

# Prevalence and Predictors of Complementary and Alternative Medicine (CAM) Use Among Health Workers in Nigeria

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Received: October 12, 2018 Accepted: October 26, 2018 Online Published: November 5, 2018

doi:10.5539/gjhs.v10n12p40

URL: <https://doi.org/10.5539/gjhs.v10n12p40>

## Abstract

**Background:** The use of complimentary and alternative medicines has risen globally. We therefore, explored the prevalence and predictors of use of complementary and alternative medicines among healthcare workers.

**Methods:** This was a cross-sectional study that was conducted between 1<sup>st</sup> June and 31<sup>st</sup> August 2018 on the use of complementary and alternative medicines among health workers in Federal Medical Center Makurdi and Benue State University Teaching Hospital, Makurdi in Benue State. Questionnaire was used to collect data from respondents and data analysed using logistic binary regression models.

**Result:** Response rate for the study was 80.2% out of which females were 196 (58.2%) with 215 (65.7%) in the age bracket of 31 – 60 years. Married respondents were 244 (72.4%) while Medical Doctors followed by Nurses were 87 (25.8%) and 84 (24.9%) respectively. Majority of the respondents, 113 (33.8%) have a monthly salary of above N100,000 (277.8 USD @ exchange rate of N360) while health workers of Tiv ethnic extraction had the highest number of 202 (60.7%) followed by those of Idoma extraction, 95 (28.5%). Those with years of work experience between (0 -15) were 268 (87.9%). The most used CAM was spiritual therapy, 230 (68.2%) while whole-body therapy was the least with 84 (24.9%). Use of biological therapy and manipulative therapy were 182 (54%) and 207 (61.4%) respectively. The odds of a female health worker using spiritual therapy was more than twice that of their male counterpart, (AOR: 2.218, 95% CI: 1.391 – 3.538). The odds of a Community Health Extension Worker and a medical doctor using a biological therapy among the study population were four times and almost thrice respectively compared to a pharmacist (AOR: 4.117, 95% CI: 1.690 – 10.030) and (AOR: 2.541, 95% CI: 1.095 – 5.896). The odds of an Idoma health worker using a manipulative and body-based therapy was thrice that of a Tiv health worker (AOR: 3.00, 95% CI: 1.318 – 6.829). While the odds of a Tiv health worker using whole-body therapy was seven times that of Idoma (AOR: 7.420, 95% CI: 2.186 – 25.188).

**Conclusion:** There was high prevalence of CAM use by health workers and this has potentials to influence integration of CAM with conventional medicines.

**Keywords:** alternative, complementary, health, workers, medicines

## 1. Introduction

Complementary and alternative medicine (CAM) is a term that refers to products and medicines outside conventional medical practice (Anbari & Gholami, 2015). While there seems to be no consensus on the definition of CAM, according to the National Centre for Complementary and Alternative Medicine (NCCAM), CAM is defined as "a group of various medical and health care systems, practices, and products that are not presently considered to be an aspect of conventional medicine" (Onyiaapat, Okoronkwo, & Ogbonnaya, 2011). The use of these products and practice come in different forms and shapes. Some of the medicines come in pharmaceutical forms such as capsules, teas, concentrated extracts, decoctions, tablets, and tinctures while the practice among others include chiropractic, traditional healing, naturopathy, massage, yoga, reflexology, Ayurveda, and acupuncture (Fakeye, Adisa, & Musa, 2009). Complementary and alternative medicines are used for various reasons as some use it as prophylactic measures while others to treat illness.

