

Relationship between the Level of Spirituality and Medication Adherence among Adult Hypertensive Patients in Rural South Western Nigeria

Adetunji Omonijo^{1*}, Paul Olowoyo², Adejumoke Oluwatosin Omonijo³, Azeez Oyemomi Ibrahim⁴, Olayide Toyin Elegbede⁴, Olusegun Emmanuel Gabriel-Alayode⁴ and Oluwaserimi Adewumi Ajetunmobi⁴

¹Consultant Family Physician, Department of family medicine, Federal Teaching Hospital, Ido-Ekiti, Ekiti State, Nigeria

²Consultant Neurologist, Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria

³Department of Animal and Environmental Biology, Federal University Oye-Ekiti, Nigeria

⁴Consultant Family Physician, Department of family medicine, Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria

*Corresponding Author

Adetunji Omonijo, Consultant Family Physician, Department of family medicine, Federal Teaching Hospital, Ido-Ekiti, Ekiti State, Nigeria.

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Abstract

Background: Spirituality has been found to drive the motivational component of the Behavioural Wheel of the Theory of Change Approach in adaptation mechanisms. Effective medication adherence has been strongly associated with good hypertension control and one way to achieve this is to leverage spirituality as a strong coping mechanism in hypertensive patients.

Method: Selection was done by systematic random sampling technique. Socio-demographic and clinical information were obtained through semi-structured interviewer-administered questionnaires. The level of Spirituality was assessed using the Spiritual Perspective Scale and medication adherence was assessed using the Morisky Medication Adherence Scale 8. Data were analysed using the Statistical Package for Social Sciences version 20.0. Statistical significance was set at $p \leq 0.05$.

Results: The mean age of the respondents was 61.1 ± 11.1 years. More than half (52.6% and 61.2%) had high level of spirituality and good medication adherence respectively. Respondents with high level of spirituality (99.4%) had good medication adherence and this was statistically significant with $p < 0.001$.

Conclusion: Proper understanding and effective utilization of this relationship will assist health professionals and researchers in the appropriate integration of this concept into patients' holistic care with the aim of achieving better blood pressure control among hypertensive patients.

Keywords: Spirituality, Medication Adherence, Hypertension, Southwest, Nigeria

1. Introduction

The prevalence of hypertension is increasing in Nigeria and poor adherence to antihypertensive medications has been cited as the main contributor to hypertensive complications such as cardiovascular diseases including stroke, renal impairment and eventually death [1,2]. It is also clear that various psychosocial and pharmacological determinants influence the adherence behaviour of hypertensive patients [3,4]. Medication adherence according to the World Health Organization is the extent to which a person's

behaviour taking medication, following a diet, and/or executing lifestyle changes – corresponds with agreed recommendations from a health care provider [5]. Studies done among hypertensive patients in Nigeria by Olowookere et al., Bello et al., and Akintunde et al., showed adherence rates of 39%, 36.8% and 32% to antihypertensive medications respectively, while 44.3% was reported in a study done by Ibrahim et al. in Nigeria [6-9]. Worldwide, there has been a systematic introduction of the concept of spirituality into the medical field with a growing interest in the

possible health benefits because of having a spiritual belief and following a religious lifestyle [10].

Spirituality can be defined as “the aspect of humanity that refers to the way individuals seek and express meaning and purpose and the way they experience their connectedness to the moment, to self, to others, to nature, and to the significant or sacred” [11]. Spirituality has been found to play vital roles in health through disease detection and treatment compliance, beliefs that conflict with medical care, medical decision-making and spiritual struggles that create stress and impair health outcome [12]. Specifically, it has been noted as an essential factor influencing the health-related quality of life of chronically ill patients due to its integration into positive thoughts and health behaviours, as well as healthy coping styles which alleviate the perceived overwhelming persistent situation [13,14].

A proposed conceptual model in understanding the nature and role of spirituality in relation to medication adherence among African American hypertensives by Lewis and Ogedegbe linked spirituality with better medication adherence in patients with hypertension [15]. Lewis and Ogedengbe in their conceptual framework showed that spiritual activities such as prayer, meditation, fasting and reading spiritual materials have been noted to strengthen faith and assist with decision making in health related practices [15]. Hence, faith in the transcendent force provided direction and guidance for maintaining health and this may be useful in making positive decisions about adherence to prescribed medications [15]. In addition, spirituality provides transformation and consolation, which provide strength, which may offer resources to combat barriers associated with medication adherence [15].

In general, spirituality has been found to have direct and indirect positive influence on medication adherence by improving coping skills and social support, fostering feelings of optimism and hope, promoting healthy behavior, encouraging a sense of relaxation and reducing feelings of depression and anxiety [16-18]. Several researchers in Africa have studied the relationship between spirituality and hypertension [10]. Some of them revealed a positive correlation between spirituality, medication adherence and blood pressure control while others did not [10]. Some studies support an independent, positive relationship between spirituality and medication adherence, while others support an inverse (or lack of) association between spirituality and medication adherence [13,19,20].

