

## Determinants of Community-Based Healthcare Intervention for Infants and Children in Nasarawa State, Nigeria.

Abubakar, M.<sup>1</sup>

<sup>1</sup> Department of Geography, Faculty of Environmental Science, Nasarawa State University, P.M.B. 1022, Keffi – Nigeria.

Corresponding author's e-mail: [drdanbarau@yahoo.com](mailto:drdanbarau@yahoo.com) +234807 754 0624

### ABSTRACT

*This paper appraised the most important practices determining the community-based healthcare interventions provided to infants and children in Nasarawa State. The sampling table by Krejcie and Morgan (1972) was used to determine the sample size of 392 with a margin error of 5%. A multi-stage sampling technique was adopted; field observation and questionnaire administration was used to collect data from the respondents. Descriptive statistics, standardized score (z-score) as well as Principal Component Analysis techniques were employed to get the differentials in healthcare intervention for infants' programmes in Nasarawa State. The result established that eight Local Government Areas (LGAs) were advantaged with a score that ranged from 0.93 – 0.15 while those in the disadvantaged category were between -0.75 and -0.11. Keffi LGA was found to be the most privileged. The disadvantaged category includes Keana LGA which appeared to be the worst with a composite score value of -0.47 while Awe LGA seemed to be the least advantaged with a score of -0.11. Two Principal Components (PC) were extracted and explained 75% of the variation in the original data set, based on the Kaiser criterion of extracting variables with Eigenvalue >1 from the 10 sets of variables. Loadings of  $\pm 0.6$  were identified and selected as the significant variables affecting the strength of the intervention programme for infants and children in the study area. The result shows that PC<sub>1</sub> had weak, positive and negative loading on four variables: Home Treatment (.279); Care Seeking (-.207); Antenatal Care (.189) and Malaria Prevention (.037), and is responsible for 51% of the total variance in the overall data set and symbolizes preventive care. PC<sub>2</sub> was responsible for 23.9% of the total variance and had the entire four preventive dimensions negatively loaded. However, Exclusive Breastfeeding (.232) from the feeding dimension, as well as Micronutrients Supplementation (.336) and Hygiene (.211) in the curative dimension were similarly identified among the major factors that require further intervention in the study area. The study recommends implementation of sustainable policies and result oriented plans at the community level with specific strategies to reach the poorest through greater funding, for a reduction/elimination of neonatal mortality.*

**Keywords:** Immunization, Breastfeeding, Sanitation, Hygiene, Healthcare.

### 1. INTRODUCTION

When infants and children become sick, it is their parents and other primary caregivers, who form the first line of care. Household members, particularly mothers, undertake the primary diagnosis of illness, assess the severity and probable outcome, select treatment and care

options, including home treatment and procure and administer drugs and other remedies (De Roodebeke, Lukas, Rouzaut and Bana, 2011).

There are indications that most communities in Nasarawa State lack basic Primary Health Care (PHC) outlets; empowerment to participate in health care and environmental services; good

hygiene, clean water, and sanitation practices, resulting to poor provision of care. These were against the provisions of both the Alma-Ata in 1978 (Alma-Ata, 1978), and United Nations' Sustainable Development Goals (SDG) making the desired "health care for all" a mirage, particularly in most disadvantaged and impoverish groups and areas (Lassi, Das, Salam and Bhutta, 2014; Lassi, 2015; Lassi, Kumar and Bhutta, 2016).

As the United States Joint Commission on Accreditation of Health Care Organizations puts it, Community-based Health-care Intervention for Infants and Children is a "Sentinel event" which can be used as an indicator of a country's population health, healthcare system development, as well as its social and economic development (Salam, Das, Lassi & Bhutta, 2014). It can serve as basis for determining the quality of a country's health care system (WHO, 2014; Girum & Wasie, 2017). Since structural, social, cultural and economic factors such as distance to the health care facilities, cultural beliefs and practices, lack of information and motivation, poverty, and healthcare system-related factors such as inadequate numbers and distribution of trained and skilled health workers, poor quality services have been identified and implicated in the poor availability and accessibility of maternal neonatal health services especially in the rural and resource-limited communities of the developing countries (Antor *et al.*, 2020; Say *et al.*, 2014; UNFPA, 2012), community-base care or intervention can serve as a veritable tool and valuable programme that will ensure the availability and accessibility of maternal, newborn and child health care, most especially in the rural and resource-deprived communities of developing countries (Guta,Patrone, Risenga, Moleki & Alemu, 2018). To improve maternal, newborn, and child health outcomes thereby halting its undesirable antithesis in maternal, newborn, and child morbidity and mortality, an integrated strategy, that has as one of its major components as community-based care is recommended (Lassi, Kumar & Bhutta, 2016). Any progress that will be recorded here will be critical in achieving the sustainable Development Goals (SDGs)'s targets 3.1 and 3.2, aimed at reducing the global maternal and child mortalities ratio to less than 70 in every 100,000 live births as well as preventing preventable newborn and under-5 mortalities by 2030 (Khan *et al.*, 2018).

Participation in healthcare goes beyond the direct benefits to community members as they engage in activities that can impact positively on their health. It forms the heart of a rights-based approach progress. Participation is critical to enable people to achieve their full capabilities, exercise their rights to engage in public and community affairs, and foster equity and empowerment. These characteristics are fundamental to sustainable human development and to the objectives of such compacts as the Universal Declaration of Human Rights, the Convention on the Rights of the Child, the convention on the Elimination of All Forms of discrimination against Women, the Millennium Declaration and more recently the SDGs. The objective of this paper is to determine the most important community-based healthcare practices that encourage community-based healthcare intervention in Nasarawa State.