The use of CAM has continued to rise globally in the last few decades and different reasons have been proffered for the increasing popularity of these medicines and practice both in developing and developed economies. In the USA, 89% of the population is said to use complementary medicines while a survey in two major cities in Canada (Edmonton and Ottawa) shows that the use of complementary medicines ranged from 51% to 89% (Ellison Richmond, Denise Adams, Simon Dagenais & Lola Baydala, W James King, 2014). In the UK, prevalence of use of CAM by patients and consumers was found to be relatively lower, 51.8% (Posadzki, Watson, Alotaibi, & Ernst, 2013). World-wide, the use of CAM varies in literature from 6% to 84% (Metcalf, Williams, McChesney, Patten, & Jetté, 2010). A global systematic review of 49 surveys from 15 countries for 12-month prevalence shows a range of 9.8 – 76% (Harris, Cooper, Relton, Thomas, & Harris, 2012). The range of prevalence shows an increase over what was found in the literature ten years earlier where the global prevalence of use of CAM was found to be in the range of 9% - 65% (Ernst, 2000). In developing nations, the percentage of people that depends on CAM for their primary health care ranged from 40% in Colombia to 90% in Ethiopia (Van Anandel & Carvalho, 2013).

A literature review of published research work globally showed a life time use of CAM to be 30% - 70% among people living with HIV /AIDS (PLWHA) (Lorenec & Robinson, 2013). In a descriptive cross-sectional study of PLWHA attendees in a public hospital in Trinidad, San Fernando General Hospital, a third of the participants, 113 (32.8%) out of 343 used one form of CAM or the other (Bahall, 2017). In the United States, a total of 53.6% of those with severe depression reported using complementary and alternative therapies to treat their condition during the past 12 months in a survey carried out between November 1997 and February 1998 (Kessler et al., 2001). In Switzerland, prevalence of 53% was found among under 18 years who were registered at Swiss Childhood Cancer Registry (SCCR) between January 2002 and December 2011 (Magi, Kuehni, Torchetti, Wengenroth, & Luer, 2015). The use of CAM is also found among hypertensive patients. In a study in Baghdad, Iraq among hypertensive patients attending two public general hospitals, 65.5% (262) out of 400, was found to have used CAM at some point concurrently with orthodox medicines (Rifaat, Azmi, Saleem, Al, & Thanoon, 2018). The use of CAM is not exempted in pregnancy as many studies found the use of herbs and other forms of CAM among pregnant women. In Ethiopia, 48.6% (177) participating pregnant women were found to have used CAM in their current pregnancy as at the time of the study (Mekuria, Erku, Gebresillassie, & Birru, 2017). In northern Uganda, the prevalence compared to the study in Ethiopia was less as only 20% (78/383) was found to have used CAM during their current pregnancy (Nyeko, Tumwesigye, & Halage, 2016).

In Nigeria, the use of CAM has been studied by various researchers. Among patients attending hematologic clinic in Lagos University Teaching Hospital, 88.5% (200) of the respondents were found to have used CAM in the preceding three months (Busari & Mufutau, 2017). In a cross-sectional survey of three local government areas of Enugu urban in Enugu state, 84.7% (620) of respondents acknowledged use of CAM at some point in their life (Onyiaapat et al., 2011). Oreagba, Oshikoya, and Amachree, (2011), found a prevalence of 66.8% (259) for the use of herbs and other forms of CAM among residents in south - western part of Nigeria. The use of CAM is said to cut across all ages and categories of persons including healthy and those suffering from illness. Socio-economic spectrum is also not a barrier when it comes to the use of CAM. Among pregnant women from three geopolitical zones in Nigeria, prevalence of use of CAM was 67.5% (595) (Fakeye et al., 2009).

There are many reasons why people use complementary and alternative medicines in Nigeria. For some, once it has the approved mark by the regulatory agency, National Agency for Food, Drug Administration and Control (NAFDAC), the drug is safe. For some, it has to do with affordability and availability while for others, it is for a singular fact that the product is imported. With the continued rise in the use of CAM globally, understanding the prevalence and determinants among health workers is important after all, health workers largely influence patients preference to treatment (Masanja, Lutambi, & Khatib, 2012). Because of dearth of empirical evidence of the use of CAM among health workers in Benue State, Nigeria, the study aims to look at the prevalence and determinants of use of CAM among health workers in Makurdi, the capital city of the state. Specifically, the aim is to explore beliefs, attitude and knowledge of health workers on CAM vis-à-vis their socio-economic status. We therefore, seek to explore demographic socio-economic factors that predict the use of CAM among health workers.