A qualitative study conducted by Lewis to explore how African American older adults used spirituality to adhere to their antihypertensive medications showed that spirituality was perceived as a positive resource that helped study participants to adhere to their antihypertensive medication regimen [14]. It is worth noting that spirituality is an important component of the cultural beliefs of these participants but to date there is scanty

literature examining how Africans and specifically Nigerian adults with hypertension use their spirituality as a positive or negative reinforcement for medication adherence and Blood Pressure control [14].

The majority of the studies and reviews on the role of spirituality on anti-hypertensive medication adherence have been carried out in countries in Africa and specifically West- Africa other than Nigeria [14]. In Nigeria, relationship between spirituality and medication adherence has been explored for other health conditions like diabetes, asthma and HIV/AIDS, and not for hypertension [14]. Nigerians have strong spiritual beliefs hence their spirituality can be harnessed to improve their medication adherence [14]. In addition, some factors, which affect health beliefs and health behaviours of hypertensive patients, have been explored; there is limited research on the relationship between spirituality and hypertensive medication adherence specifically in Nigeria. This study therefore is set to address this knowledge gap. Hence, this is a study on hypertension in Nigeria that seeks to bring to light, the role of spirituality on medication adherence. Knowledge of patient’s level of spirituality and its effect on medication adherence can help primary care giver explore this often-neglected aspect of their patient’s life to improve their medication adherence. Most literatures focused on factors affecting adherence to antihypertensive therapy but not much has been published on the importance of spirituality on medication adherence. This study is designed to determine the role of spirituality in medication adherence among hypertensive patients.

These markers of spirituality and medication adherence may serve as important indices in the control of blood pressure. It also seeks to answer the following research questions:

1. What is the level of spirituality among adult hypertensive patients?
2. What is the level of medication adherence among the respondents?
3. What is the relationship between the level of spirituality and the Socio - Demographic Characteristics of respondents?
4. What is the relationship between the level of medication adherence and the Socio - Demographic characteristics of respondents?
5. What is the relationship between the level of spirituality and medication adherence among respondents?

2. Materials and Method

2.1. Study Area/Study Design/Population

The hospital-based descriptive cross-sectional study was conducted among adult hypertensive patients aged 18 years and above attending the Family Medicine Clinic of Federal Teaching Hospital, Ido-Ekiti (FETHI) in rural Southwest Nigeria. The study was conducted over sixteen (16) weeks from April to July 2017 during which a total of 1,986 hypertensive patients were encountered.

2.1.1. Inclusion Criteria

1. All consenting adult hypertensive patients aged 18 years and above.

2. Patients who have been diagnosed and on treatments for hypertension for at least 3 months in the clinic and had recorded a minimum of three (3) consecutive clinic visits in the last six months before recruitment to ensure familiarity with diagnosis and prescribed treatment modalities.

2.1.2 Exclusion Criteria

1. Patients with co-morbidity (Chronic Kidney Disease, Diabetes)

2. Critically ill patient as at the time of the study (Hypertensive emergency, Congestive cardiac failure, Cerebrovascular accident).

3. Pregnant hypertensive patients because they belong entirely to another class of hypertension.

2.2. Data Collection and Instruments

Socio-Demographic variables were obtained using semi-structured interviewer-administered questionnaire Clinical parameters (including BP) of respondents were measured, recorded and graded by the researcher.

Assessment of patients' level of Spirituality was done using the Spiritual perspective scale (SPS). It is a 10-item tool designed to measure the extent to which individuals hold certain spiritual beliefs and engage in spiritually related behaviours [10,21]. It was scored using the mean [14,22]. The mean spirituality score for this study was 40.9 ± 15.2 . The scoring and determination of the level of spirituality are found below (section 3.9.3.3.1) [14]. Scores within 10-35 was indicated a low level of spirituality and those ranging between 36-60 indicated a high level of spirituality. Using Cronbach's alpha, reliability has consistently been rated above 0.90 and average inter-item correlations are 0.878 [14,22,23]. The SPS has been used successfully in prior African studies [22,23].

2.3. Scoring and Determination of the Level of Spirituality[24]

Ten items are measuring the beliefs and behaviours of respondents on a 6 point Likert scale.

The minimum and maximum obtainable scores were 10 and 60 respectively.

Range = minimum possible score – maximum possible score

Number of expected outcome = Respondents' level of spirituality dichotomised into high or low. i.e. 2 divisions

For this study, respondents' level of spirituality is dichotomised into high or low.