According to the Stedman's Medical Dictionary (2012), community-based care is the provision of skilled therapy services within a client's own home or community, with the requirement that the practitioner takes into consideration the lifestyle of the client and the cultural and social characteristics of the client's setting. It can as well be described as interventions delivered in community settings or healthcare activities that take place outside health facilities (Perry, Becerra, & Becerra, 2015). Community-based care is usually provided by community health workers (CHWs), either in a volunteering or in a no volunteering capacity. However, this set of services can as well be provided by formally trained healthcare professionals including midwives, nurses, doctors, and family health functionaries, among others, with a focus on public and community health (World Bank, 2015 & WHO, 2019a). Community-based newborn and child healthcare interventions are usually define by functional attributes such as mobilizing community resources to provide maternal, newborn and child healthcare interventions promptly and at the doorsteps of the communities to significantly improve and save lives (Guta, Risenga, Moleki, and Alemu, 2018). Also, community-based healthcare intervention involves providing home or community-level skilled care for communities through Community Health Workers (CHWs), making referrals and establishing linkages to health facilities to remove all forms of delay in order to take care of unpreventable and

untreatable obstetric and neonatal complications that may occur at home (Khan, Lassi, and Bhutta, 2018; Guta, Risenga, Moleki, and Alemu, 2018).

## 2. MATERIALS AND METHODS

### 2.1 Study Area

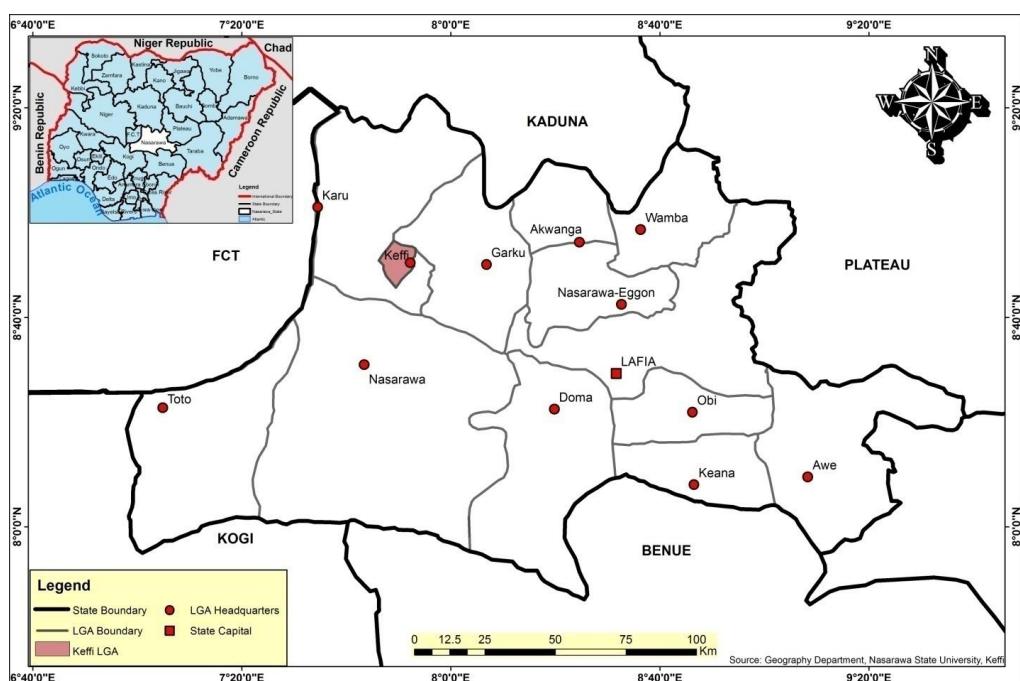
Nasarawa State which was created on 1<sup>st</sup> October, 1996 is located on latitude 7° 50' 00" N – 9° 25' 00" N and longitude 6° 58' 00" E – 9° 33' 00" E (see Figure 1) within the Guinea Savannah belt of North-Central Nigeria. The State has 13 Local Government Areas (LGAs) covering a total land area of about 26,666.02km<sup>2</sup>. The State's population was 1.87 million persons in the year 2006 (NPC, 2007). The mean annual rainfall in the State is 1300mm; Nasarawa State enjoys high sunshine hours of 8-9 hours per day. Hence daytime lengths are on the average about 8.5 hours for most of the dry season with increase in evaporation (Abubakar, Yusuf & Rabiu, 2013). Malaria transmission is intense and perennial in this area (National Population Commission,

community; ten (10) were selected for analysis. Variables  $X_1$  and  $X_2$  are categorized as feeding dimension;  $X_3$  to  $X_6$  are categorized as curative dimension; and  $X_7$  to  $X_{10}$  are categorized as preventive dimensions. In order to minimize the redundancy that may occur when too many factors are considered to achieve this, the factor analysis was used. The ten selected factors are shown in Table 1.

**Table 1: Factors Influencing Community-Based Health Care Intervention**

S/N	Household Practices	Label
1	Exclusive breast feeding	$X_1$
2	Complementary feeding	$X_2$
3	Micronutrients Supplementation	$X_3$
4	Hygiene	$X_4$
5	Immunization	$X_5$
6	Feeding and fluids for sick children	$X_6$
7	Home treatment	$X_7$
8	Care seeking	$X_8$
9	Antenatal care	$X_9$
10	Malaria Prevention	$X_{10}$

The projected population of Nasarawa State as at 2020 with a growth rate of 3.5% is 2,614,755.



**Figure 1: Geographical Location of the Study Area**

2012).