## 2. Materials and Methods

This was a cross-sectional survey of health workers using questionnaires as the instrument to obtain data from the participants in Benue State in the two tertiary health institutions in the state. The health facilities included Federal Medical Center Makurdi and the Benue State University Teaching Hospital and they were purposely selected because of the size of their health workers. These two hospitals are the biggest and by our estimation, their health workers constitute over 70% of the entire health workforce of Benue State. Ethical approval for the study was obtained from the Benue State Ministry of Health and Human Services. Consent was inferred by response to the

questionnaire. The study was restricted to only participants who could read and write. Since it will not be economically and logistically possible for us to survey the entire health workers in Makurdi, we made use of the Leslie and Kish formula (Eng, 2003) to estimate the required sample size,

$$n = \frac{Z^2 p q}{\delta^2}$$

where  $n$  equals the sample size required,  $Z$  = Standard deviation set at 1.96 (Confidence Interval of 95%). The abbreviation  $p$  marks the proportions (40%) of the attribute in the population under investigation (Van Anandel & Carvalho, 2013). Delta ( $\delta$ ) equals the marginal error (5%); that is the level of precision taken.  $Q = 1 - p$ . The estimated sample size was 369.

Data was collected strictly with the use of questionnaire which was developed by the researchers. Data for the study was collected between 1<sup>st</sup> June and 31<sup>st</sup> August 2018. The questionnaire was piloted on 10 health workers who were excluded from the study and found to be easy to self-administer and took an average of only six minutes to complete. Revision was made based on comments from the pilot test. Two of the authors in addition to three research assistants were trained to facilitate the administration of the questionnaire and because the target audience was a literate population, there was no need for interpretation of the questionnaire. There were 12 questions on the questionnaire divided into two sections. The first section collected socio-demographic data which included sex, age, religion, ethnicity, marital status, occupation, income and years of professional work experience. Benue State is made of three main ethnic groups (Tiv, Idoma and Igede), any other ethnic group was grouped as 'others' in our study. The second section elicited responses on life time use of CAM which was sub-divided into biological agents, manipulation of body-based therapies, spiritual-based therapies, and whole-body medicines. All the questions contained in the questionnaire except two were close-ended with options for participants to make a choice. The open-ended questions were on age and years of work experience. Biological agents in the study included in the questionnaire were herbal medicines, honey, herbal multivitamins, food supplements and other animal products. Manipulative and body-based therapies included exercise, massage, relaxation and yoga. On the other hand, spiritual based therapies included use of holy water, anointed oils, prayers, fasting and abstinence and mantles. While whole body medicines included acupuncture, chiropractic, spinal manipulation, use of smart phones or computers among others. The data from the questionnaire were extracted into Microsoft Excel, cleaned and exported to Statistical Package for Social Sciences (IBM SPSS Inc., Chicago, IL) version 24.0. A univariate analysis was carried out and variables that showed significant association with use of CAM after Chi square test were entered into a stepwise backward logistic regression model and analysed to identify predictors of use of CAM. Statistically significant level,  $p$  was set at .05.

### 3. Results

A total of 420 questionnaires were sent out to the two tertiary health institutions namely the Benue State University Teaching Hospital Makurdi and the Federal Medical Centre Makurdi. Out of the 358 questionnaires that were returned, 21 were observed to have been filled wrongly. These wrongly filled forms included those returned forms with more than an ethnic group circled, those with more than one salary band circled and those that circled both gender. Because these errors were done randomly, those questionnaires were discarded representing a return rate of 80.2%. There were 196 (58.2%) females while those in the age category of 31 – 60 years were 215 (65.7%). Among the respondents, health workers of Tiv ethnicity were 202 (60.7%). Married respondents were 244 (72.4%) while Medical Doctors followed by Nurses were 87 (25.8%) and 84 (24.9%) respectively. Majority of the respondents, 113 (33.8%) had a monthly salary of above N100,000 (277.8 USD exchange rate of N360). Those with years of work experience between (0 -15) were 268 (87.9%). See Table 1 for details. The most used CAM was spiritual therapy, 230 (68.2%) while whole-body therapy was the least with 84 (24.9%). Use of biological therapy and manipulative therapy were 182 (54%) and 207 (61.4%) respectively. See Figure 1 for details. The population was a homogenous one with respect to religion as 337 (100%) indicated Christianity as their religion. Religion was therefore excluded from the analysis.