This gives a range of $60 - 10 = 50$

Interval = $\frac{\text{Range (50)}}{2}$

The number of expected outcomes (2). Interval is 25

Therefore

10 to 35 (minimum score + interval) is a low level of spirituality

36 to 60 is a high level of spirituality

The Eight-item self reported questionnaire – Morisky Medication Assessment Scale (MMAS-8) was used to assess the level

of medication adherence among respondents [25,26]. The questionnaire has seven yes/no questions (accorded 1 or 0 scores respectively) and one question answered on a five-point Likert scale. It was developed from MMAS-4. According to the scoring systems of the MMAS-8, scores ranged from 0 to 8, scores <6 was considered as low adherence and 6 to 8 as high adherence respectively [27,28]. The sensitivity of the measure to identify patients with poor blood pressure control was estimated to be 93% and the specificity was 53% [27,28]. The MMAS-8 scale is reliable (Cronbach's alpha = 0.83) and it is significantly associated with blood pressure control ($p < 0.05$) in individuals with hypertension (i.e. low adherence levels were associated with lower rates of blood pressure control) [25,26]. This instrument has been used in studies in Nigeria [6,7,29]. Assessment of Blood Pressure was measured with an Accoson® brand mercury sphygmomanometer. For this study, a cut-off level of both < 140mmHg and < 90mmHg for SBP and DBP respectively were considered Controlled BP. Uncontrolled BP was considered when the SBP and DBP were ≥ 140 mmHg and ≥ 90 mmHg respectively using the recommendation of eight Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-VIII) criteria [30].

2.4. Data Analysis

All data collected were analyzed using the Statistical Package for Social Sciences (SPSS) for Windows software version 20 (SPSS Inc., Chicago, IL, USA) [31]. The data were presented in tabular form, graphs and charts as appropriate. Frequency tables and charts were generated for relevant variables. Means, standard deviations, and percentages were determined as appropriate. The means, median and standard deviation were calculated for continuous variables while categorical variables were analyzed using proportions. The Pearson's chi-square test was used to assess the bivariate association between spirituality with the respondents' socio-demographic characteristics and blood pressure control and the Fisher's exact test was used in analyzing variables with cells less than 5 counts. Binary logistic regression analysis was used to assess the association between the independent variable (spirituality) and dependent variable (blood pressure control) while adjusting for the socio-demographic characteristics. A P-value of equal or less than 0.05 was taken to be statistically significant.

2.5. Ethical Clearance and Consent

Ethical approval was obtained from the Ethics and Research Committee of Federal Teaching Hospital, Ido-Ekiti (Protocol Number: ERC/2016/02/25/08A). Informed verbal consent was obtained from the willing participants. To maintain confidentiality, no names appeared on the questionnaires, but only numbers were used as identifiers.

3. Results

3.1. Characteristics of Respondents

304 respondents participated in the study. The respondent's ages ranged between 18 and 82 years, their mean age was 61.1 ± 11.1 years and the majority (57.9%) were older adults (65-82 years).

The majority of respondents were female (53.6%) and were married (76.0%), Christians (78.6%) and rural dwellers (64.5%) from the Yoruba tribe (74.7%). Most respondents were traders (37.5%) who had a primary level of education (31.9%) and earned incomes below the poverty line (57.7%). The details of the respondent's socio-demographic characteristics were as shown in Table 1 below.

Variable	Frequency (n = 304)	Percentage (%)
Age (years)	61.1 ± 11.1	
Young Adult (18-35)	6	2.0
Middle-Aged Adult (36-64)	122	40.1
Older Adult (65-82)	176	57.9
Sex		
Male	141	46.4
Female	163	53.6
Marital Status		
Single	10	3.3
Married	231	76.0
Divorced/Separated	43	14.1
Widowed	20	6.6
Religion		
Christianity	239	78.6
Islam	59	19.4
Traditionalist	6	2.0
Domicile		
Urban	108	35.5
Rural	196	64.5
Ethnicity		
Yoruba	227	74.7
Igbo	46	15.1
Hausa	26	8.6
Others	5	1.6
Educational Level		
None	38	12.5
Primary	97	31.9
Secondary	63	20.7
Tertiary	88	29.0
Post Graduate	18	5.9
Occupation		
Professionals	61	20.1
Trading	114	37.5
Farming	67	22.0
Retiree	32	10.5
Self – Employed	30	9.9
Income*		
< Poverty Line (<₦20,520)	175	57.7
≥Poverty Line (≥₦20,520)	129	42.3

₦20,520 is the expected minimum income per month equivalent of \$1.90 per day at \$1 equals to ₦360 (as of July 5, 2017)[32]

Table 1: Socio-Demographic Characteristics of Respondents

Table 2 showed the Spiritual perspective scale based on the spiritual behaviours and beliefs of respondents. Spiritual behaviours that contributed significantly to the high level of spirituality in this study were: private prayers/meditations ($\chi^2 = 3.42$, $SD = 0.97$) and spiritual discussions with family and friends ($\chi^2 = 3.19$, $SD =$

0.92), while Spiritual beliefs that contributed significantly to the high level of spirituality in this study were: forgiveness ($\chi^2 = 3.27$, $SD = 0.74$), seeking spiritual guidance before making decisions ($\chi^2 = 3.26$, $SD = 0.87$) and regarding spirituality as a means of finding live meaning and solving life's puzzle ($\chi^2 = 3.26$, $SD = 0.64$).