### 2.2 Methodology

This research adopted a correlational research design in an attempt to appraise the relationships between certain measured variables and make predictions and them. Among the factors that influence community-based health care intervention, promotions of child survival, health and nutrition in a

The sampling table by Krejcie and Morgan (1972) was used to determine sample size of 392 with a margin error of 5%. The sample size for each of the thirteen LGAs varies with the population size thus: Keffi (39), Toto (29), Akwanga (39), Nasarawa (34), Keana (26), Obi (25), Lafia (39), Wamba (27), Karu (40), Doma (18), Nasarawa Eggon (28), Kokona (24), and Awe (24). Considering the sampling

techniques, a multistage sampling was adopted and used. First, three wards were randomly selected in each LGA, making a total of thirty-nine (39) wards for the study. Secondly, the households were randomly selected. It was the head of the household and the women aged 18 years and above that supplied the data for the study.

Structured questionnaire was used to collect data from the respondents in the thirteen (13) Local Government Areas in Nasarawa state. The secondary sources of data included documented materials from official gazettes, annual reports, research reports, journals, and the National Population Commission (NPC). Respondents were asked to rank the hypothesized variables (Table 1) in order of importance; with the most important variable ranked as 1, second most important ranked as 2 ..., and 12 for the least important (Table 1).

The following hypotheses were tested:

$H_01$ : There is no significant difference between the distribution of observed exclusive breast feeding and a random distribution

$H_02$ : There is no significant difference between the distribution of observed curative dimension and a random distribution

$H_03$ : There is no significant difference between the distribution of observed preventive dimension and a random distribution

$H_04$ : There is no significant difference between the distribution of observed community-based health-care intervention for infants and children in the study area.

The study employed descriptive statistics such as frequency counts, averages and percentages to summarize the data. Also, the mean and standard deviation of the composite score was used to categorized the spatial variation of the community-based health-care intervention for infants and children in Nasarawa State. On the other hand, Standardized Score (Equation 1) technique was employed to get the differentials in Community-based Health-care Intervention for Infants and Children in Nasarawa State. The

score of each LGA is standardized into zero mean and unit standard deviation. The zero means form the baseline from which scores of each observation on a particular variable was compared. The composite scores are obtained by adding all the standardized scores of the variables for a particular LGA together. This aggregate score gives room for the determination of the relative position of LGAs. In fact all the LGAs that have positive or negative composite scores are tagged advantaged and disadvantaged respectively.

$$X'_{ij} = \frac{x_{ij} - \bar{x}_i}{\sigma_i} \quad (\text{Eq. 1})$$

Where  $X'_{ij}$  = Standardized score for the  $i$ th observation

$x_{ij}$  = The original of the  $i$ th observation  
 $x_{ij} - \bar{x}_i$  = The mean of the  $i$ th observation, and

$\sigma_i$  = Standard deviation of the  $i$ th observation

Moran's Index (Equation 2) was used to identify the magnitude and measure the strength of the observed spatial pattern and assess the extent to which the LGAs clustered or dispersed using the percentage of the measured variable of each LGA.

$$\text{Moran's Index} = \frac{n \sum_i \sum_j W_{ij} (X_i - \bar{X})(X_j - \bar{X})}{\sum_i \sum_j W_{ij} \sum (X_i - \bar{X})^2} \quad (\text{Eq. 2})$$

Principal Component Analysis technique was adopted to determine the strength of the variables that are responsible for the pattern of Community-based Health-care Intervention for Infants and Children in Nasarawa State.

Kaiser-Meyer-Olkin (KMO) and Bartlett's Sphericity Test is used to measure the sampling adequacy (Landau and Everitt, 2004). A value of 0.7 or below indicates unsatisfactory consistency and reliability, any value above 0.7 indicate satisfactory reliability and it is significant enough for the variables to be correlated. The result shows that the internal consistency of each measure is 0.889 which implies a good level of reliability (Table 2).

The factor analysis is used to derive the set of variables in terms of smaller number of

**Table 2: Reliability (KMO and Bartlett's) Test Statistics**

Kaiser-Meyer-Olkin Measure Of Sampling Adequacy.	Bartlett's Test of Sphericity.	Approximate Chi-Square	Df	Sig.
		.899	4374.277	.000

*Source: Author's Computation, 2020.*

dimensions out of the total number of variables in the analysis. The factor analysis model expresses each variable as a linear combination of underlying common factors  $f_1, f_2, \dots, f_m$ , with an accompanying error term to account for that part of the variable that is unique (not common with the other variables).

For  $y_1, y_2, \dots, y_p$  in an observation vector  $\mathbf{y}$ , the model is as follows:

$$y_1 = \lambda_{11}f_1 + \lambda_{12}f_2 + \dots + \lambda_{1m}f_m + \mu_1 + \epsilon_1 \dots \text{(Eq. 3)}$$

$$y_2 = \lambda_{21}f_1 + \lambda_{22}f_2 + \dots + \lambda_{2m}f_m + \mu_2 + \epsilon_2 \dots \text{(Eq. 4)}$$

$$y_p = \lambda_{p1}f_1 + \lambda_{p2}f_2 + \dots + \lambda_{pm}f_m + \mu_p + \epsilon_p \dots \text{(Eq. 5)}$$

Ideally,  $m$  should be substantially smaller than  $p$ ; otherwise we have not achieved a Parsimonious description of the variables as a functions of a few underlying factors. The  $f$ 's is the random variable that engender the  $y$ 's. the coefficients  $\lambda_{ij}$  are called *loading* and are served as weights, showing how each individually depends on the  $f$ 's. With appropriate assumptions,  $\lambda_{ij}$  indicate the importance of the  $j$ th factor  $f_j$  to the  $i$ th variable  $y_i$  and can be used in interpretation of  $f_j$ .