Table 1. Socio-demographic variables

Variable	N	%
<b>Sex</b>	337	
Female	196	58.2
Male	141	41.8
<b>Age (Years)</b>	327	
16 – 30	104	31.8
31 – 60	215	65.7
Above 60	8	2.4
<b>Religion</b>	334	
Christianity	334	100.0
<b>Ethnicity</b>	333	
Idoma	95	28.5
Igede	23	6.9
Others	13	3.9
Tiv	202	60.7
<b>Marital Status</b>	337	
Married	244	72.4
Single, separated, or divorced	86	25.5
Widowed	7	2.1
<b>Occupation</b>	337	
CHEW/SCHEW	62	18.4
Lab Scientist	10	3.0
Medical Doctor	87	25.8
Nurse	84	24.9
Others	58	17.2
Pharmacist	36	10.7
<b>Income (Naira)</b>	334	
0 – 40,000	82	24.6
41,000 – 100,000	139	41.6
Above 100,000	113	33.8
<b>Years of Work Experience</b>	305	
0 -15	268	87.9
16 – 30	30	9.8
31 – 45	7	2.3

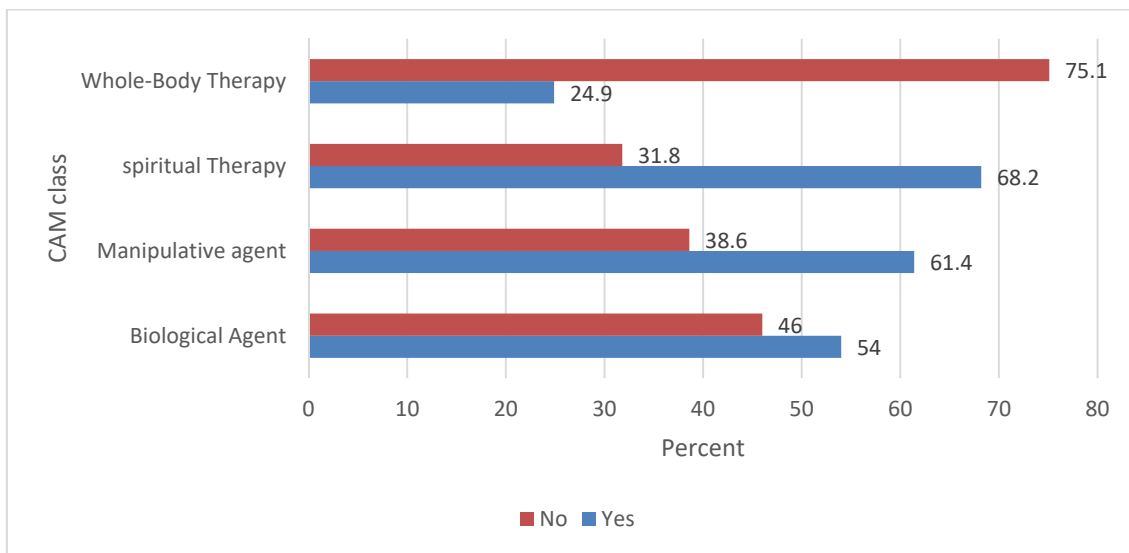


Figure 1. Chart showing percentage of respondents using CAM

### 3.1 Biological Agents

Among the ethnic groups, the odds of ‘others’ using a biological agent was almost 11 times compared to a Tiv health worker (AOR: 10.87, 95% CI: 1.387 – 85.150) while the odds of an Igede health worker taking a biological agent decreased by 68% compared to a Tiv health worker (AOR: 0.320, 95% CI: 0.121 – 0.844). The odds of a Health Extension Worker taking biological agent was four times compared to a Pharmacist (AOR: 4.11, 95% CI: 1.690 -10.030) while that of a Medical Doctor was twice that of a Pharmacist (AOR: 2.54, 95% CI: 1.095 – 5.896). The odds of someone with an income between N41,000 – N100,000 (114 USD - 278 USD) consuming a biological agent decreased approximately 70% compared to those with an income greater than N100,000 (>278 USD) (AOR: 0.294, 95% CI: 0.174 – 0.496). Lit review. (See Table 2)