S/N	SPS (Spiritual Behaviours)	Not at all	Less than once a year	About once a year	About once a month	About once a week	About once a day	ΣF	Mean	Standard Deviation
1	In talking with family and friends, how often do you mention spirituality?	4	10	16	35	102	137	304	3.19	0.92
2	How often do you share with others the problems and joys of living according to your spiritual beliefs?	10	11	10	54	102	117	304	3.08	1.10
3	How often do you read spiritually related material?	14	15	20	50	92	113	304	2.95	1.11
4	How often do you engage in private prayer and meditation?	9	10	6	36	48	195	304	3.42	0.97

Table 2a: Spiritual Perspective Scale

S/N	SPS (Spiritual Beliefs)	Strongly Disagree	Disagree	Disagree more than agree	Agree more than disagree	Agree	Strongly Agree	ΣF
5	Forgiveness is an important part of my spirituality.	5	7	10	11	154	117	304
6	I seek spiritual guidance in making decisions in my everyday life.	5	19	20	24	127	109	304
7	My spirituality is a significant part of my life.	5	20	27	31	120	101	304
8	I frequently feel very close to God or a "higher power" in prayer, during public worship or at important moments in my daily life.	2	19	32	19	132	100	304
9	My spiritual views have had an influence upon influenced my life.	5	10	33	25	130	101	304
10	My spirituality is especially important to me because it answers many questions about the meaning of life.	2	7	21	31	151	92	304

Table 2b: Spiritual Perspective Scale

Table 3 showed the level of spirituality among the respondents. More than half (52.6%) of the respondents had a high level of spirituality while 47.4% had a low level of spirituality. The mean spirituality score obtained was 40.9±15.2.

Variable	Frequency n= 304	Percentage (%)
Spirituality Perspective Scale		
Low (10-35)	144	47.4
High (36-60)	160	52.6
Total	304	100.0
Mean Spirituality Score ± SD	40.9 ± 15.2	

Table 3: Assessment of the Level of Spirituality among the Respondents

Table 4 showed the level of medication adherence amongst the respondents based on the Morisky Medication Adherence Score (MMAS). It was observed that 61.2% of the respondents had high level of medication adherence while 38.8% had low level of medication adherence. The mean medication adherence score obtained was 5.75±1.96.

Variable	Frequency n= 304	Percentage (%)
Medication Adherence		
Low (<6)	118	38.8
High (6-8)	186	61.2
Total	304	100.0
Mean Adherence Score ± SD	5.75± 1.96	

Table 4: Assessment of the Level of Medication Adherence among the Respondents

Table 5 showed the relationships between the socio-demographic characteristics of respondents and their level of spirituality. Older adult (64.4%), female (67.5%), married (58.4%), Christian (56.5%), Urban dwelling (55.1%) respondents had high level of spirituality. In addition, respondents that had a tertiary level of education (70.4%) who are retired (66.7%) and earned below the poverty line (75.4%) had a high level of spirituality. All variables were statistically significant with p<0.05 except the area of domicile.

Variable	Spirituality			χ ²	p-value
	Low (%) n = 144	High (%) n = 160	Total N=304		
Age (years)					
Young Adult (18-35)	4 (66.7)	2 (33.3)	6 (100)		0.004‡
Middle-Aged Adult (36-64)	77 (63.6)	44 (36.4)	121 (100)		
Older Adult (65-82)	63 (35.6)	114(64.4)	177 (100)		
Sex					
Male	91 (64.5)	50 (35.5)	141 (100)	31.09	<0.001
Female	53 (32.5)	110 (67.5)	163 (100)		
Marital Status					
Single	10 (100.0)	0 (0.0)	10 (100)		0.001‡
Married	96 (41.6)	135 (58.4)	231 (100)		
Divorced	15 (75.0)	5 (25.0)	20 (100)		
Separated	14 (60.9)	9 (39.1)	23 (100)		
Widowed	9 (45.0)	11 (55.0)	20 (100)		
Religion					
Christianity	104 (43.5)	135 (56.5)	239 (100)		0.018‡