The variables  $y_1, y_2, \dots, y_p$  are represented as a linear combinations of a test random variables  $f_1, f_2, \dots, f_m$  ( $m < p$ ) called *factors*, with mean vector  $\mu$ . The factors are underlying *constructs* or *latent* variables that "generate" the  $y$ 's. The  $F_1, F_2, \dots, F_k$  are the common factors in each variable  $Y$ , while  $\lambda_1, \lambda_2$  signify loading and serve as weights, which shows how  $y_i$  depends on the common factors  $F_i$ , it is therefore open to question. if the original variable  $y_1, y_2, \dots, y_p$  are at least moderately correlated, the basic dimensionality of the system is less than  $p$ . The goal of factor analysis is to reduce the redundancy among the variables by using a smaller number of factors. The Statistical Package IBM SPSS software version 23 was used to analyze the data

### 3. RESULTS AND DISCUSSION

The data matrix of the standardized score (Z-score) is analysed in the following sub-sections namely, feeding, curative measure and preventive measure dimensions and subsequently put all the ten variables used for assessing levels of community-based healthcare intervention for infants and children in Nasarawa State

#### 3.1 Feeding Dimension

The criterion is presented in Table 3. It shows the data matrix in respect of standardized score values for Nasarawa State. It revealed that eight

LGAs were advantage while the remaining areas were found to be disadvantaged.

**Table 3: Standard Score on LGAs in Nasarawa State on Feeding Dimension**

LGAs	ZI	ZII	Sum	Rank
Keffi	0.04	0.89	0.93	1
Akwanga	-0.03	0.36	0.33	2
Lafia	-0.02	0.28	0.26	3
Karu	-0.05	0.28	0.23	4
Nasarawa-Eggan	0.58	-0.36	0.22	5
Toto	-0.06	0.27	0.21	6
Kokona	0.02	0.17	0.19	7
Wamba	-0.06	0.21	0.15	8
Keana	-0.02	-0.09	-0.11	9
Obi	-0.10	-0.09	-0.19	10
Doma	-0.18	-0.29	-0.47	11
Nasarawa	-0.16	-1.05	-1.21	12
Awe	-0.11	-1.11	-1.22	13

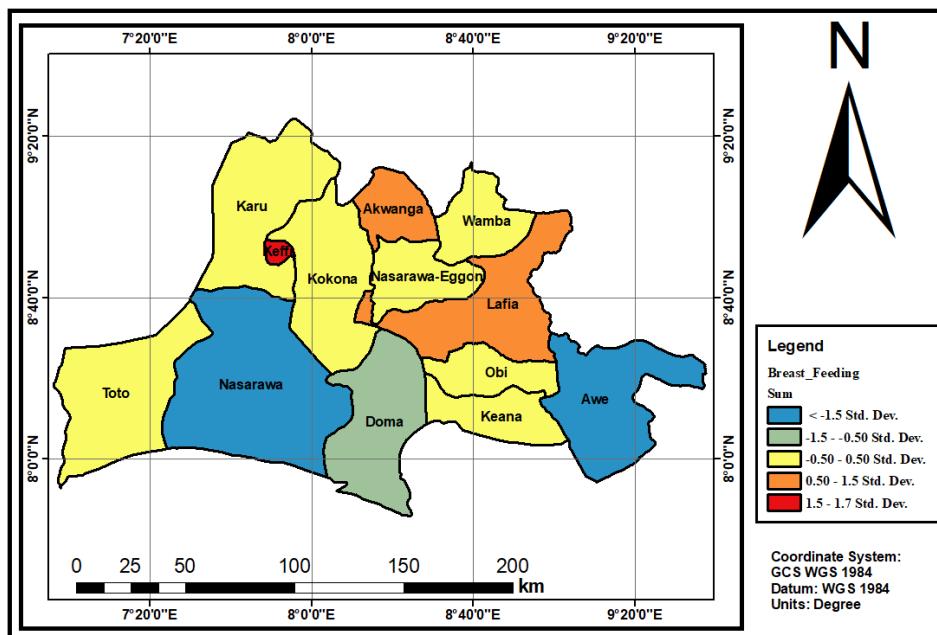
Key: Exclusive Breast Feeding = ZI, Complementary Feeding = ZII

Source: Author (2020)

The scores of the LGAs in the advantaged category range from 0.93 – 0.15 while those in the disadvantaged category are between -0.74 and -0.11. Keffi LGA was found to be the most privileged. The may be attributed to the close proximity of Keffi to the Federal Capital Territory (FCT), Abuja and houses the Federal Medical Centre, as may receive more attention and assistance from the government.

The disadvantaged category include Nasarawa and Awe LGAs, this is followed by Doma LGA that appeared to be the worst with a composite score value of -0.47. Furthermore, Keana, Obi, Wamba, Kokona, Nasarawa Eggan, Karu and Toto seemed to be the least advantaged with a score that ranged from -0.5 to 0.5, this could have been as a result of inadequate feeding practices, lack of hygiene and access to safe water or adequate sanitation. It is interesting to note that Keffi and Karu LGAs maintain the status quo of enjoying more of the facilities. The pattern of the feeding dimension is presented in Figure 2 and Figure 3.

Given the z-score of 0.902332618614, which does not exceed the critical limit of 2.58 at confidence level of 0.01, the pattern does not appear to be significantly different than random, therefore the study concludes that there is no pattern in the distribution of exclusive breast feeding in community-based healthcare intervention for infants and children in Nasarawa State.