Table 2. Use of biological agents by responders

Variable	n	Non-Users of CAM %	of Users of CAM %	Adjusted OR (95% CI)	P value
<b>Ethnicity</b>					
Idoma	95	43.2	56.8	1.193 (.730 – 1.949)	.482
Igede	23	73.9	26.1	.320 (0.121 - .844)	.021
Others	13	7.7	92.3	10.868 (1.387 – 85.150)	.023
Tiv	202	47.5	52.5	1	
<b>Marital Status</b>					
Married	244	38.9	61.1	2.091 (.458 -9.551)	.341
Separated, divorced, or single	86	65.1	34.9	.714 (0.150 – 3.403)	.673
Widowed	7	57.1	42.9	1	
<b>Occupation</b>					
CHEW/SCHEW	62	38.7	61.3	4.117 (1.690 – 10.030)	.002
Lab Scientist	10	70	30	1.114 (.240 – 5.180)	.890
Medical Doctor	87	50.6	49.4	2.541 (1.095 – 5.896)	.030
Nurse	84	53.6	46.4	2.253 (.967 - 5.251)	.060
Others	58	15.5	84.5	14.156 (5.113 – 39.193)	.001
Pharmacist	36	72.2	27.8	1	

Monthly Income (N)						
0 – 40,000	82	43.9	56.1	.573 (.318 – 1.035)		.065
41, 0000 -100,000	139	60.4	39.6	.294 (.174 - .496)		.001
>100,000	113	31	69	1		

### 3.2 Manipulative Therapies

The odds of an Idoma health worker using a manipulative agent was thrice that of a Tiv health worker (AOR: 3.00, 95% CI: 1.318 -6.829). The odds of a Health Extension Worker, a Medical Doctor and a Nurse using a manipulative agent were about 11 times (AOR: 10.936, 95% CI: 2.135 – 56.009), five times (AOR: 5.269, 95% CI: 1.847 – 15.035) and about four times (AOR: 3.95, 95% CI: 1.268 – 12.092) respectively compared to that of a Pharmacist. See Table 3 for details.

Table 3. Use of manipulative therapies

Variable	n	Non-Users of CAM %	Users of CAM %	Adj OR (95% CI)	P value
<b>Ethnicity</b>					
Idoma	95	26.3	73.7	3.00 (1.318 – 6.829)	.009
Igede	23	39.1	60.9	1.026 (.0244 – 4.315)	0.927
Others	13	7.7	92.3	4.772 (0.198 – 115.003)	0.336
Tiv	202	47	53	1	
<b>Occupation</b>					
CHEW/SCHEW	62	38.7	61.3	10.936 (2.135 – 56.009)	.004
Lab Scientist	10	70	30	0.694 (0.113 – 4.275)	0.694
Medical Doctor	87	34.5	65.5	5.269 (1.847 – 15.035)	0.002
Nurse	84	38.1	61.9	3.915 (1.268 – 12.092)	0.018
Others	58	24.1	75.9	9.316 (2.653 – 32.713)	0.001
Pharmacist	36	63.9	36.1	1	
<b>Monthly Income (N)</b>					
0 – 40,000	82	43.9	56.1	0.347 (0.099 – 1.223)	0.100
41, 000 -100,000	139	46.8	53.2	0.560 (0.263 – 1.189)	0.131
> 100,000	113	25.7	74.3	1	

### 3.3 Spiritual Therapy

The odds of a female health worker using a spiritual therapy was twice that of a male (AOR: 2.218, 95% CI: 1.391 – 3.538). The odds of a Nurse using a spiritual therapy was four times that of a Health Extension Worker (AOR: 4.191, 95% CI: 1.857 – 9.462) while the odds of a Pharmacist being among spiritual therapy users decreased by 82% compared to a Health Extension Worker (AOR: 0.180, 95% CI: 0.071 – 0.461). Compared to those with an income of N40,000 and below ( $\leq$  111 USD) the odds of a health worker that received over N100,000 ( $>$ 278 USD) using a spiritual therapy decreased by 72% (AOR: 0.283, 95% CI: 0.159 – 0.506). See Table 4.