Islam	37 (62.7)	22 (37.3)	59 (100)		
Traditionalist	4 (66.7)	2 (33.3)	6 (100)		
Domicile					
Urban	88 (44.9)	108 (55.1)	196 (100)	1.35	0.245
Rural	56 (51.9)	52 (48.1)	108 (100)		
Educational Status					
None	24 (63.2)	14 (36.8)	38 (100)	21.57	<0.001
Primary	57 (58.8)	40 (41.2)	97 (100)		
Secondary	31 (49.2)	32 (50.8)	63 (100)		
Tertiary	26 (29.6)	62 (70.4)	88 (100)		
Post Graduate	6 (33.3)	12 (66.7)	18 (100)		
Occupation					
Professionals	24 (39.3)	37 (60.7)	61 (100)	13.43	0.009
Trading	49 (43.0)	65 (57.0)	114 (100)		
Farming	43 (64.2)	24 (35.8)	67 (100)		
Self Employed	18 (56.3)	14 (43.7)	32 (100)		
Retired	10 (33.3)	20 (66.7)	30 (100)		
Income					
<Poverty Line	43 (24.6)	132 (75.4)	175 (100)	85.96	<0.001
≥Poverty Line	101 (78.3)	28 (21.7)	129 (100)		

‡ = Fisher's Exact Test

Table 5: Relationships between the Level of Spirituality and Sociodemographic Characteristics of Respondents

Table 6 showed the relationships between the socio-demographic characteristics of respondents and their medication adherence. Older adults (79.7%), female (90.4%), married (68.4%), and urban dwelling (65.8%) respondents had high medication adherence. In

addition, respondents that had tertiary level of education (84.1%) who are retired (80.0%) and earned below the poverty line (86.9%) had a high level of medication adherence. All variables were statistically significant with $p < 0.05$.

Variable	Low (%) n = 118	High (%) n = 186	Total N=304	χ^2	p - value
Age (years)					
Young Adult (18-35)	6 (100.0)	0 (0.0)	6 (100)	12.736	0.002‡
Middle-Aged Adult (36-64)	76 (62.8)	45 (37.2)	121 (100)		
Older Adult 65-82)	36 (20.3)	141 (79.7)	177 (100)		
Sex					
Male	86 (61.0)	55 (39.0)	141 (100)	53.227	<0.001
Female	32 (19.6)	131 (90.4)	163 (100)		
Marital Status					
Single	9 (90.0)	1 (10.0)	10 (100)	53.227	0.003‡
Married	73 (31.6)	158 (68.4)	231 (100)		
Divorced	14 (70.0)	6 (30.0)	20 (100)		
Separated	13 (56.5)	10 (43.5)	23 (100)		
Widowed	9 (45.0)	11 (55.0)	20 (100)		
Domicile					

Urban	67 (34.2)	129 (65.8)	196 (100)	4.984	0.026
Rural	51(47.2)	57(52.8)	108 (100)		
Educational Status					
None	22 (57.9)	16 (42.1)	38 (100)	34.085	<0.001
Primary	51 (52.6)	46 (47.4)	97 (100)		
Secondary	26 (41.3)	37 (58.7)	63 (100)		
Tertiary	14 (15.9)	74 (84.1)	88 (100)		
Postgraduate	5 (27.8)	13 (72.2)	18 (100)		
Occupation					
Professionals	17 (27.9)	44 (72.1)	61 (100)	20.026	<0.001
Trading	40 (35.1)	74 (64.9)	114 (100)		
Farming	38 (56.7)	29 (43.3)	67 (100)		
Self – Employed	17 (53.1)	15 (46.9)	32 (100)		
Retired	6 (20.0)	24 (80.0)	30 (100)		
Income					
< Poverty Line	23 (13.1)	152 (86.9)	175 (100)	114.45	<0.001
≥Poverty Line	95 (73.6)	34 (26.4)	129 (100)		

\ddagger = Fisher's Exact Test

Table 6: Relationships between Medication Adherence and the Socio – demographic Characteristics of Respondents Medication Adherence

Table 7 showed the relationships between spirituality and Medication Adherence among the respondents. The table showed that medication adherence increases with higher spirituality. Medication adherence was higher among respondents with high

level of spirituality (99.4%), while majority of those with low level of spirituality ranked lowest in medication adherence (81.3%). The relationship was statistically significant as $p < 0.05$.

Variable	Medication Adherence			χ^2	p-value
	Low (<6) (%) n = 118	High (6-8) (%) n = 186	Total (%) N=304		
Spirituality					
Low (10-35)	117 (81.3)	27 (18.7)	144 (100)	207.44	<0.001
High (36-60)	1 (0.6)	159 (99.4)	160 (100)		

Table 7: Relationship between Spirituality and Medication Adherence among the Respondents

Table 8 explains how some socio-demographic characteristics predicted the level of spirituality. Respondents who were middle-aged adults (1.54 times), Married (7.54 times), Christians (3.38 times), Postgraduate (2.70 times), Professionals (3.54) were more

likely to have a high level of spirituality. However, respondents who were male gender (0.71 times), farmers (0.78) and earned income below the poverty line (0.74 times) were less likely to have high medication adherence.

