

Critical Issues of Health Care Services Delivered by Primary Health Care Centers' in Rural Areas of Niger State in Nigeria: Implications on Rural Farm Sector Economy Growth and Development

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ABSTRACT

The present research empirically examined the critical issues of health care services delivered by primary health care centers' in rural areas and its implications on the rural farm sector economy growth of the studied area. Cross-sectional data collected from 186 rural farmers using multi-stage sampling design were used. The instruments for data collection were structured questionnaire complemented with interview schedule and the collected data were analyzed using descriptive and inferential statistics. Findings showed an active and productive labour force with most of them been literate but have large household size. Results showed that farming is the major occupation, mostly practiced on small-scale and the farmers have adequate farming experience to enhance rationalization in resource-use. Furthermore, it was observed that the farmers had access to almost all the health care services delivered but with low utilizations of the services. Also, the perceptions of the farmers with respect to the quality of the health care services delivered in the studied area were not impressive, thus an impediment to enhancement of farmers income and economic growth. From the GLM results it was observed that access to credit was the only factor found to have significant influence across all the health care utilization levels. Findings showed that the services delivered by the healthcare centers' in the studied area have been fraught by shortage of qualified practitioners, insufficient health infrastructure, socioeconomic and physical barriers. Based on these findings, study recommends that health policy debates should focus on expanding health insurance coverage, improving health care quality and value so as to achieve high labour supply, improvement on farm efficiencies and health outcomes. Thus, with proper adoption of an efficient healthcare system in the studied area, farm-sector induced economic growth in the rural economy would surely produce a desired response.

Keywords: Healthcare; rural farm sector; economic growth; PHC; Nigeria

INTRODUCTION

According to WHO (1986), health is a state of complete physical, social and mental wellbeing, and not merely the absence of disease or infirmity. Health is considered a means to an end which can be expressed in functional terms as a resource which permits people to live an individually, socially and economically productive life.

Adeoti and Awoniyi (2014) stated that health is an important component of human capital in the sense that investment in health has important

direct effects on productivity and thus on economic growth. Devoid of bias and ambiguity these statements show the relationship between healthcare access and growth inducement in the economy, especially rural area. Therefore, how health influences the labour market and in turn economic outcomes have been an inquiry in the development research since the last 50 years (Amrita, 2010).

Healthcare access and utilization are of major interest to rural development, because they are vital elements of wellbeing and components of human capital (Aghion *et al.*, 2010). In rural

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areas, where physical jobs tend to be more abundant, healthcare access and utilization stand to be more important than education in determining labour productivity. According to Omonona *et al.* (2015), every individual sees good health as a need, thus makes healthcare utilization an economic good. Harttgen and Misselhorn (2006) stated that access to health infrastructure is important for reduced child mortality which is a strong determinant for agricultural-labour participation by rural farmers. On the other hand, socioeconomic factors, especially poverty, are often found to be strong determinants of health outcomes (Nolte and Mckee, 2004; Young, 2001 and Leger, 2001).

Empirical evidence suggests that health inequalities have been persistent over time and in many cases, have been growing (Omonona *et al.*, 2015). Despite efforts by government all over the world and all concerned stakeholders to make healthcare services accessible to the masses, many low-income countries have not been able to meet the basic healthcare needs of their people, especially those in the rural areas and since agriculture is an integral culture of this rural populace, Hamid *et al.* (2005) reported that there is a growing recognition of the challenge of rural people's health issues and suggested the need for it to be addressed. Nigeria basically being an agrarian country, health condition is expected to have a significant effect on agricultural production. Inadequate access to health services is therefore a major issue confronting the poor in Nigeria. The rich can ignore government finance and health facilities and access private sector health facilities on their own, while the poor are more dependent on the public sector orthodox medical infrastructure and governments often do not have enough resources to expend on pro-poor health programmes and interventions (Tandon, 2007). However, there is a phenomenal challenge of poor healthcare among its rural populace manifested by the continuous decline in food production and sufficiency. Human development indicators are staggeringly low considering the country's GDP per capita. The present study extensively examined the state of healthcare access, utilization, problems and their relationships with the farm sector growth in the rural economy because it is a sure way that would trigger quantum boost in the farm sub-

sector and overall rural economic growth of the studied area. The specific objectives were:-

- To describe the socio-economic profile of the rural farmers;
- To evaluate rural farmers access to the rural health care services;
- To assess rural farmers perception on the quality of the health services delivered by rural healthcare centers;
- To assess utilization of rural health care services by the rural farmers;
- To identify the factors determining utilization of health care services by the rural farmers; and,
- To identify the barriers to the rural health care services in the studied area.

RESEARCH METHODOLOGY

Niger state of Nigeria which is the study area is located between latitude $8^{\circ} 20'$ and $11^{\circ} 30'$ North of the equator and longitude $3^{\circ} 30'$ and $7^{\circ} 20'$ East of the Greenwich Meridian. The mean annual precipitation is between 1100mm and 1600mm with an average monthly temperature hovering around 23°C to 37°C . The estimated population of the state is 4.08 million with an estimated GDP of \$6.00 billion and per capita annual income of \$1,480 (C-GIDD, 2017). The state has the largest landmass in the country which is approximately 76,363 km^2 . The inhabitants are predominantly peasant farmers cultivating mainly food crops alongside keeping live stocks for family consumption and market. The study utilized cross-sectional data collected from 186 rural farmers *via* multi-stage sampling design. The stage-wise random sampling procedure was as follows: purposive selection of all the three agricultural zones in the state *viz.* Bida, Kuta and Wushishi because farm practice cut across the state and health has direct synergy with farming; random selection of one Local Government Area (LGA) from each of the zone; random selection of four (4) villages from each of the selected LGAs; proportionate random sampling of 5% of farmers from the sampling frame of each selected villages to get a representative sample size; and, random selection of 186 farmers. Data were collected during the month of October to December in the year 2016. The instruments for data collection were structured questionnaire complemented with interview schedule. Descriptive, pseudo-

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inferential and inferential statistics were used to analyze the data collected. Objective I was achieved using descriptive and pseudo-inferential statistics such as frequency, percentage and chi-square; objective II was achieved using multinomial probit and ordered probit regression models (GLM); objective III and V were achieved using Garret ranking,

Kendall's coefficient of concordance, Friedman's chi-square, Cochran's test statistic and the Exploratory factor analysis; and, objective IV was achieved using 3 Likert scale, Kendall's coefficient of concordance, Friedman's chi-square and the Exploratory factor analysis.

