</sub></b>	<b>M<sub>3</sub></b>	<b>F</b>	<b>W</b>	<b>χ<sup>2</sup></b>	<b>χ<sup>2</sup>(p)</b>
Constant	-31.06	-31.91	-31.64				
Age	3.48	3.55	3.57	2.91*			
Number of father's children	0.09	0.11	0.07	0.40			
Position in the family	0.24	0.21	0.27	1.23			
Negative mood symptom	0.52	0.50	0.54	0.10			
Negative self esteem	-0.74	-0.62	-0.57	1.86			
Ineffectiveness	0.59	0.51	0.43	4.82*			
Interpersonal problem	1.09	1.11	0.97	6.76*			
<i>C</i>	48.3%	27.9%	48.7%				
<i>f<sub>1</sub></i>					0.98	$\frac{46.5}{4}$	<.001
<i>f<sub>2</sub></i>					0.99	$\frac{14.2}{7}$	0.03

M<sub>1</sub>- Low Social Relationship model; M<sub>2</sub> - Moderate Social Relationship model;  
M<sub>3</sub> - Excellent Social Relationship model; W- Wilks' lambda f<sub>1</sub> - Function 1; f<sub>2</sub> - function 2;  
C - % of correct prediction.

\* Significant at 5% level of significance

**Table 12.** Assessing Discriminators of Adolescents' Environmental Health among the Domains of (CDI)

Respondent's characteristics	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	F	W	$\chi^2$	$\chi^2(p)$
Constant	-31.96	-	-36.39				
Age	3.35	3.50	3.48	14.32*			
Number of father's children	0.22	0.19	0.17	6.23*			
Position in the family	0.12	0.11	0.09	2.71			
Emotional symptom	-0.11	-0.25	-0.38	11.08*			
Conduct problem	0.02	0.28	0.33	12.99*			
Hyperactivity	0.95	0.92	0.80	21.58*			
Peer problem	0.70	0.74	0.75	5.24*			
Prosocial Behaviour	1.27	1.53	1.75	67.56*			
C	60.4%	31%	63.3%				
<i>f</i> <sub>1</sub>					0.88	242.30	<.001
<i>f</i> <sub>2</sub>					0.98	38.98	<.001

M<sub>1</sub> - Low Environmental Health model; M<sub>2</sub> - Moderate Environmental Health model; M<sub>3</sub> - Excellent Environmental Health model; W - Wilks' lambda; *f*<sub>1</sub>- Function 1; *f*<sub>2</sub> – function 2; C - % of correct prediction.

\* Significant at 5% level of significance

**Table 13.** Assessing Discriminators of Adolescents' Environmental Health among the Domains of (SDQ)

<b>Respondent's characteristics</b>	<b>M<sub>1</sub></b>	<b>M<sub>2</sub></b>	<b>M<sub>3</sub></b>	<b>F</b>	<b>W</b>	<b><math>\chi^2</math></b>	<b><math>\chi^2(p)</math></b>
Constant	-30.47	-32.51	-31.26				
Age	3.43	3.61	3.60	14.32*			
Number of father's children	.13	.08	.07	6.23*			
Position in the family	.23	.23	.22	2.71			
Negative mood symptom	.56	.52	.44	21.36*			
Negative self esteem	-.71	-.57	-.63	18.48*			
Ineffectiveness	.54	.53	.47	18.44*			
Interpersonal problem	1.14	1.06	1.02	6.88*			
<i>C</i>	41.9%	34.2%	60.6%				
<i>f</i> <sub>1</sub>					0.95	104.64	<.001
<i>f</i> <sub>2</sub>					0.98	45.43	<.001

M<sub>1</sub> - Low Environmental Health model; M<sub>2</sub> - Moderate Environmental Health model; M<sub>3</sub> - Excellent Environmental Health model; W - Wilks' lambda; f<sub>1</sub> - Function 1; f<sub>2</sub> - function 2; C - % of correct prediction.

\* Significant at 5% level of significance

**Table 14.** Assessing Discriminators of Adolescents' Quality of Life among the Domains of (SDQ)

Respondent's characteristics	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	F	W	$\chi^2$	$\chi^2(p)$
Constant	-32.35	-35.29	-36.39				
Age	3.35	3.47	3.49	9.68*			
Number of father's children	0.22	0.20	0.16	9.03*			
Position in the family	0.14	0.09	0.11	5.12*			
Emotional symptom	-0.11	-0.23	-0.34	15.82*			
Conduct problem	-0.01	0.26	0.28	16.51*			
Hyperactivity	0.94	0.92	0.75	39.40*			
Peer problem	0.74	0.69	0.72	8.26*			
Prosocial Behaviour	1.26	1.50	1.74	82.41*			
C	57.2%	30.8%	66.2%				
$f_1$					0.86	284.84	<.001
$f_2$					0.98	45.75	<.001

M<sub>1</sub> - Low Quality of Life model; M<sub>2</sub> - Moderate Quality of Life model; M<sub>3</sub> - Excellent Quality of Life model; W - Wilks' lambda;  $f_1$ - Function 1;  $f_2$  - function 2; C - % of correct prediction.  
 \* Significant at 5% level of significance

**Table 15.** Assessing Discriminators of Adolescents' Quality of Life among the Domains of (CDI)

<b>Respondent's characteristics</b>	<b>M<sub>1</sub></b>	<b>M<sub>2</sub></b>	<b>M<sub>3</sub></b>	<b>F</b>	<b>W</b>	<b><math>\chi^2</math></b>	<b><math>\chi^2(p)</math></b>
Constant	-30.82	-32.23	-31.43				
Age	3.43	3.57	3.61	9.68*			
Number of father's children	0.13	0.10	0.06	9.03*			
Position in the family	0.25	0.21	0.23	5.12*			
Negative mood symptom	0.54	0.54	0.45	30.97*			
Negative self esteem	-0.72	-0.58	-0.66	29.62*			
Ineffectiveness	0.58	0.52	0.45	31.19*			
Interpersonal problem	1.15	1.08	1.00	12.92*			
<i>C</i>	42.8%	34.5%	60.5%				
<i>f</i> <sub>1</sub>					0.93	134.30	<.001
<i>f</i> <sub>2</sub>					0.98	40.66	<.001

M<sub>1</sub> - Low Quality of Life model; M<sub>2</sub> - Moderate Quality of Life model; M<sub>3</sub> - Excellent Quality of Life model; W - Wilks' lambda; f<sub>1</sub> - Function 1; f<sub>2</sub> - function 2; C - % of correct prediction.  
 \* Significant at 5% level of significance