Variable		OR	95% CI		p-value
			Lower	Upper	
Age group	Young Adult (18-35)	0.54	0.53	2.68	0.051
	Middle-Aged Adult (36-65)	1.54	1.05	8.42	0.003
	Older Adult (>65)	1.0 (RC)			
Sex	Male	0.71	0.04	0.90	0.021
	Female	1.0 (RC)			
Religion	Christianity	3.38	1.22	10.81	0.004
	Islam	1.11	1.08	3.29	0.031
	Traditionalist	1.0 (RC)			
Education	None	1.0 (RC)			
	Primary	1.55	0.13	6.93	0.051
	Secondary	1.11	1.04	7.42	0.012
	Tertiary	2.13	1.67	10.54	0.037
	Postgraduate	2.70	1.08	9.93	0.030
Occupation	Professionals	3.54	1.04	9.47	0.022
	Trading	1.21	1.02	6.21	0.004
	Farming	0.78	0.09	0.99	0.016
	Self – Employed	3.02	1.98	9.83	0.039
	Retired	1.0 (RC)			
Income	< Poverty Line	0.74	0.10	0.97	0.006
	>Poverty Line	1.0 (RC)			

Table 8: Logistics Regression for predictors of Spirituality among the Respondents

Table 9 explains how some socio-demographic characteristics predicted medication adherence. Respondents who were married (7.54 times), divorced (3.23 times), Urban dwellers (2.13 times), Professionals (3.29) and high level of spirituality (4.53 times)

were more likely to have high medication adherence. However, respondents who were middle-aged adults (0.72 times), male gender (0.63 times) and earned income below the poverty line (0.54 times) were less likely to have high medication adherence.

Variable		OR	95% CI		p-value
			Lower	Upper	
Age group	Young Adult (18-35)	0.53	0.10	3.21	0.072
	Middle-Aged Adult (36-64)	0.72	0.16	0.94	<0.001
	Older Adult (65-82)	1.0			
Sex	Male	0.63	0.23	0.89	0.010
	Female	1.0			
Marital Status	Single	0.51	0.181	1.432	0.201
	Married	7.54	1.21	17.89	<0.001
	Divorced	3.23	1.11	7.38	<0.001
	Separated	0.92	0.51	1.35	0.052
	Widowed	1.0			
Domicile	Urban	2.13	1.87	6.82	<0.001
	Rural	1.0			

Education	None	1.0 (RC)			
	Primary	2.32	1.02	7.59	0.034
	Secondary	4.84	3.42	10.29	0.027
	Tertiary	5.96	1.03	7.00	0.016
	Postgraduate	5.99	1.10	10.25	0.001
Occupation	Professionals	3.29	1.79	9.67	0.009
	Trading	2.12	1.45	4.42	0.025
	Farming	0.93	0.39	1.92	0.052
	Self – Employed	1.17	1.01	3.02	0.031
	Retired	1.0 (RC)			
Income	< Poverty Line	0.54	0.06	0.82	0.004
	>Poverty Line	1.0 (RC)			
Spirituality	High	4.53	1.42	9.96	<0.001
	Low	1.0 (RC)			

Table 9: Logistics Regression for predictors of Medication Adherence among the Respondents

4. Discussion

4.1. Socio-Demographic Characteristics of Respondents

In Table 1, the socio-demographic profile of the respondents showed that the mean age of patients with hypertension in this study was 61.1 ± 11.1 years with the majority of the respondents being above 65 years. This was higher than 50.9 ± 9.1 years reported in a similar hospital-based study in Port-Harcourt by Akpa et al and 50.6 ± 1.5 years reported in a study by Azinge et al in Lagos [33,34]. It was however lower than the mean age of 63.1 ± 5.7 years found in an international survey [35]. The reason for the higher preponderance of hypertension in the older age group found in this study compared to other studies might be because this study was done in a rural population as this usually consists of older age group due to rural to urban migration of the young age groups. However, Ido-Ekiti town is a non-industrialised semi-urban setting surrounded by rural settlements.

The majority of the respondents {163 (53.6%)} in this study were females. This aligned with the findings of Iloh et al. (65.2%) who also reported a higher prevalence of hypertension in females [36]. It is worthy of note that women are protected from most cardiovascular events compared to men, until after menopause, during which women are at increased risk of cardiovascular complications compared to premenopausal women [37,38]. Gender differences in blood pressure is inconsistent in many population studies, while some studies quoted a higher prevalence of hypertension among males, others reported no significant gender difference [33,39-41]. These inconsistencies could be as a result of different age populations or the methodology used in these studies.