Table 1. Distribution of the respondents according to the sampling frame

Agric. Zone	LGA	Village	Sampling frame	Sample size
Bida	Lapai	Ebbo	368	18
		Birnin-Tashibo	188	9
		Arewa/Yamma	566	28
		Evuti	54	3
Kuta	Bosso	Maitumbi	136	7
		Garatu	947	47
		Bosso central	113	6
		Maikunkele	175	9
Wushishi	Wushishi	Sabon-Gari	267	13
		Barwa	192	10
		Zungeru	442	22
		Lokogoma	272	14
Total	3	12	3710	186

Source: Source: Niger State Agricultural and Mechanization Development Authority (NAMDA), 2016

Empirical Model

The Multinomial Model is Specified Below

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon_i \dots\dots\dots (1)$$

Where;

Y_i = Health care service utilization level (HCSUL) of the i^{th} respondent (Very high utilization = 4, High utilization = 3, Moderate utilization = 2, Low utilization = 1 and Non-utilization = 0)

$$HCSUI_{it} = \frac{\sum_{i=0}^n \text{health care service (s) utilized by the } i^{\text{th}} \text{ respondent}}{\sum_{i=0}^n \text{health care services available in the studied area}} \times 100 \dots\dots\dots (2)$$

Where;

$HCSUI_{it}$ = Health care service utilization index of the i^{th} farmer

Derivation of $HCUL_{it}$ from the $HSCUI_{it}$:

Non-utilization = 0

Low utilization = 0.01- 0.25

Moderate utilization = 0.25 - 0.50

High utilization = 0.51 - 0.75

Very high utilization = 0.76 – 1.00

X_1 = Age (in years)

X_2 = Gender (Male =1, Otherwise = 0)

X_3 = Household size (Number)

X_4 = Access to credit (Yes =1, Otherwise = 0)

X_5 = Co-operative membership (Yes =1, Otherwise = 0)

X_6 = Education (Formal =1, Otherwise = 0)

X_7 = Extension contact (Yes =1, Otherwise = 0)

β_1 = Intercept

β_{1-11} = Coefficients of estimated parameters

Garrett's Ranking Technique

The Garrett's ranking technique has been used to rank the objects identified by the farmers. The rank assigned to a particular object by the farmers was transmitted into scores using the formula given by Garrett and Woodworth (1969) as adopted by Kumar and Kaur (2017); Varathan *et al.*(2012); and Sedaghat (2011):

$$\text{Percentage position} = 100*(R_{ij} - 0.5)/N_j \dots\dots\dots (3)$$

Where;

R_{ij} = Rank given to i^{th} object by the j^{th} farmer

N_j = Number of the object ranked by the j^{th} farmer

By referring to the Garrett table, the percent position estimated was converted into scores.

Kendall's Coefficient of Concordance (W)

Kendall's coefficient of concordance (W) proposed by Maurice G. Kendall and Bernard

Babington-Smith is a measure of agreement among several 'm' variables that are assessing a set of 'n' objects of interest. In social sciences, the variables are often people, called judges or respondents, assessing different subjects or situations. Kendall's coefficient of concordance (W) uses the χ^2 statistic for testing. If the test statistic W is 1, then all the survey respondents have been unanimous and each respondent has assigned the same order to the list of subjects or situations. If W is 0, then there is no overall trend of agreement among the respondents and their responses may be regarded as essentially random. Intermediate values of W indicate a greater or lesser degree of agreement among the various respondents. Following Sadiq *et al.* (2017) the Kendall's coefficient of concordance developed by Kendall and Smith (1939) and Wallis (1939) is given below:

$$W = \frac{12S}{k2n(n2-1)-kT} \dots\dots\dots (4)$$

Where;

S = Sum over all subjects

k = Number of respondents ranking the attributes or objects

n = Number of attributes or objects that is evaluated by respondents

T = Tie-correction factor

$$T = \sum (t_k^3 - t_k) \dots\dots\dots (5)$$

' t_k ' is the number of tied ranks in each (k) of g groups of ties. The sum is computed over all groups of ties found in all m variables of the data table. T is 0 when there are no tied values.

The Chi² (χ^2) statistic is given as follow:

$$\chi^2 = k(n-1)W \dots\dots\dots (6)$$

Where;

k = Number of respondents

n = Number of objects or attributes being ranked

W = Kendall's coefficient of concordance (KCC)

Friedman's Chi-square Statistic

The Friedman's Chi-square statistic proposed by Friedman (1937) was developed primarily to test the hypothesis that the ratings assigned to subjects under investigation come from the same statistical population. This is an indirect way of evaluating the extent of agreement among raters. Due to its close mathematical

relationship with Kendall's coefficient of concordance (W) it is used in studies of inter-judge reliability. The Friedman's Chi-square statistic is given below:

$$\chi^2_r = k(n-1)W \dots\dots\dots (7)$$

Where;

χ^2_r = Friedman's chi² statistic

k = Number of respondents

n = Number of objects or attributes being ranked

W = Kendall's coefficient of concordance (KCC)

RESULTS AND DISCUSSION

Socio-Economic Profile of the Farmers in the Studied Area

The results of the socio-economic characteristics of the respondents in the studied area are presented in Table 2. The mean age of the respondents as shown in the table was 45 years, indicating a productive labour force with the capability of performing adequate farm operations if given proper incentives. In order words it means the studied area has relatively young people engaged in farming which is an insurance for agricultural production given that young people are very active in farm operations and more responsive to agricultural extension programmes, thus, a boost to food security. The mean household was 12 persons, implying a large household which on one hand is an asset in terms of providing free labour supply and additional income if most of the household members are able bodied people and on the other hand a drain on farmers income in respect of meeting the family expenditures if most of the household members are weak people-children and old people, thereby affecting their standard of living. Majority of the respondents acquired one form of formal education or the other, indicating literate farming population in the studied area i.e there exist relatively high level of literacy among the farmers. It is expected that education will assist the farmers to test and accept innovations available to them; enhance their ability to make informed and accurate decisions on farm management, thus, increased their income stream. Majority of the respondents were married, indicating a responsible social setting in the studied area. Also, married farmers have twin benefits- social and economic powers. The results further revealed that majority of the farmers were male, an indication that religion and cultural barriers

