EFFECT OF HEALTH EDUCATION INTERVENTION ON TREATMENT ADHERENCE IN PATIENTS WITH PULMONARY TUBERCULOSIS IN LAGOS STATE, NIGERIA

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Abstract
Non adherence to anti-tuberculosis treatment increases the risk for the development of Multi-drug resistant tuberculosis, re-occurrence and mortality. Therefore, this research examined the effect of health education intervention on treatment adherence among pulmonary tuberculosis patients in Lagos state, Nigeria. The study adopted the Quasi-experimental research design and one hundred tuberculosis patients were randomly selected from two chest clinic hospitals. Fifty participants were each selected for the control and experimental groups. The experimental group undergo the normal routine tuberculosis care and health education session while the control group received only the routine care. The health education intervention lasted for eight weeks. Morisky 8-Item Questionnaire and Tuberculosis Knowledge and Attitudinal Questionnaire were used to measure the rate of adherence before and after the intervention. The descriptive statistics of frequency counts and percentages was used to analyse the demographic variable of the participants while inferential statistics of independent t-test was used to determine the mean difference of the stated hypotheses at 0.05 level of significance. The result revealed that there is great improvement on treatment adherence among the experimental group and also knowledge and attitude of the experimental group significantly improved compared to the control group. The study recommends that health education intervention should be adopted as part of the DOTS Strategies in combating and controlling tuberculosis in the society.

***Keywords*:** Health Education, Intervention, Treatment Adherence, Tuberculosis Patients and Mortality

Introduction

Tuberculosis is an infectious disease caused by Mycobacterium tubercle, which is transmitted through air (pulmonary tuberculosis) or by ingesting infected milk or meat (Bovine tuberculosis) and it is both preventable and curable (World Health Organisation WHO, 2014). The causative organisms (M-tuberculosis, M-bovis and M-africanum) of tuberculosis are transmitted exclusively by inhalation of infective droplets from patients with tuberculosis through coughing, sneezing, talking or spitting (Erah & Ojieabu, 2009). The disease primarily affects lungs and causes pulmonary tuberculosis. It can also affect intestine, meninges, bones and joints, lymph glands skin and other tissues of the body (Extra-Pulmonary Tuberculosis) (Oladeji, Tijani, Bello, Hamid & Prefa, 2014). Tuberculosis is usually chronic with cardinal features like persistent cough or without expectoration, intermittent fever, loss of appetite, weight loss, chest pain and haemoptysis (Awofeso, 2008).

Health Education plays a crucial role in the development of healthy, inclusive and equitable social, psychological and physical environment. It reflects current best practice, using an empowering, multi-dimensional and multi professional approach which relates to all setting, organizations, including the community, schools, health services and the workplace. Health Education helps provide health knowledge, enhance wellness behaviours, promote health situations, facilitate healthful relationship and enables community members make responsible decisions. The Joint Committee on Health Education and Promotion Terminology (2001) defined Health Education as any combination of planned learning experiences based on sound theories that provide individuals, groups, and communities the opportunity to acquire information and the skills needed to make quality health decisions. Health education is the process of persuading people to accept measures which will improve their health and to reject those that will have an adverse effect. Oladele (2014) is of the opinion that health education strategy such as training and teaching, awareness campaign through posters, handbills, reminders, health promotion and improvement help in fighting misconceptions about diseases conditions, improve health, and also to make informed health decisions.