Table 4. Use of spiritual therapy

Variable	n	Non-Users of CAM %	Users of CAM %	Adj OR (95% CI)	P value
<b>Sex</b>					
Female	196	24.5	75.5	2.218 (1.391 – 3.538)	0.001
Male	141	41.8	58.2	1	
<b>Occupation</b>					
Lab Scientist	10	40	60	0.947 (0.242 – 3.708)	0.938
Medical Doctor	87	31	69	1.404 (0.708 – 2.781)	0.331
Nurse	84	13.1	86.9	4.191 (1.857 – 9.462)	0.001
Others	58	22.4	77.6	2.189 (0.981 – 4.872)	0.056
Pharmacist	36	77.8	22.2	0.180 (0.071 – 0.461)	0.001
CHEW/SCHEW	62	38.7	61.3	1	
<b>Monthly Income (N)</b>					
>100,000	113	18.6	81.4	0.283 (0.159 – 0.506)	0.001
41, 0000 -100,000	139	44.6	55.4	0.552 (0.282 – 1.080)	0.083
0 – 40,000	82	29.3	70.7	1	

### 3.4 Whole-Body Therapies

It was only marital status that showed no significant association with use of whole-body therapies after using Chi-square. The remaining variables that showed a significant association were included in the binary logistics regression. The odds of a female health worker using a whole-body therapy was thrice that of a male (AOR: 3.186, 95% CI: 1.816 – 5.620). The odds of a those between ages 31 – 60 years using a whole-body therapy was 83% less compared to those who were above 60 years (AOR: 0.283, 95% CI: 0.159 – 0.506). The odds of a Tiv health worker using a whole-body therapy was seven times that of an Idoma health worker (AOR: 7.420, 95% CI: 2.186 – 25.188). As for the laboratory scientists, their odds of using a whole-body therapy was 14 times that of a Pharmacist (AOR: 14.733, 95% CI: 1.942 – 111.782) and lastly, the odds of a health worker with maximum of 15 years using a whole-body therapy was reduced by 82% compared to those with over 30 years of work experience (AOR: 0.176, 95% CI: 0.038 – 0.812). See Table 5.

Table 5. Use of whole-body therapy

Variable	N	Non-Users of CAM %	Users of CAM %	Adj OR (95% CI)	P value
<b>Sex</b>					
Female	196	66.8	33.2	3.186 (1.816 – 5.620)	0.001
Male	141	86.5	13.5	1	
<b>Age</b>					
16 - 30	104	53.8	46.2	0.857 (0.203 – 3.612)	0.834
31 - 60	215	85.6	14.4	0.168 (0.040 – 0.709)	0.0151
61 and above	8	50	50	1	
<b>Ethnicity</b>					
Igede	23	87	13	1.178 (0.672 – 2.065)	0.568
Others	13	30.8	69.2	0.495 (0.141 – 1.738)	0.272
Tiv	202	76.7	23.3	7.420 (2.186 – 25.188)	0.001
Idoma	95	73.7	26.3	1	