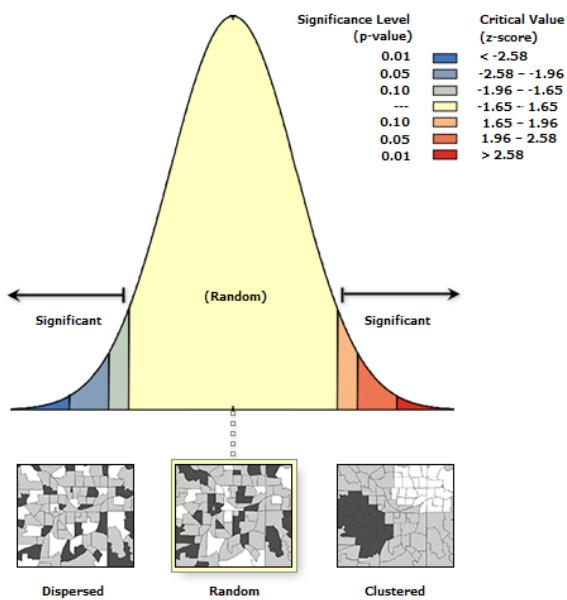
**Figure 2:** Pattern of Feeding Dimension in Community-Based Healthcare Intervention for Infants and Children in Nasarawa State.

Source: Author (2020)

Moran's Index: 0.055458

z-score: 0.902333

p-value: 0.366880



**Figure 3:** Testing the First Hypothesis

### 3.2 Curative Dimension

The standardized scores of the variables selected under this criterion are presented in Table 4 while the pattern of the curative dimension is presented in Figure 4. A cursory look at Table 4 shows that the most disadvantaged LGAs are Nasarawa Eggon at -0.64, Obi (-0.35), followed by Keffi at 0.46,

Lafia (0.15), Karu (0.10), Nasarawa (0.070, Toto (0.06), Kokokna (0.06), Wamba (-0.02) and Keana (-0.16), while the remaining three LGAs are advantaged under this criterion. The composite score values of the advantaged LGAs range from 2.1 for Akwanga, 0.67 for Awe and 0.66 for Doma are regarded as the most privileged as far the curative dimension is

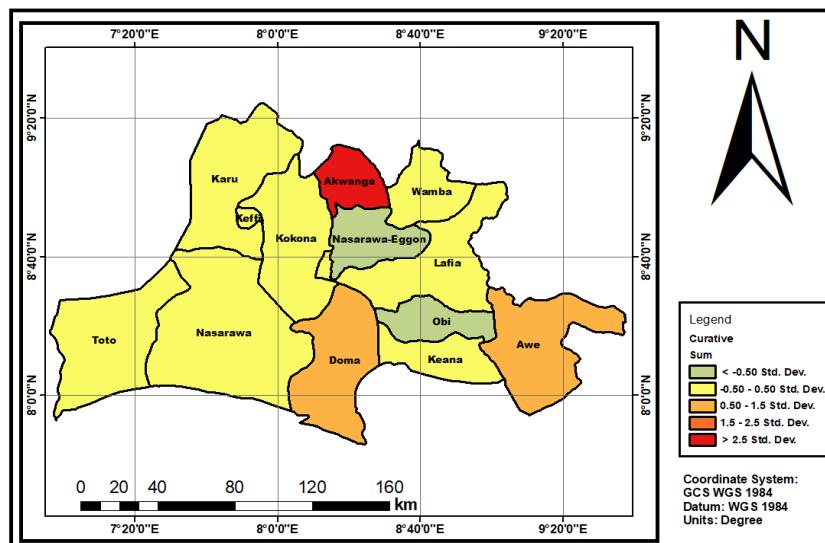
concerned in that order of performance. It can

**Table 4:** Standard Score on LGA's in Nasarawa State on Curative Dimension

LGAs	ZI	ZII	ZIII	ZIV	Sum	Rank
Akwanga	1.92	0.22	0.12	-0.16	2.1	1
Keffi	0.21	0.04	0.05	0.16	0.46	2
Lafia	-0.41	0.05	-0.06	0.57	0.15	3
Karu	-0.19	-0.03	-0.03	0.35	0.10	4
Nasarawa	0.13	0.01	0.13	-0.17	0.07	5
Toto	-0.01	0.29	0.11	-0.33	0.06	6
Kokona	-0.19	0.05	0.11	0.09	0.06	6
Wamba	0.01	-0.05	-0.15	0.17	-0.02	7
Keana	-0.25	-0.02	0.04	0.07	-0.16	8
Obi	-0.30	-0.25	-0.22	0.42	-0.35	9
Nasarawa-Eggan	-0.25	-0.17	-0.15	-0.70	-0.64	10
Doma	-0.25	0.03	0.11	-0.55	-0.66	11
Awe	-0.26	0.05	0.13	-0.56	-0.67	12

Key: Micronutrients Supplement = ZI, Hygiene = ZII, Immunization = ZIII, and Feeding and Fluids for sick children = ZIV

Source: Author (2020)

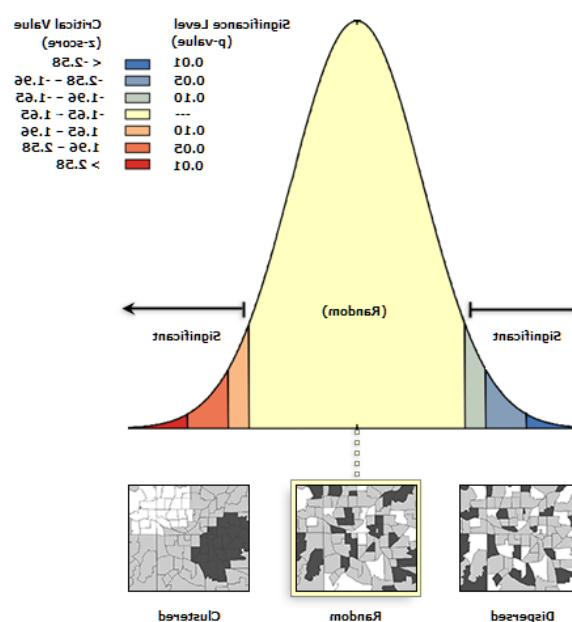


**Figure 4: Pattern of Curative Dimension in Community-Based Healthcare Intervention for Infants and Children in Nasarawa State**  
 Source: Author (2020)

Moran's Index: -0.232218

z-score: -1.006116

p-value: 0.314360



**Figure 5: Testing the Second Hypothesis**

be noted that none out of the thirteen LGAs has positive scores in all the four variables. This implies that each of the LGAs are either advantaged or disadvantaged in each of the curative dimension variables. Given the z-score of -1.00611564294, which does not exceed the critical value of -2.58 at confidence level of 0.01, the pattern does not appear to be significantly different than random, therefore the study concludes that there is no pattern in the distribution of curative dimension in community-based healthcare intervention for infants and children in Nasarawa State.