In this study about two-thirds {231 (76%)} of all the respondents were married. This was similar to findings by Marfo et al [42]. Who reported 74% married hypertensive patients [42]. However, findings in this study was higher than the 66.4% reported in Ibadan

by Ekore et al.[41]. This difference may be due to the variation in marriage culture in different states and regions among the study populations in Nigeria. The percentage of respondents who did not have any formal education was 12.5%. It could be inferred that 87.5% had formal education in this study. This might be due to the study area which is located in the South-Western part of the country where there is a high literacy level which might influence patients' health-seeking behaviour in terms of them presenting in the hospital for the management of their disease. This study confirms the rating of Ekiti State as an educationally advantaged state. The reported level of literacy was much higher in a hospital-based study done among young adults in Ibadan, South-western Nigeria where about 79.1% of respondents had a minimum of secondary school education and 40.0% reported in Lagos among market women [41,43]. These differences may be due to the different study populations among whom the studies were conducted.

4.2. Level of Spirituality among Respondents

In Table 3, this study showed that the majority of the respondents (52.6%) had a high level of spirituality. The finding of the majority of the respondents being highly spiritual in this study may not be unconnected with the cultural practices, which were inherent in Nigeria. This was similar to a study by Ibraheem et al in the relationship between self-reported health status and spirituality among adult patients in Ibadan, Nigeria who found a 51% level of spirituality [44]. In contrast, Jeri and Lynda reported 100% spirituality level among Nigerians living in America [45].44 This is higher than that obtained in the present study, and the difference may be due to the different study populations among whom the studies were conducted and the method used in the study.

In Table 2. Spiritual behaviours that contributed significantly to the high level of spirituality in this study according to Table 3 were:

private prayers/meditations ($\chi^2 = 3.42$, $SD = 0.97$) and spiritual discussions with family and friends ($\chi^2 = 3.19$, $SD = 0.92$). Also, Spiritual beliefs that contributed significantly to the high level of spirituality in this study were: forgiveness ($\chi^2 = 3.27$, $SD = 0.74$), seeking spiritual guidance before making decisions ($\chi^2 = 3.26$, $SD = 0.87$) and regarding spirituality as a means of finding meaning to live and solving life's puzzle ($\chi^2 = 3.26$, $SD = 0.64$).

4.3. Relationship between Spirituality and Medication Adherence
In Table 4, this study has shown a good medication adherence level of 61.2% and 52.6% high spirituality level. Chi square test showed a significant relationship between them with $p < 0.001$. It was observed that majority (99.4%) of those who had high level of spirituality also had good medication adherence and conversely more than two-third (81.3%) of respondents who had low level of spirituality also had poor medication adherence. This is similar to a cross sectional study by Lewis and Ogedengbe which showed a significant positive relationship between spirituality and medication adherence [15]. The mechanism identified by them included social support, active coping and complementary practices like prayer and faith [15]. However, inverse patterns of relationship between spirituality and medication adherence were seen in studies conducted by Polzer et al. and Koenig et al [16,46]. These studies showed that spirituality encouraged avoidance or discontinuance of allopathic treatments, failure to seek medical care, and avoidance of effective preventive health measures [16,46]. Logistic regression done in this study according to Table 9 showed that for a single unit increase in the level of spirituality, hypertensive patients were 4.53 times more likely to adhere to their medication ($OR = 4.53$, $95\%CI = 1.42-9.96$, $p < 0.001$). Hence, high level of spirituality is a significant predictor of high (good) medication adherence among hypertensive patients.

4.4. Relationship between Spirituality and Socio-Demographic Characteristics of Respondents

In Table 5, this study found that spirituality levels increased with age and specifically, more than half (64.4%) of the older aged group has a higher level of spirituality. This could be as a result of the fact that, as people get older they tend to find solace and meaning to life in the transcendent and hence tend to have more inclination towards spirituality [47]. The above finding is in agreement with hospital-based research conducted by Ibraheem et al (83.9%) who also reported an increased level of spirituality with age [44].

This study established the fact that women have higher spirituality than men (67.5%). This is possibly due to the vulnerability of women in this part of the world and women tend to find solace in their spiritual and religious practices. This is also similar to what Jeri et al. (63%) found in his study [45].

In this study, a higher spirituality score was found among the respondents who were married (58.4%) when compared with the respondents who were single or divorced and this difference was statistically significant ($p = 0.001$). This might be due to the possible encouragement by the spouse towards spirituality, which

is not found between the single and the divorced. This trend was in agreement with the finding of Ibraheem et al [44]. In his study on the relationship between self-reported health status and spirituality among adult patients attending the General outpatient clinic of a tertiary hospital in Ibadan where he reported a higher spirituality level among married people (68%) compared with those who were not married [44].

It was observed in this study that spirituality increased with an increase in the level of literacy and this was statistically significant ($p < 0.001$). This might be due to the high literacy level found in a large proportion of the respondents in this study. This is different from the previous finding of Silva et al [48]. Who reported that people of low socio-economic class tend to be more spiritual and that the prevalence of spiritual commitment tends to drop off among higher-income categories [48].