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in the studied area limit women from being household head if she has a living husband and breadwinner in case of widow. With respect to religion practice in the studied area, majority of the respondents were Muslims. However, this is outcome is not surprising given that the studied area is Muslim dominated. The mean farm size was 3 hectares, indicating that farming in the studied area was carried out on small operational holdings. This outcome is expected given that the majority of the farming population which accounted for the bulk of food produced in the country is dominated by resource poor farmers who have no economic power to delve into large scale farming. Small holdings can give high productivity if production resources coupled with adequate technologies are properly and efficiently utilized. The mean farming experience was 20 years, implying that the respondents had adequate experience to enable them allocate farm resources efficiently in a manner to minimize costs and maximize profit. Majority of the respondents were full-time farmers with no access to credit facilities, thus, affecting their scope of expansion in production. With respect

to land acquisition, majority of the respondents inherited their farm lands from their forefathers and parents and this kind of land are mostly plagued with the problem of fragmentation which increase the tendency of small-holding since every adult member of the family will like to have his own parcel of land. It was observed that majority of the farmers had no access to extension service and did not belong to any co-operative association. Therefore, study suggests adequate provision of change agent so that farmers can take advantage of innovative technologies aimed at productive agriculture. Also, non-membership of majority of the farmers in co-operative society will deny them the benefits that are inherent in co-operative organizations i.e pecuniary advantages. Also, social groups can serve as a medium through which extension agents can disseminate innovation effectively to farmers. The results of the chi-square (χ^2) for all the socio-economic variables were different from zero at 1% probability level, implying difference in the proportion of distribution among each of the variables under consideration.

Table2. Socio-economic profile of the farmers

Variables	Frequency	Percentage	X ± SD	χ^2 test statistic
Age				
≤ 29	20	10.8		57.12 (0.000)
30-39	27	14.5		
40-49	63	33.9		
50-59	61	32.8		
≥ 60	15	8.1		
Total	186	100	45 ± 10	
Family size				
≤ 3	11	5.9		152.28 (0.000)
4-6	23	12.4		
7-9	34	18.3		
≥ 10	118	63.4		
Total	186	100	12 ± 7	
Education				
Informal	76	40.8		195.01 (0.000)
Primary	46	24.7		
Secondary	49	25.8		
Tertiary	15	8.6		
Total	186	100		
Marital status				
Single	20	10.8		411.81 (0.000)
Married	166	89.2		
Total	186	100		
Gender				
Male	171	91.9		130.84 (0.000)
Female	15	8.1		
Total	186	100		
Religion				
Muslim	139	74.7		154.48 (0.000)

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Christian	42	22.6		
Traditional	5	2.7		
Total	186	100		
Farm size				
≤ 1	2	1.1		162.55 (0.000)
1-2	81	43.5		
3-4	78	41.9		
≥ 5	25	13.4		
Total	186	100	3.1 ± 2.6	
Farming experience				
≤ 3	12	6.5		231.08 (0.000)
4-6	8	4.3		
7-9	31	16.7		
≥ 10	135	72.6		
Total	186	100	20 ± 15.4	
Occupation				
Farming	151	81.2		439.86 (0.000)
Trading	18	9.7		
Civil servant	12	6.5		
Artisanal	2	1.1		
Others	3	1.6		
Total	186	100		
Access to credit				
Yes	159	85.5		93.68 (0.000)
No	27	14.5		
Total	186	100		
Land acquisition				
Inherited	103	55.4		137.57 (0.000)
Gifted	4	2.2		
Purchased	14	7.5		
Rented	65	34.9		
Total	186	100		
Extension contact				
Yes	50	26.8		151.07 (0.000)
No	139	73.1		
Total	186	100		
Co-operative membership				
Yes	70	37.6		107.84 (0.000)
No	116	62.4		
Total	186	100		

Source: Field survey, 2016

Farmers' Access to Health Care Services

The results of farmers' evaluation on access to the health care services delivered in the studied area are presented in Table 3. A cursory review of the results shows that the farmers have good access to the health care services *viz.* Body temperature medical check-up, Blood pressure medical check-up, Child delivery and Antenatal care services; moderate access to malaria diagnosis; and, poor access to typhoid fever and HIV/AIDS diagnoses. These results showed the reasons for numerous and alarming avoidable deaths i.e recent high death rate experienced in the studied area. Unfortunately, the causes of these disturbing realities are illnesses that can be

treated and deaths that can be prevented by simple interventions but for which inappropriate structures have constituted a stumbling block. Despite various government and non-governmental intervention programmes on malaria fever eradication such as distribution of free mosquito nets to rural dwellers, roll out malaria from Nigeria, water sanitary strategies, distribution of contraceptives against HIV/AIDS, it's obvious that the impacts of these interventions are yet to be felt in the studied. Based on this finding the study advised that government and private stakeholders in the health care sector should intervene more in the area of diseases-Typhoid and Malaria fevers which are curable ailment and the dreaded

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ailment-HIV/AIDS which requires anti-retroviral drugs. However, accessibility of the farmers to the health care services were ranked in order of importance and the results shows that Body temperature medical check-up, Blood pressure medical check-up, child delivery and Antenatal care services were ranked 1st, 2nd, 3rd and 4th accessible health care services respectively; access to malaria diagnosis was ranked 5th while Typhoid fever and HIV/AIDS diagnoses received the least ranks- 6th and 7th accessible health care services, respectively. With respect to the ranking, the estimated coefficient of Kendall coefficient of concordance (W) is 0.628 and significant at 1% probability level, indicating that there is strong

agreement among the respondents with respect to this ranking. Furthermore, the estimated coefficient of Friedman's χ^2 test (χ^2) is 365.26 and significant at 1% probability level, justifying that the ratings assigned to these services under investigation comes from the same statistical population. For any policy intervention by either public or private organization, the present study advised that they should comply with this ranking. Also, the study advise that policy makers or stakeholders in the health sector be it public or private organization should add more to the present effort in addressing the lapses limiting adequate access to the 5th to 7th health care services in the studied area.