### 3.3 Preventive Dimension

The standard scores of the LGAs in the preventive dimension are presented in Table 6 while the spatial patterns of the composite scores are presented in Figure 6. The data from Table 5 indicates that eleven LGAs are advantaged while the remaining two LGAs are underprivileged. The most advantaged LGA is

packages of essential primary healthcare services for children across a continuum of healthcare that spans from pregnancy, childbirth and after delivery, leading to healthcare for children in the crucial early years of life. Again, given the z-score of 0.752362572965, which does not exceed the critical limit of 2.58 at confidence level of 0.01, the pattern does not appear to be significantly different from random, therefore the study concludes that there is no pattern in the distribution of preventive dimension in community-based healthcare intervention for infants and children in Nasarawa State.

### 3.4 Pattern of Community-based Health-care Intervention for Infants and Children in Nasarawa State

The study analyzed the pattern of community-based health-care intervention for infants and children using the selected ten indicators in the study in the study area and the result is

**Table 5:** Standard Score by LGAs in Nasarawa State on Preventive Dimension

LGAs	ZI	ZII	ZIII	ZIV	Sum	Rank
Awe	0.00	0.89	0.09	0.02	1.00	1
Keana	0.19	0.45	0.25	0.10	0.99	2
Keffi	-0.16	0.49	0.23	0.16	0.72	3
Obi	0.11	0.51	0.03	0.01	0.66	4
Wamba	0.07	0.09	0.23	0.16	0.55	5
Karu	-0.07	0.16	-0.04	0.11	0.16	6
Kokona	-0.09	-0.09	0.03	0.22	0.07	7
Nasarawa Eggon	-0.07	-0.23	0.20	0.14	0.04	8
Toto	-0.03	-0.32	0.03	0.26	-0.06	9
Lafia	-0.19	0.07	0.02	0.27	-0.08	12
Doma	0.02	-0.04	-0.09	-0.07	-0.18	11
Akwanga	0.01	-0.04	-0.83	-0.73	-1.89	12
Nasarawa	0.01	-0.43	-0.93	-0.83	-1.99	13

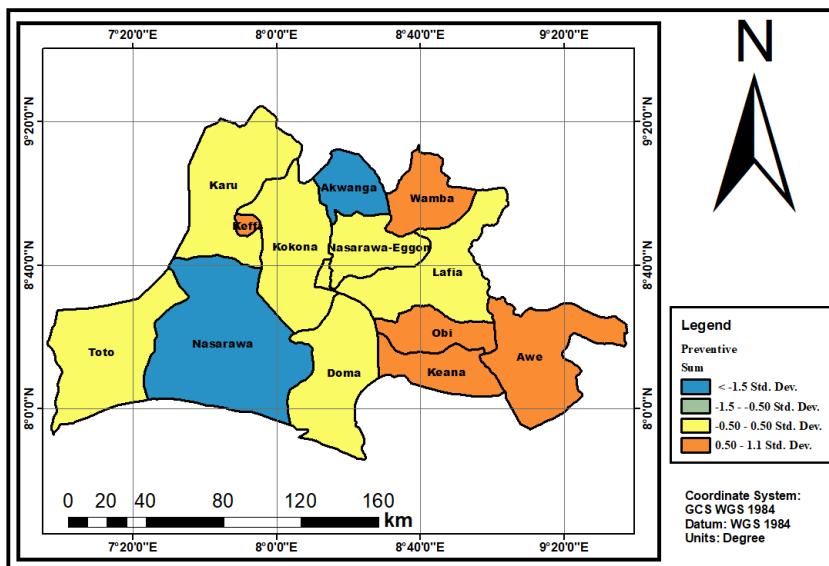
Key: Home Treatment = ZI, Care Given = ZII, Antenatal Care = ZIII, and Malaria Prevention = ZIV

Source: Author (2020)

Awe at 1.00 as far as the distribution of preventive dimension is concerned. This finding is in variance to that of WHO (2016), Olds *et al.*, (2004), Bhutta *et al.*, (2008), Khan *et al.*, (2018), and Aboubakar *et al.*, (2014) which revealed the impact of community-based intervention by bringing a 5% increase in uptake of tetanus immunization and health seeking for neonatal morbidities. This is then followed by Keana (0.99), Keffi (0.72), Obi (0.66), Wamba (0.55), Karu (0.16), Kokona (0.07) and Nasarawa Eggon (0.04) in that order of performance in the distribution. It must be noted that although these LGAs have positive scores, they enjoy varying degree of privileges in the preventive dimension. These varying degrees of privileges are attributed to appreciable level of various community-based healthcare intervention programmes by the respective LGA administrations which provide

presented in Table 6 while the pattern of community-based health-care intervention for infants and children is represented Figure 8. The study showed that the four LGAs are the most advantaged and they include Akwanga (2.24), Keffi (2.11), Awe (2.05), Toto (2.02), Doma (0.75), Wamba (0.69), Karu (0.53), Kokona (0.36), Keana (0.23) and Lafia (0.17). However, areas such as Nasarawa (-0.15), Nasarawa Eggon (-0.85), and Obi (-1.10) were found to be under-privileged in the community-based healthcare intervention for infants and children.