4.5. Relationship between Medication Adherence and Socio-Demographic Characteristics of Respondents

In Table 7, the level of medication adherence in this study was found to increase with increasing age. Specifically, more than three-quarter (79.7%) of the older aged group had high level of medication adherence. This could be attributed to the fact that older people might have more concern about their health than younger people have and hence adhere strictly to prescribed regimen. However, inverse relationship between age and medication adherence levels have been highlighted in a study by Akintunde et al [49]. Which was attributed to presence of co-morbidities leading to high pill burden from treating the co-morbidities, hence worsening their adherence levels.

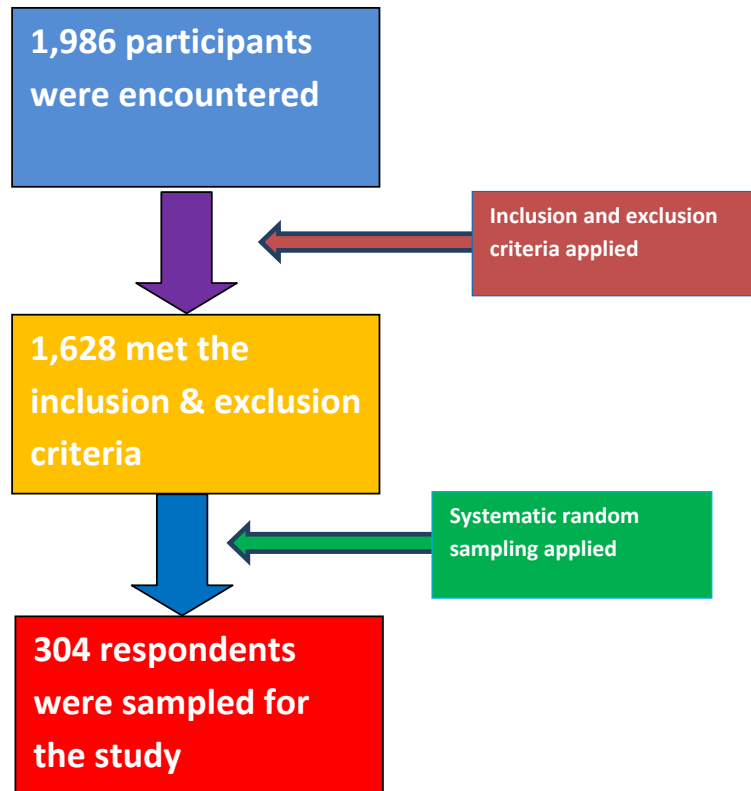
This study showed that over two-third (68.4%) of married participants had good medication adherence. Being married connotes good social support, which could have contributed to high medication adherence found in this study. This is supported by previous study on spirituality and medication adherence among hypertensive patients by Lewis and Ogedengbe where good family or social support is predictive of high medication adherence [15].

Medication adherence level was found to be better among the female respondents. The observation of this study could be because the majority (53.6%) of the study population were female therefore; there is tendency for a skewed result to a higher medication adherence levels among women. In addition, this might be due to possibly better health seeking behaviour and better family support among women with hypertension. This is in contrast to a study on medication adherence done by Manjusha et al [50]. In India where higher adherence rates was found in male respondents and this might be due to higher level of education among males in the study.

Respondents with low literacy level were found to have lower medication adherence (57.9%). This is not surprising as low literacy level might affect their level of knowledge of hypertension

and consequently its management. They also may not recall verbal advice or may misinterpret such advice. This is similar to what was found in a study on by Boima et.al in Ghana (47.7%). He found that low educational level makes learning difficult as treatment

gets more complex; patients are required to have more cognitive skills to be able to understand the prescribed therapy and to adhere to treatment [51].



5. Conclusion

Spirituality has a strong influence on medication adherence among adult hypertensive patients in rural South-western. Health professionals can leverage this information to provide socio-culturally sensitive and patient-centred care that will improve medication adherence among patients with hypertension.

Recommendations

Spirituality is a strong motivator for medication adherence among patients with hypertension. Therefore, physicians should take appropriate history on spirituality while managing patients with hypertension to identify their level of spirituality to project the adherence capability. This will help to strengthen the available opportunities to improve their spirituality amidst other factors determining medication adherence such as side effects and pill burden. In addition, the Physicians should encourage the health facilities to have chaplains and Imams that patients can be referred to for spiritual assistance when needed. It is also important that the Physicians understand their limits in the process of integrating spirituality into their patient's care, giving room for patients autonomy.

Limitations of the Study

The study was a cross-sectional study done in a tertiary health

institution; the findings may not apply to the general population. Recall Bias might exist in using MMAS-8 as a self-report measure and this may affect their responses in reporting their level of adherence to antihypertensive medications.

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