Table3. Evaluation of access to health care services in the studied area

Health care service	Rank		Total score	Mean score	Rank
	1	2			
HIV/AIDS diagnosis	46	120	7384	39.70	7
Malaria fever diagnosis	113	73	9933	53.40	5
Typhoid fever diagnosis	71	115	8799	47.31	6
Blood pressure test	163	23	11283	60.66	2
Body temperature test	172	14	11526	61.97	1
Child delivery	160	26	11202	60.23	3
Antenatal	159	27	11175	60.08	4
Kendell's W (KCC)	0.628				
Chi-square (χ^2)	365.26				
P-value	0.000				
Friedman's test (χ^2)	365.26				
P-value	0.000				
Cochran's Q	365.26				
P-value	0.000				
Df	6				
Total no. of respondent	186				

Source: Field survey, 2016

In order to get a meaningful interpretation of items and factor mapping along the principal axis, the extracted principal component was rotated using orthogonal transformation by Varimax. From the results of the delivered health care services attributes in Table 4, the Keiser-Meyer-Olkin (KMO) measure of sampling adequacy achieved the middling level of 0.713, while the Bartlett's test of sphericity was significant at 1% probability level, confirming the appropriateness of the factor model. In testing the reliability of the summated scale for each factor loading, the Cronbach's alpha was used to verify the internal consistency. The Cronbach alpha coefficient range from 0 to 1, but Nunnally and Bernstein (1994) reported that the acceptable reliability estimates for social sciences ranged from 0.7 to 0.8 and a value of less or equal to 0.6 generally

indicates unsatisfactory internal consistency reliability (Malhotra, 2009).

A perusal of Table 4 showed that the estimated Cronbach's alpha values for each of the four dimensions or factors to be greater than 0.7. All of these findings provide evidence of the appropriateness of the sample for the principal components analysis. The behaviour of individual items in relation to others within the same factor provides confirmation of content validity because the highest factor loading is central to the domains assessed by these factors (Francis *et al.*, 2000). The total variance explained by these factors was 63.32% and generally considered satisfactory in social sciences (Hair *et al.*, 1998; 2006 as cited by Sadiq *et al.*, 2017). The extracted factors and their respective factor loadings exclude those for which the absolute value of the loading was less

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than 0.40. In labeling the factors that were loaded from two factor loadings, only the higher factor score was considered. The three extracted factors were labeled as ailment factor, medical check-up factor and maternity factor.

Factor one (1), with an Eigen-value of 1.998 captured three items and accounted for 28.55% of the variance. Collectively these three items were labeled as "ailment". This factor comprised items related to ailment such as malaria fever, typhoid fever and HIV/AIDS and has a Cronbach's alpha estimate of 0.748 which relatively indicate satisfactory reliability. This factor explained how the farmers were more concerned about the nature of the ailment while accessing the services at the health care centers'. Factor two (2) captured two items, had an Eigen-value of 1.247 and accounted for 17.82%

variance. The Cronbach's alpha estimate of 0.878 indicates high reliability of the measurement. These two items collectively labeled as "maternity" include child delivery and Antenatal care. This factor explained how farmers were more conscious about maternity issues while choosing the health care centers' for this health services. Factor three (3) captured two items, had an Eigen-value of 1.187 and accounted for 16.95% of the variance. The Cronbach alpha estimate of 0.810 implies relative satisfactory reliability of the measurement. These two items collectively labeled as "medical check-up" included blood pressure and body temperature medical check-up. For this factor, farmers were more concerned with medical check-up such as appropriateness of the test.

Table 4. Exploratory factor analysis of rural farmers' access to health care service delivery

Items	Factor 1	Factor 2	Factor 3
Ailment			
HIV/AIDS diagnosis	0.762		
Malaria diagnosis	0.706		
Typhoid fever diagnosis	0.634		
Maternity			
Child delivery		0.757	
Antenatal		0.840	
Medical check-up			
Blood pressure test			0.765
Body temperature test			0.789
Cronbach's Alpha	0.748	0.878	0.810
Eigen value	1.998	1.247	1.187
% of Variance	28.55	17.82	16.95
Cumulative variance explained (%)	28.55	46.37	63.32
Kaiser-Meyer-Olkin Measure of sampling accuracy	0.713		
Bartlett's Test of Sphericity (χ^2)	133.53		
Df	21		
P-value	0.000		

Notes: Extraction method: Principal component analysis, Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 5 iterations

Perception on the Quality of Healthcare Services Delivered

Farmers' perceptions on the quality of health care services delivered at rural health care centers are presented in Table 5. A perusal of the table shows that the farmers had good perception with respect to the quality of the following health care services delivered at the rural health care centers viz. malaria test, typhoid fever test, body temperature and blood pressure medical check-ups; moderate perception on the quality of provision of essential drugs, medical counseling, follow-up treatment, community outreach, child delivery

and response to emergency cases; while perceptions on the qualities of HIV/AIDS test and Antenatal care (ANC) by the respondents in the studied area were very poor. Therefore, study advise stakeholder in the health sector to improve on the quality of these services that are lagging behind and should not exhibit complacency on the quality of those services that where perceived to be good by the farmers in the studied area. With respect to ranking of the healthcare services delivered viz. malaria and typhoid tests received the highest rank order in respect of 1st and 2nd ranks respectively, while HIV/AIDS test and Antenatal care received the

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least rank order in respect of 10th and 11th ranks respectively. Furthermore, the estimated coefficient of Kendall test of concordance (KCC) is 0.707 and significant at 1% probability level, indicating that there is good agreement among the respondents with respect to the ranking on the quality perception of the health care services delivered by the rural health care centers in the studied area. Also the significance of the Friedman's Chi² statistic (χ^2) (423.37) at 1% justified that the ratings assigned to these services under investigation comes from the same statistical population. Therefore, for any intervention stakeholders in the rural health care centers are advice to comply with this ranking in order to fast tract development of health services in the studied area.