The composite score values of the indicators responsible for the variation ranged from 2.24 to -2.05 representing Akwanga and Toto LGAs respectively. Keffi LGA ranked second with a score value of 2.11. Wamba LGA came third with a score of 0.69. Of considerable



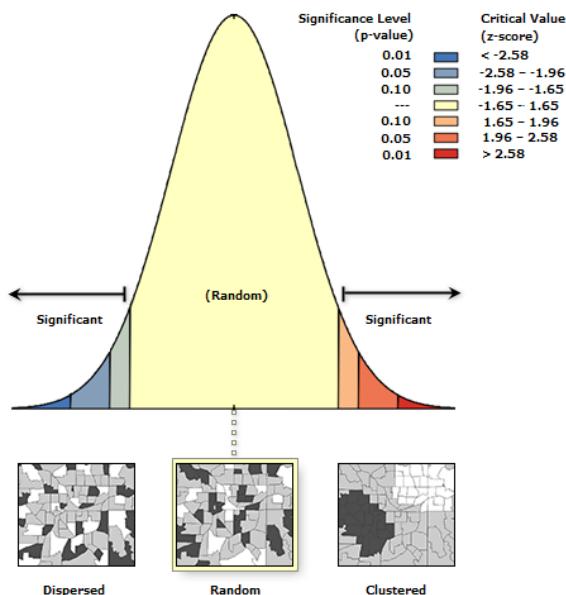
**Figure 6: Pattern of Preventive Dimension in Community-based Health-care intervention for infants and children in Nasarawa State**

Source: Author (2020)

Moran's Index: 0.047345

z-score: 0.752363

p-value: 0.451833



**Figure 7: Testing the Third Hypothesis**

importance are the scores of Akwanga and Keffi LGAs which are significantly higher than others areas. Nasarawa, Nasarawa Eggon and Obi LGAs are disadvantaged in terms of access to Antenatal Care while Akwanga LGA is advantaged in terms of complementary feeding. It is equally worth noting that none of the LGAs is advantaged in all of the indicators. Again, given the z-score of -0.3869959543023, which does not exceed the critical limit of -2.58 at a confidence level of 0.01, the pattern does not appear to be significantly different from

random. Therefore, the study concludes that there is no pattern in the distribution of community-based health-care intervention for infants and children in Nasarawa State.

### 3.5 Factors Affecting Community-based Healthcare Intervention for Infants and Children in Nasarawa State

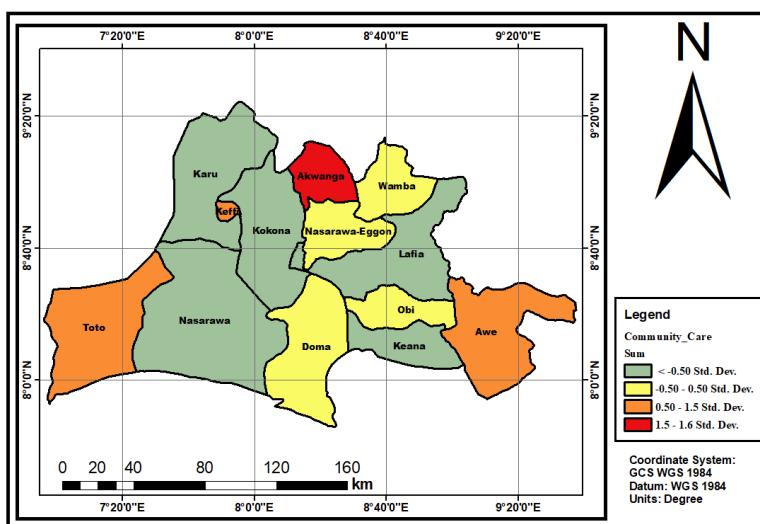
The Principal Component Analysis (PCA) was used to identify the strength of the three measured dimensions (feeding, curative, and

**Table 6:** Z-Score for Community-Based Health-Care Intervention for Infants and Children in Nasarawa State

LGA	I	II	III	IV	V	VI	VII	VIII	IX	X	$\Sigma$	Rank
Akwanga	.02	1.92	.22	.12	-.03	.36	-.04	-.16	-.09	-.07	2.24	1
Keffi	-.16	.21	.04	.05	.04	.89	.49	.16	.23	.16	2.11	2
Awe	.02	-.31	-.26	-.22	.06	-.12	-.34	-.39	.83	-.37	2.05	3
Toto	.01	-.30	-.25	-.22	-.06	.21	-.34	.42	-.83	-.73	2.02	4
Doma	-.19	.13	.01	.11	-.18	-.29	.07	-.17	.02	-.27	0.75	5
Wamba	.07	-.19	.05	.11	-.06	.21	.01	.09	.23	.16	0.69	6
Karu	-.07	-.41	.05	-.06	-.05	.28	.16	.57	-.04	.11	0.53	7
Kokona	-.09	-.19	-.03	.03	.02	.17	-.09	.35	.03	.22	0.36	8
Keana	.19	-.25	.03	.11	-.02	-.09	.45	-.55	.25	.10	0.23	9
Lafia	-.03	.01	-.05	-.15	-.02	.28	-.32	.17	.03	.26	0.17	10
Nasarawa	.00	-.01	.29	.11	-.16	-1.05	.89	-.33	.09	.02	-0.15	11
Nasarawa	.07	-.25	-.17	-.15	.58	-.36	-.23	-.70	.20	.14	-0.85	12
Eggon												
Obi	.17	-.25	-.02	.04	-.10	-.49	-.51	.07	.03	.01	-1.10	13

Key: Exclusive Breast Feeding = I, Complementary Feeding = II, Micronutrients Supplement = III, Hygiene = IV, Immunization = V, and Feeding and Fluids for sick children = VI, Home Treatment = VII, Care Given = VIII, Antenatal Care = IX, and Malaria Prevention = X