Failure of tuberculosis treatment and poor health outcomes often occurs due to patient not adhering to the drug regimen, extensive cavitary disease at the time of diagnosis, drug resistance, mal-absorption of drugs, laboratory error and biological variation (Center for Diseases Control, 2014). Patients are often not adhering to the drug regimen due to symptomatic improvement, co-morbidity (Ai, Men, Guo, Zhang, Sun et al., 2010), reaction to side effects (Adegbesan, 2014), and feeling better (Abraham & Moretz, 2012). Therefore, the key success of treatment requires maintenance of patient's health, including healthy behaviours and taking medications. WHO (2003) defined adherence as the extent to which a patient follows medical instruction. Treatment adherence is the extent to which a person's behaviour in terms of taking medications, following diets or executing lifestyle changes coincide with medical or health advice. Biswas (2010) included the following health behaviours in her study: complying with anti-tuberculosis medication, following healthy diet, performing physical exercise, maintaining environmental hygiene, preventing disease transmission, avoiding the risk factors of tuberculosis and keeping up with medical appointments. The opportunity for proper patient assessment is usually presented when patients go to their health providers for medical reviews. The important starting point of this process is when patients keep appointments for medical review. Patients that miss appointments with health care providers create delays or lack of monitoring of their conditions thereby predisposing them to exacerbations of disease and diseases-related complications. They are likely to end up admitted or making emergency consultations because of poor disease outcomes. This increases the burden on the health system as well as loss of productivity due to illness. Therefore, this study examined the effect of health education intervention on treatment adherence among tuberculosis patients.

Method

The study adopted the Quasi-experimental research design whereby two hospitals were selected as the study center. The population for the study comprised all tuberculosis patients in Lagos state, while 100 participants were randomly selected into the control and experimental groups. The experimental group were selected from Mainland Hospital, Yaba while the control group were selected from Lagos State Teaching Hospital, Ikeja. The Morisky 8-Item Adherence Questionnaire and Tuberculosis Knowledge and Attitudinal Questionnaire were used to solicit information from the respondents. The health education intervention includes health education sessions and tuberculosis care manual booklet which were given to the experimental groups coupled with the normal routine tuberculosis care which lasted for eight weeks while the control group undergo only the routine care. The pre and posttest measurement were computed and analysed using independent t-test.

Results

Table 1

Frequency Distributions and Percentages of Demographic Information of Participants

Variables	Control group		Intervention group	
	Frequency	Percentage	Frequency	Percentage
Gender				
Male	22	44	20	40
Female	28	56	30	60
Total	50	100	50	100
Age				1
18-25 Years	14	28	5	0
26-35 Years	22	44	12	24
36-45Years	6	12	14	28
46 Years & above	8	16	19	38
Total	50	100	50	100
Marital Status				
Single	16	32	12	24
Married	32	64	32	64
Divorced	2	4	6	12
Total	50	100	50	100
Occupation				
Student/Apprentice	21	42	10	20.0
Unemployed	-	-	19	38.0
Government/Public	4	8	6	12.0
Private	4	8	7	14.0
Self Employed	21	42	8	16.0
Total	50	100	50	100
Qualification				
No Formal	-	-	-	-
Education	7	14	8	16
SCH/FSCL	21	42	17	34
SSCE	22	44	25	50
Tertiary Education	50	100	50	100
Total				

Table1 above shows the demographic information of the participants (control and intervention groups) in the study. The results from the table shows that for control group, 22(44%) of the participants were male participants while the remaining 28(56%) of the respondents were female. Similarly, for the intervention group 20(40%) of the respondents were male while the remaining 30(60%) of the respondents were female. From the table, it can be inferred that female were more in the two groups than the male. As regards to the age grade of the participants, 14(28%) of the participants from the control group falls with 18-25 years old, 22(44%) were between 26-35 years while 36-45 years and those between 46 years and more constitutes 6(12%) and 8(16%) respectively. Similarly, for the intervention group, 5(10%) of the participants were between 18 and 25 years old, 12(24%) were between 26-35 years old, while the remaining 14(28%) and 19(38%) participants were within 36-45years and 46 years and more respectively.

Distribution of the participants based on marital status shows that for control group, 16(32%) of the participants were single at the point of this study, 32(64%) were married while only 2(4%) were divorced. Also in a similar vein, for the invention group 12(24%) were single at the time of the study, 32(64%) married while the remaining 6(12%) of the respondents were divorced.