Also Table 5 shows two factors captured from the principal component analysis as evident from the respective Eigen values which were greater than one. The Keiser-Meyer-Olkin (KMO) measure of sampling adequacy achieved meritorious level of 0.862 with the Bartlett's test of sphericity been significant at 1% probability level, indicating the appropriateness of the factor model. A cursory review shows that factor one is made up of seven items with Eigen

value of 6.816 with approximately 56.80% of explained variance and Cronbach alpha of 0.924. This factor was labeled "medical check-up" and consists provision of essential drugs, follow-up treatments, blood pressure medical check-up, body temperature medical check-up, medical counseling, community outreach and response to emergency while assessing the quality of services delivered at the rural health care centers. For this factor, the farmers were more concerned with the quality of medical check-ups offered by the health care centers such as medical check-ups for blood pressure and body temperature which were among the factors considered by the farmers in the studied area.

Factor two had Eigen value of 1.180 with explained variance of 9.831% and Cronbach's alpha of 0.831. This factor was labeled "maternity/disease" and was described by the items viz., malaria test, typhoid fever test, HIV/AIDS test, child delivery and Antenatal care. The famers were more concerned with the quality of services for maternity and treatment of diseases such as child delivery and test for HIV/AIDS while assessing the quality of health care services provided in the studied area.

Table 5. Farmers perception and exploratory analysis of the Quality of health care services

Service	Mean	Rank	Factor 1	Factor 2
Medical check-up				
Provision of essential drugs	2.18	5 th	0.647	
Follow-up treatment	2.16	7 th	0.742	
Blood pressure test	2.25	4 th	0.803	
Body temperature test	2.28	3 rd	0.829	
Medical counseling	2.17	6 th	0.748	
Community outreach	2.05	8 th	0.718	
Response to emergency	2.01	9 th	0.742	
Maternity and Disease				
Malaria test	2.42	1 st		0.776
Typhoid fever test	2.32	2 nd		0.685
HIV/AIDS	1.76	10 th		0.809
Child delivery	2.01	9 th		0.820
Antenatal care	1.59	11 th		0.739
Kendell's W (KCC)	0.707			
Chi-square (χ^2)	423.37 (0.00)			
Friedman's test (χ^2)	423.37 (0.00)			
Cronbach's Alpha			0.924	0.831
Eigen value			6.816	1.180
% of variance			56.799	9.831
Cumulative variance explained (%)			56.799	66.630
Kaiser-Meyer-Olkin Measure of sampling accuracy	0.862			
Bartlett's Test of Sphericity (χ^2)	1643.622			
Df	66			
P-value	0.000			

Source: Field survey, 2016

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Notes: Extraction method: Principal component analysis, Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 5 iterations

Utilization Level of Healthcare Services Delivered in the Studied Area

Presented in Table 6 are the levels of utilization of health care services by the farmers in the studied area. The results show that only Antenatal care service was highly utilized and was ranked 1st; HIV/AIDS test service was moderately utilized and rank 2nd while the remaining health care services were poorly/not-adequately utilized in the studied area. Medical counseling, provision of essential drugs and malaria test received the least ranks in respect of rank 9th, 10th and 11th, respectively. Relying on the poor quality of the HIV/AIDS test and Antenatal care services as rated by the respondents, utilizations of these services were observed to be high and this might be attributed to the fact that the alternative health centre i.e standard private clinics are out of reach of these farmers i.e farmers in the studied area in most cases cannot afford the alternative health care centre (private clinic) due to high cost of medical services. Again the private clinics are located in urban areas which in most cases are far from the remote area coupled with poor road

network etc. On the other hand, the presences of drug vendors, quackeries, Ayurvedic medicines might be the reasons for poor utilization of the remaining services provided in the studied area since these ailments are presumed to be mild ones by the farmers in the studied area. The estimated KCC value was 0.628 and significant at 1% probability level, indicating that there is agreement among the farmers with respect to this ranking. Also, the significance of the estimated Friedman's Chi² statistic of 466.304 and significant at 1%, proved that the ratings assigned to the utilization of these services under study comes from the same statistical population. Therefore, study call on the stakeholders in public health services in the state to critically upgrade the rural health dispensaries in the studied area to the world recommended standard in order to enhance the health status of the rural populace and achieve universal health care for all. By so doing the food security status of the state would be enhanced given that the bulk of the food supply is produced by these resource poor farmers who reside in the remote area, thus improving the economy of the state.

Table6. Assessing health care service utilization by rural farmers' in the studied area

Health care service	Rank		Total score	Mean score	Rank
	1	2			
Malaria fever test	192	6771	6963	37.44	11 th
Typhoid fever test	2368	5513	7881	42.38	7 th
HIV/AIDS	8704	1850	10554	56.74	2 nd
Essential drugs provision	1984	5735	7719	41.5	10 th
Child delivery	5504	3700	9204	49.48	4 th
Follow-up treatment(s)	2816	5254	8070	43.39	5 th
Blood pressure test	2560	5402	7962	42.81	6 th
Body temperature test	2368	5513	7881	42.37	8 th
Medical counseling	2176	5624	7800	41.94	9 th
Community outreach	5568	3663	9231	49.63	3 rd
Emergency	5504	3700	9204	49.48	4 th
Antenatal	7360	6327	13687	73.59	1 st
Kendell's W	0.623				
Chi-square (χ^2)	466.304				
P-value	0.000				
Friedman's test (χ^2)	466.304				
P-value	0.000				
Cochran's Q test	469.051				
P-value	0.000				
Df	11				
Total no. of respondent	186				

Source: Field survey, 2016

Principal factor analysis with orthogonal Varimax rotation applied to 12 presented health

care services utilized resulted in four interpretable factors with Eigen values more

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than 1 (Table 7). The KMO measure of sampling adequacy achieved marvelous level of 0.957 and Bartlett's test of sphericity of 444.071 is significant at 1% probability level, indicating an identity matrix suitable for factor analysis. The factor loadings for the utilization of health care services exclude those for which the absolute value of the loading was less than 0.40. The results showed that 59.027 percent of total variation in the twelve variables was explained by the four factors which is a satisfactory value in social sciences (Hair *et al.*, 1998). In labeling the factor that was loaded from two factor loadings, only the highest factor score was considered.