<b>Occupation</b>					
CHEW/SCHEW	62	80.6	19.4	0.509 (0.084 – 3.077)	0.462
Lab Scientist	10	30	70	14.733 (1.942 – 111.782)	0.009
Medical Doctor	87	83.9	16.1	0.957 (0.240 – 3.809)	0.950
Nurse	84	83.3	16.7	0.659 (0.140 -3.101)	0.598
Others	58	46.6	53.4	2.509 (0.339 – 18.550)	0.368
Pharmacist	36	83.3	16.7	1	
<b>Monthly Income (N)</b>					
0 – 40,000	82	75.6	24.4	1.470 (0.222 – 9.740)	0.689
41, 0000 -100,000	139	77.7	22.3	0.469 (0.144 – 1.521)	0.207
Greater than 100,000	113	70.8	29.2	1	
<b>Years of Work Experience</b>					
0 -15	268	81	19	0.176 (0.038 – 0.812)	0.026
16 -30	30	70	30	0.321 (0.059 – 1.739)	0.188
31 -45	7	42.9	57.1	1	

#### 4. Discussion

There have been considerable debates whether CAM should be completely incorporated into orthodox medicine. While some consider CAM as an untapped resource base for health care services, others still have a strong doubt regarding the veracity of its efficacy relative to orthodox medicines. According to the World Health Organisation, most people in developing nations still use complementary and alternative medicines for their health care (World Health Organization, 2002). In view of the crucial role played by health workers in healthcare delivery, it is important to understand the predisposing factors and prevalence of use of CAM among them. Our study shows a high prevalence of use of CAM and this is not surprising as health workers are well exposed to CAM (Johnson, Ward, & Knutson, 2011).

##### 4.1 Spiritual Therapy

Among the four categories of CAM in the study, spiritual therapy had the highest prevalence of 220 (68.2%). The use of spiritual therapy which is not new in healthcare services has continued to gain strong ground in healthcare and there are many studies that show a strong link to the use of spiritual therapy in healing and healthcare (Narayanasamy & Narayanasamy, 2008; Puchalski, 2001). In a study by American pain Society for patients in different kinds of pains, 76% preferred personal prayer for their healing to relaxation, pain medication, massage and pain injection (Mcneill et al., 1998). Some of the components of spirituality as contained in our research questionnaire included use of anointed oil, prayer, use of holy water and of mantles. In a systematic review of studies on prayer in healthcare of patients, 57% (7/12) of the participants in the literature review considered prayer as a vital factor in healing (Simão, Caldeira, & Carvalho, 2016). In our study, the odds of a female health worker using spiritual therapy was more than twice that of their male counterpart, (AOR: 2.218, 95% CI: 1.391 – 3.538). This finding agrees with that of a study in Australia where 26% of women used spiritual healing on regular basis and in the presence of illness such as cancer, the odds of using spiritual therapy was almost twice that of men (OR 1.84; 95% CI 1.28 to 2.65) (Rao, Sibbritt, Phillips, & Hickman, 2015). It is pertinent to note that females in Nigeria seek spiritual help much more than their male counterpart and topmost on the reasons for seeking such help is health problems (Balogun & Oladipo, 2009). Based on our findings, a Nurse is four times more likely to seek spiritual help compared to a CHEW while a Pharmacist is 78% less likely to use spiritual therapy. The high likelihood of use of spiritual therapy by nurses could be related to their profession. Spirituality is known to have relevance to all aspect of nursing care and not only for patients at the point death or palliative care (Giske & Cone, 2015). Nurses are also known to derive their strength on spirituality especially when relating with their patients (Evangelista, 2016).

##### 4.2 Biological Agent

The prevalence of use of biological agents among the surveyed health workers in Benue State was 54% (182) and this is not surprising as a related study on the subject matter showed a similar prevalence of 56% (347) and 62.9%