Source: Author (2020)



**Figure 8:** Pattern of Community-Based Health-Care Intervention for Infants and Children in Nasarawa State.

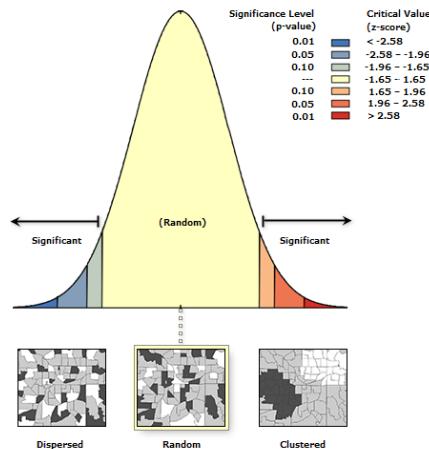
Source: Author (2020)

#### Testing the Fourth Hypothesis

Moran's Index: -0.156691

z-score: -0.386996

p-value: 0.698759



**Figure 9:** Testing the Fourth Hypothesis

preventive) of the intervention programme in order to identify the intervention which requires

more attention in the study area. The PCA result is shown in Table 7. PCA result using Varimax

normalized rotation produced two Principal Components that explained 75% of the variation in the original data set. Based on the Kaiser criterion of extracting variables with Eigenvalue  $>1$  (Hu *et al.*, 2013), two principal components were extracted from the 10 sets of variables. In the present study, loadings (correlation coefficients) of  $\pm \leq 0.6$  were identified and selected as the significant variables affecting the strength of the intervention programme for infants and children in the study area. The result indicates that (principal component one) PC<sub>1</sub> had weak, both positive and negative loading on four variables: Home Treatment (.279); Care Seeking (-.207); Antenatal Care (.189) and Malaria Prevention (.037). PC<sub>1</sub> was responsible for 51% of the total variance in the overall data set and symbolizes preventive care. The positive and negative signs of loading of the variables on PC<sub>1</sub> simply indicate a mixture of the characteristics of the various levels of intervention in the study area. PC<sub>2</sub> was responsible for 23.9% of the total variance and had the four preventive dimensions negatively loaded. However, Exclusive Breastfeeding (.232) from the feeding dimension, as well as Micronutrients Supplementation (.336) and Hygiene (.211) in the curative dimension were similarly identified among the major factors that require further intervention in the study area.

**Table 7:** PCA Rotated Component Matrix of Infants and Children<sup>a</sup>

S/N	Household Practices	Principal Component	
		PC1	PC2
1	Exclusive breast feeding	.840	.232
2	Complementary feeding	.802	.847
3	Micronutrients Supplementation	.793	.336
4	Hygiene	-.914	.211
5	Immunization	-.913	.608
6	Feeding and fluids for sick children	.720	.811
7	Home treatment	.279	-.051
8	Care seeking	-.207	-.045
9	Antenatal care	.189	-.186
10	Malaria Prevention	.038	.200
	Eigenvalues	4.586	2.132
	% Variance	50.955	23.691
	Cumm. %	50.955	74.645

<sup>a</sup>the underlined coefficients of  $\pm \leq 0.6$  are considered significant

The two extracted components, therefore, identified preventive care as the major area that requires further necessary intervention activities across the study area. The result in Table 7 shows that preventive measures need attention. It also indicates that the most basic,

yet important services and practices that requires further intervention include: skilled attendants at delivery and newborn care; hygiene promotion; adequate nutrition, particularly in the form of early and exclusive breast feeding during first six months of life, micronutrients supplementation to boost immune system; and insecticide-treated mosquito nets and effective medicines to prevent and treat malaria. This result is consistent with the studies of Salami *et al.*, (2014); Lazi (2015); Guta *et al.*, (2018); Khan *et al.*, (2018); Haruna *et al.*, (2019); Olanade *et al.*, (2019) and Sageer *et al.*, (2019), that prevention is as important as cure in reducing deaths of infants from killer diseases such as pneumonia, and that the key preventive measures for children are adequate nutrition (including breast feeding, vitamin A supplementation and zinc intake) and reduction in indoor air pollution. Likewise, studies such as De Roodebeke *et al.*, (2016); Back *et al.*, (2017); and Girum and Wasie (2017) have shown that care seeking of environmental factors, such as living in crowded homes and being exposed to parental smoking or indoor air pollution play a role in increasing children's susceptibility to pneumonia and its consequences.

#### 4.1 CONCLUSION

The study concluded that there is a varying degree of variation among the LGAs in terms of community-based health-care intervention for infants and children in Nasarawa State. The problem of gap narrowing is one that demands drastic reorientation of policy. It is viewed that the persistent wide gap in community-based health-care intervention for infants and children in Nasarawa State results stems from a lack of sound policy to create the right atmosphere for the achievement of community-based health-care intervention for infants and children in the state. There is need for the community-based health-care intervention in lagging areas so that all the communities will have equal access to benefits and assistance from the government.

A basic challenge in the future of community-based health-care intervention process in Nasarawa State in particular and Nigeria as a whole is therefore the narrowing of the gap between the advantaged and the disadvantaged LGAs. Sustainable community-based health-care intervention is unlikely to occur without serious attention from the government. Proper

channels towards implementing necessary community-based health-care intervention strategies should be strictly adhered to in order to deal with the prevailing challenges.

On the basis of the findings, the study recommends implementation of sustainable policies, proper monitoring and evaluation to reduce child mortality and provision of financial assistance to poor urban and rural mothers to improve antenatal visits, feeding and adequate sanitation. There is a need for the employment of experienced Community Health Extension Works (CHEW) and high-impact simple intervention service delivery at the community level by the Government through improved facility-based clinical care and outreach services.

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