The four extracted factors were labeled as maternity, medical check-up, HIV/AIDS test and fever ailment, respectively. Factor 1 with Eigen value of 2.727 and Cronbach alpha of

0.766 accounted for 22.722% of variance and had high loading from provision of essential drugs, child care delivery, follow-up medical treatments, response to emergency cases and Antenatal care. Factor 2 labeled medical check-up accounted for 15.0% of variance with Eigen value of 1.806 and Cronbach alpha of 0.771, was highly loaded from blood pressure medical check-up, body temperature medical check-up and medical counseling. HIV/AIDS test was loaded on Factor 3 and the factor accounted for 10.792% of variance, had Eigen value of 1.295 and Cronbach alpha of 0.709. Factors 4 labeled fever ailment's accounted for the remaining explained variance, had Eigen value of 1.256 and Cronbach alpha of 0.757. This factor was highly loaded from malaria and typhoid fever tests.

Table 7. Exploratory factor analysis of utilization of health care services in the studied area

Items	Factor 1	Factor 2	Factor 3	Factor 4
Maternity				
Provision of essential drugs	0.542			
Child care delivery	0.816			
Follow-up medical treatment(s)	0.777			
Community outreach	0.652			
Response to emergency	0.800			
Antenatal	0.643			
Medical check-up				
Blood pressure test		0.761		
Body temperature test		0.796		
Medical counseling		0.718		
HIV/AIDS				
HIV/AIDS			0.772	
Ailment				
Malaria test				0.818
Typhoid fever test				0.692
Cronbach's Alpha	0.766	0.771	0.709	0.757
Eigen value	2.721	1.806	1.295	1.256
% of Variance	22.722	15.050	10.792	10.463
Cumulative variance explained (%)	22.722	37.772	48.564	59.027
Kaiser-Meyer-Olkin Measure of sampling accuracy	0.957			
Bartlett's Test of Sphericity (χ^2)	444.071			
Df	66			
P-value	0.000			

Notes: Extraction method: Principal component analysis, Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 5 iterations

Factors Determining Utilization of Healthcare Services Delivered in the Studied Area

The independent multinomial and ordered probit MLE results of the factors determining utilization of primary health care service

delivered in the studied area are shown in Table 8. The diagnostic statistic *viz.* Wald χ^2 (χ^2) for the independent multinomial and ordered probit regression models are 61.586 and 86.288 respectively and both significant at 1% risk level. This implies that the aforementioned models are the best fit for the specified

equations and the coefficients herein are different from zero. The number of cases correctly predicted for the former and latter models are 69.4 and 84.9% respectively. Also the test of multicollinearity for the independent multinomial and ordered probit model indicates non-presence of collinearity between the independent variables included in the model as evident from the variance inflation factor (VIF) of each variable which is less than 10% (Table 9). The MLE results of the independent multinomial probit regression shows that the significant variables determining low, moderate, high and very high utilization levels of primary health care service delivered in the studied area are household size, access to credit and education; access to credit and extension contact; age of the farmer, household size, access to credit and co-operative membership; and, farmer's age, household size, access to credit, co-operative membership, education and extension contact, respectively.

The estimated coefficient of household size for low, high and very high utilization levels of primary health care service delivered are negatively signed and significant at 10, 5 and 1% risks levels respectively. This implies that an increase in the household size would increase the odd of not utilizing the health care service delivered as compared to the reference levels of health care service delivered *viz.* low, high and very high utilization categories. Large household size with most of its members being children and old people i.e not able bodied members are less likely to afford delivered health care services at primary health care centers' due to high expenditure incurred on family food consumption which leave them with little or no income, thus, forcing the farmers to patronize traditional or Ayurvedic medicines as the case may be to solve their ailments. This call for increase sensitization for rural farmers on the need and importance of fair household championed by WHO in order to enjoy a better standard of living. The estimated coefficient of access to credit across all the utilization levels are negatively signed and significant at 10, 5 and 1% probability levels. The implication is that farmers with no access to credit have decrease odds in favour of the reference health utilization levels *viz.* low, moderate, high and very high utilization when compared to the base level (non-utilization). Credit is not only a catalyst but an incentive which will encourage farm household to be productive in agriculture;

and, health being directly related to productive agriculture, farmers with credit will be ready to pay to get the required health care services delivered at the primary health care centers rather than patronize the traditional orthodox medicines which are more of trial and error. In order to ensure that the agricultural credits provided to the farmers are productive i.e to overcome default and delinquency the credit should be in twofold: consumption and production credits. Similarly, the negative and significance coefficients of education for low, high and very high utilization levels implies that uneducated farmers have increase odd in favour of no utilization of delivered health care services when compared with the reference utilization levels (low, high and very high utilizations). In other words it means that farmers with no formal education would likely not utilize the health care services delivered at the primary health care centers'. Education is light and the tendency of educated farmer to be laggard is very little or none as they know the attendant benefits inherent in modern medicine and the consequences that follows traditional orthodox medicine. With respect to the type of prevailing social setting in the studied area lack of formal education is expected to affect utilization of the delivered health care services at the health centers. Educational exposure serves as a catalyst or elixir that activates the engine of growth *via* efficient information acquisition and usage. The negative signed and the significance of the coefficients of co-operative membership for high and very high utilization levels of health care services implies that the odd in favour of non-utilization of health care services by farmers who don't belong to any social organization is greater than that of the reference categories. In other words it means that farmers' that don't belong to any social organization would likely not prefer to utilize the health care services as compared to their counterparts who participate in social organization. The role of social organization is not only limited to economic services but extend to social, education and moral services. It was also observed that the coefficients of extension contact for moderate and very high health utilization levels for health care services are negatively signed and significant at 5 and 1% risk levels respectively. Incidentally, the relative risk ratio in favour of non-utilization of health care services by farmers with no extension contact is greater when compared to farmers with extension contact. Agricultural extension

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programmes are not limited to farm activities but encompasses those necessary and vital factors most especially health and security that are directly related to productivity and wellbeing of the farm family. However, the age coefficient of the farmer under very high utilization category was found to be positive and significant at 1% risk level, indicating that the relative risk ratio of farmers as age advanced in favour of high utilization of health care services is greater when compared to young and

middle age farmers. In other words, if farmer age increases, the odd of going for very high utilization of health care services increase compared to the base category (non-utilization). The older the farmer the more likely he would sort for health care services given that old age in most cases is accompany with numerous health challenges in a typical agrarian setting ranging from fatigue, chronicle diseases- high blood pressure, diabetes etc.