(156) among adults in Eastern and South Western Nigeria respectively and (Busari & Mufutau, 2017; Onyiaapat et al., 2011). In Selangor, Malaysia, use of biological therapy among diabetic patients was found to be 50% (150) (Ching, Zakaria, Paimin, & Jalalian, 2013). Many reasons have been provided for the popularity of biological agents as many consider them to be relatively safe, natural, less side effects, affordable and very effective (Sirois, Salamonsen, & Kristoffersen, 2016). The high prevalence of the use of biological therapy among health workers therefore, may be connected to the belief that biological therapy is effective, natural, lesser side effects and probably more affordable. Health workers of Igede ethnic extraction were 68% less likely to use biological therapy compared to their Tiv counterpart. This is not surprising as the use of biological agents for treatment is common among the Tiv ethnic group. The use of herbs for medicinal purposes among the Tiv people has been widely documented (Adebayo & Krettli, 2011; Tor-Anyiin, Sha'ato, & Oluma, 2003). In our research work, the odds of a CHEW and a medical doctor using a biological therapy among the study population were four times and almost thrice respectively compared to a pharmacist (AOR: 4.117, 95% CI: 1.690 – 10.030) and (AOR: 2.541, 95% CI: 1.095 – 5.896). The reason for the low odds of use of biological therapy among pharmacists could be documented concerns for CAM as reported among pharmacists. As experts in the study of drugs, pharmacists are said to express concern on the use of complimentary and alternative medicines due to perceived lack of scientific evidence on the efficacy of CAM and lack of knowledge of CAM (Culverhouse & Wohlmuth, 2012; Oi, Ung, Harnett, & Hu, 2017). The probability of health worker that received N41000 – N100,000 per month taking a biological therapy was 70% less compared to those collecting over N100,000 monthly. This could be that the higher the income, the stronger the purchasing power.

#### *4.3 Manipulative and Body-based Therapy*

The prevalence of use of manipulative and body-based therapy was 61.4% (207) and from the study, the odds of a health worker of Idoma extraction using a manipulative and body-based therapy was thrice that of a Tiv health worker (AOR: 3.00, 95% CI: 1.318 – 6.829). This is not surprising as ethnicity is associated with use of CAM among health workers (Bahall & Legall, 2017). The odds of a CHEW using manipulative and body-based therapies was 10 times that of a Pharmacist while the odds of a Medical Doctor and Nurse were five and four times respectively compared to a Pharmacist. The high prevalence of usage of this class of CAM is not surprising as earlier studies showed a high prevalence as well. In a study among peasant farmers in south western Nigeria, 80.1% (173) was found to have used massage as a therapy (Mbada et al., 2015). The reason for the relatively low odds of use manipulative and body-based therapy by pharmacists requires further research.

#### *4.4 Whole-body Therapy*

From our research, the prevalence of use of whole-body therapy was the least, 24.9% (84). This to our views is not surprising as the use of acupuncture, chiropractic, spinal manipulation, smart phones and computers among others is not common in Nigeria. The odds of a female using whole-body treatment was thrice that of male (AOR: 3.186, 95% CI: 1.816 – 5.620) and this agrees with a study on use of CAM among health workers in Trinidad and Tobago (Bahall & Legall, 2017). Whereas, those between ages 31 – 60 were 83% less likely to use whole-body compared to those who were 61 years and above. The odds of a health worker of Tiv extraction using whole-body therapy was seven times that of Idoma (AOR: 7.420, 95% CI: 2.186–25.188. These findings agree with two cross-sectional studies in the US where females were more likely to use a whole-body therapy while those less than 44 years were less likely to use whole-body compared to older adults ( $\geq 65$  years) (Ramamonjariavelo, Qu, & Ellis-Griffith, 2016; Zhang, Lao, Chen, & Ceballos, 2012). The study by Ramamonjariavelo et al., (2016) showed that place of origin is a predisposing factor to the use of whole-body and this could explain why the odds of use of whole-body is higher for health workers of Tiv ethnic group compared to their Idoma counterpart as the geographic origin of these tribes differs.

### **5. Conclusion**

To the best of our knowledge, this is the first study in Nigeria that focused on the prevalence and predictors of CAM among health workers. The high prevalence of CAM use by health workers has potentials to influence integration of CAM with conventional medicines. Further research is needed to explore attitudes, belief and knowledge on the use of CAM by health workers. While the results of the study can not be generalised to all health workers in Nigeria, findings have enriched the body of knowledge in this field.

### **Acknowledgements**

We wish to declare that we did not receive any financial support from anyone for the study. We appreciate the three research assistants that helped in the data collection namely Jerome Anaakaa, Philip Anongo and Torkuma Tor-Anyiin. The Benue State Ministry of Health is also acknowledged for granting the ethical approval for the

study.

### Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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