Table 8. MLE of factors determining utilization of health care services by rural farmers in the studied area

Variables	Polytomous regression (Non-utilization is the base = 0)				Ordered probit regression	
	Low	Moderate	High	Very high	Ordered	Marginal effect
Age	-0.055(1.21) ^{NS}	-0.047(1.05) ^{NS}	-0.108(2.21)**	4.235(31.34)***	-0.060(2.46)***	0.0032(1.96)*
Gender	1.137(0.87) ^{NS}	0.634(0.56) ^{NS}	1.646(1.08) ^{NS}	3.150(1.28) ^{NS}	0.822(0.95) ^{NS}	-0.0495(0.97) ^{NS}
Household size	-0.109(1.96)*	-0.032(0.80) ^{NS}	-0.181(2.35)**	-17.659(30.39)***	-1.289(1.84)*	0.0036(1.83)*
Access to credit	-1.429(1.81)*	-1.163(1.89)*	-2.500(2.76)***	99.804(29.63)***	-0.064(1.89)*	0.0712(1.67)*
Co-operative mem.	0.728(1.06) ^{NS}	-0.007(0.01) ^{NS}	1.538(1.79)*	-32.902(18.87)***	0.921(1.91)*	-0.0516(1.74)*
Education	-1.438(1.90)*	-0.358(0.53) ^{NS}	-1.110(1.19) ^{NS}	21.054(10.04)***	-0.214(0.47) ^{NS}	0.01225(0.47) ^{NS}
Extension contact	-0.508(1.23) ^{NS}	-0.89(2.06)**	-1.449(1.51) ^{NS}	-68.305(32.46)***	-0.997(2.52)**	0.05676(2.38)**
Intercept 1	4.942(1.64) ^{NS}				6.173(4.43)***	
Intercept 2		5.369(1.64) ^{NS}			0.007(0.01) ^{NS}	
Intercept 3			6.220(1.89)*		1.500(1.20) ^{NS}	
Intercept 4				-143.543(23.63)***	1.290(1.19) ^{NS}	
No. of cases correctly predicted	129 {69.4%}				158 {84.9%}	
Wald Chi² (χ²)	61.586 (0.0003)				86.288(0.000)	

Source: Field survey, 2016

Note: * ** *** are 1, 5 and 10%, respectively. NS-Non-significant, () = p-value.

A perusal of the MLE of the ordered probit regression (pooled) shown in Table 8 shows that the significant variables which determine utilization of delivered health care services in the studied are farmers age, household size, access to credit, co-operative membership and extension contact. The farmers' age coefficient is negatively signed and significant at 5%, implying that as the age of the farmer increase by a unit the ordered log-odds of being in very high utilization category would increase by 0.07. The marginal effect indicates that the probability of aged old farmers not utilizing the health care services will decrease by 0.03% if the age of the farmer increases by 1% (1 unit). The estimated coefficient of the household size is negative and significant at 1%, implying that for a unit increase in the household size, the odds of non-utilization to high utilization categories combined versus very high category of utilization is 0.064 times less than if the household size did not increase, *ceteris paribus*. The marginal effect implication is that there is likely to be an increase in the probability of not utilizing the health care services by 0.04 if the household size of the farmer increases by 1% (1 unit). The estimated coefficient of access to

credit and extension contact are both negatively signed and significant at 10 and 5% probability level. The negative coefficient of these variables implies that the odds in favour of non-utilization to high utilization categories combined for farmers with no access to credit and extension contact versus high utilization category are 1.29 and 0.997 times respectively greater than if the farmer have access to credit and extension contact. The marginal effects implication are that the chances of farmers with neither access to credit nor extension contact not utilizing the health care services very high would increase by 0.071 and 0.057%. As shown in the table the ordered of co-operative membership of 0.97 suggests that if farmers belong to social organization the odds of very high utilization versus the combined non-utilization to high utilization is 0.97 times greater than if the farmers did not belong to co-operative organization. The marginal effect of co-operative membership suggests a decrease in the probability of not utilizing the health care services very high by 0.052% if the farmer did not belong to social organization in the studied area.

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Table9. Multicollinearity test results

Variables	Polytomous probit VIF	Ordered probit (VIF)
Age	1.435	1.435
Gender	1.061	1.061
House hold size	1.557	1.557
Access to credit	1.271	1.271
Co-operative membership	1.305	1.305
Education	1.150	1.150
Extension contact	1.292	1.292

Note: Values > 10.0 may indicate a collinearity problem

Factors Affecting Healthcare Services Delivered in the Studied Area

Presented in Table 10 are constraints affecting access to rural healthcare services delivered in the studied area. A perusal of the table showed that all the identified constraints with the exception of low health workers to patients' ratio were severe problem affecting healthcare services delivered in the studied area-poor location of the health centre, poor road network and delay in service delivery, distance to health centre, low empathy from health personals and poor sanitary measures been the most pressing problems and were ranked 1st, 2nd, 3rd, 4th, 5th and 6th respectively. The constraints viz. high cost of medical bills, consultation delay, poor patient-doctor relationship and inadequate health personals were ranked low in respect of 7th, 8th and 9th ranks respectively even though they were severe problems, while inadequate health personals which was identified as a moderate problem received the least rank (10th rank). With regard to ranking, the estimated

KCC value is 0.886 and significant at 1% probability level, meaning that there is strong concordance or agreement among the respondents with respect to this ranking. Furthermore, the significance of the estimated Friedman's Chi² statistic of 185.93 at 1% probability level proved that the ratings assigned to these constraints under investigation comes from the same statistical population. Therefore, for any policy intervention, the study advised that this ranking should be used as a bench mark of guidance given that any effort targeted towards reasonable goal should take a bottom to top approach rather than the reverse. Based on these findings the study advocate for urgent remedy to these problems identified by the farmers in the studied area most especially the pressing ones: central location of health care centre in order to ease access for most of the rural dwellers and prompt service delivery which will curb incessant avoidable death and worsening health condition of patients in the studied area.

Table10. Barriers to health care services delivered in the studied area

Constraints	Rank				Total score	Mean
	1	2	3	4		
High cost of medical bills	7575	3933	572	84	12164	63.40 (7 th)
Distance to health centre	8325	3534	528	28	12415	66.75 (4 th)
Location of the health centre	9375	2907	396	28	12706	68.31 (1 st)
Delay in service delivery	7575	3990	572	336	12473	67.06 (3 rd)
Low empathy from the health personals	6975	4389	660	28	12052	64.80 (5 th)
Poor patient-doctor relationship	5325	4446	1232	252	11255	60.51 (9 th)
Consultation delay	6450	3933	1320	28	11731	63.09 (8 th)
Inadequate health personnel	3975	3819	1672	784	10250	55.11 (10 th)
Poor sanitary measures	7575	2622	1540	112	11849	63.70 (6 th)
Poor road network	9075	2565	792	56	12488	67.14 (2 nd)
Kendell's W (KCC)	0.866					
Chi-square (χ^2)	185.93					
P-value	0.000					
Friedman's test (χ^2)	185.93					
P-value	0.000					
Df	9					
Total no. of respondent	186					

Source: Field survey, 2016

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Principal factor analysis with orthogonal Varimax rotation applied to 10 presented barriers to health care services resulted in two interpretable factors with Eigen-value above 1. The KMO measure of sampling adequacy attained a meritorious level of 0.870 with the Bartlett's Test of Sphericity been significant; implying non-existence of zero correlation, thus suggesting that the matrix is suitable for the factor analysis (Table 11). The factor loadings for the barriers to health care services exclude those for which the absolute values of the loadings were less than 0.4. The results show that 64.921% of total variation in the 10 variables were explained by the two factors, which is a satisfactory value in social sciences (Hair *et al.*, 1998). The two factors were labeled

as infrastructural and personnel constraints. The first factor labeled infrastructural constraint, accounted for 53.538% of the variance with an Eigen value of 5.354 and Cronbach alpha of 0.557. This factor has high loadings from high medical bills, distance to health care centre, location of the health care centre, poor sanitary measures and poor road network. The second factor labeled personnel constraint, has high loadings from delay in service delivery, low empathy from health personals, poor patient-doctor relationship, consultation delay and inadequate health personals to patients' ratio. This factor accounted for 11.384% of variation with an Eigen value of 1.138 and Cronbach alpha value of 0.65.

Table 11. Exploratory factor analysis of barriers to health care services in the studied area

Constraint	Factor 1	Factor 2
Infrastructural constraint		
High cost of medical bills	0.850	
Distance to health centre	0.839	
Location of the health centre	0.859	
Poor sanitary measures	0.648	
Poor road network	0.693	
Personnel constraint		
Delay in service delivery		0.794
Low empathy from the health personals		0.700
Poor patient-doctor relationship		0.455
Consultation delay		0.633
Inadequate health personals		0.825
Cronbach's Alpha	0.557	0.650
Eigen value	5.354	1.138
% of Variance	53.538	11.384
Cumulative variance explained (%)	53.538	64.921
Kaiser-Meyer-Olkin Measure of sampling accuracy	0.870	
Bartlett's Test of Sphericity (χ^2)	1095.98	
Df	45	
P-value	0.000	

Notes: Extraction method: Principal component analysis, Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 3 iterations

CONCLUSIONS AND RECOMMENDATIONS

The research empirically studied the utilization determinants of health care services provided by rural dispensaries in Niger state of Nigeria. The study showed that utilization of the health care services in the studied area were determined by the socio-economic characteristics of the farmers, especially the economic power. Also observed is low access and utilization of health care services especially diseases/ailments thereby causing incessant avoidable deaths in the studied. Mix perceptions with respect to the qualities of the health care services delivered in the studied area were observed. Infrastructural

and services constraints were found to be the obstacles to accessibility and utilization of health care services by the respondents in the studied area. Relying on these findings, the study draw an inference that there are potential evidences of improving the health conditions of the rural farmers *via* the rural health dispensary centers, as such all hand should be on desk with respect to support by stakeholders in public health sector in order to make the health service centers function to their fullest capacity. Based on these outcomes, study recommends the followings:

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- Farmers should be enrolled on the NHIS since they are directly linked with food security of the nation so that they can benefit from the health service subsidy.
- There is need to upgrade the rural health care or dispensaries to the recommended WHO standard to cater for the needs of the farmers in the studied area.
- There is need to increase the staff strength of the health personnel and make the salary packages remunerative in the study area thereby narrowing the wide gap between patients-health workers ratio.
- There is need to sensitize health workers on the need to show empathy to patients when ever their audience or services are required.
- There is need to sensitize farmers on the health dangers of patronizing quacks, drug vendors and Ayurvedic medicines.
- Establishment of public health centers in the core rural areas in order to eliminate the barrier to access and utilization of healthcare services caused by location of the prospective users.
- There is need to ensure formation of effective social organizations to serve as medium for pooling health insurance premium for suggested enrollment of farmers in NHIS and also for educational, health, social and economic enlightenments.
- Rural healthcare should be move to the exclusive list of the federal government given that LGAs have failed in their responsibility in delivery quality health care services to the most vulnerable people in the society.
- Effective monitoring mechanism for the National Primary Health Care Development Agency (NPHCDA) to keep up with their oversight responsibilities of making rural dispensaries to comply with WHO standards.
- Government should formulate stringent laws and policies to punish non-professional: quacks, drug vendors who take advantages of this weaker section of the society due to their fatalist nature to wreak havoc which in most cases results in ill-time death.
- The study urges the federal government to implement the 2014 National Health Act which stipulates that 1% of the consolidated

revenue fund (CRF) be dedicated to the health sector budget.

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