Also, as regard to the occupation of the participants, the results from the table shows that for control group, 21(42%) of the participants were either students or apprentice at time of the study, 4(8%) were working in government establishments, while those in private and self-employed business constitute 4(8%) and 21(42%) respectively. For the intervention group, 10(20%) of the participants were either students or apprentice at time of the study, 19(38%) were unemployed, 6(12%) were working in public/government establishments, while those in private and self-employed jobs constitute 7(14%) and 8(16%) respectively. With regards to the qualification of the participants in the study, the results from the table indicates that for control group, 7(14%) had First School Leaving Certificates (FSLC), while participants with SSCE and Tertiary education constitutes 21(42%) and 22(44%) of the participants. Similarly, for the intervention group, 8(16%) had First School Leaving Certificates (FSLC), 17(34%) had SSCE as their education while participant with tertiary education constitutes 25(50%) of the intervention group.

Hypotheses Testing

Research Question 1: Would Health Education Strategy have any significant effect on knowledge of patients towards tuberculosis treatment in Lagos State?

Research Hypothesis 1: Health Education strategy will have no significant effect on knowledge of patients towards tuberculosis treatment in Lagos State

The mean scores and standard deviation of the knowledge of the subjects towards tuberculosis for pre-test and post-test scores of the intervention and control groups were computed and results presented in figure 1.

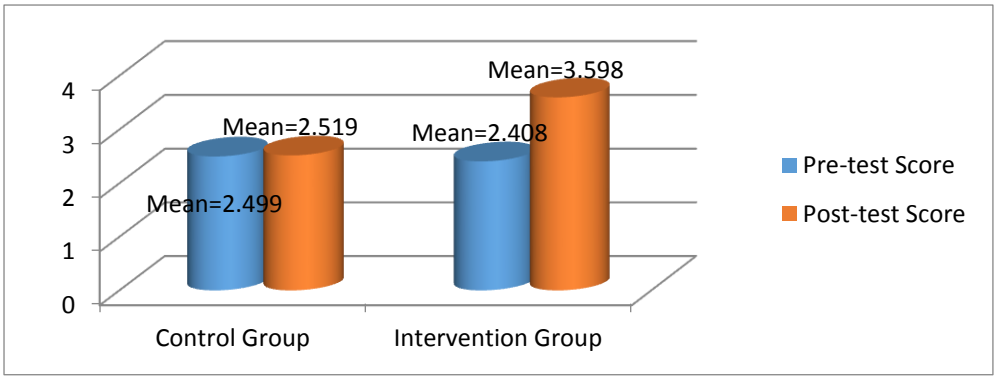

Figure 1: Bar chart presentation of pre and post-test mean scores of knowledge of patients towards tuberculosis between the intervention and control groups

The figures in the bar chart indicates that the post mean score intervention group (Mean= 3.598; Sd= .336) made a differential improvement against the control group (Mean=2.519; Sd=.331). To test the corresponding hypothesis t-test statistical tool was employed and the result is presented in table 2

Table 2

t-test analysis on Pre and Post test scores of knowledge of patients towards tuberculosis between the treatment and control group

Groups	N	Pre-test scores		Post-test scores			t-value	p-value
		Mean	Std Dev.	Mean	Std Dev.	Mean diff		
Intervention Group	**50**	2.408	.331	3.598	.336	1.190	12.658	0.000
Control Group	**50**	2.499	.311	2.519	.443	0.020		

t- value is significant at p<0.05

Table 2 presents the t- test analysis of difference in post test scores between the intervention and the control groups. The intervention groups appeared to have made differential improvements

over the control group. The intervention group has a higher mean difference score of 1.190 as against control group with a mean difference of 0.020. The difference in the mean score was statistically significant as t-calculated=12.658 at $\rho<0.05$. Thus, the null hypothesis which stated that Health Education strategy will have no significant effect on knowledge of patients towards tuberculosis treatment in Lagos State was rejected while the alternative was retained. The result implies that exposing patients to Health Education Intervention could be used to enhance knowledge of patients towards tuberculosis treatment.

Research Question 2:
Would Health Education Strategy have any effect on attitude of patients towards tuberculosis treatment in Lagos State?

Research Hypothesis 2:
Health Education Strategy will have no significant effect on attitude of patients towards tuberculosis treatment in Lagos State

The means response scores and standard deviation of participants' attitude towards tuberculosis treatment for pre-test and post-test scores of the intervention and control groups were computed and results presented in figure 2 above.

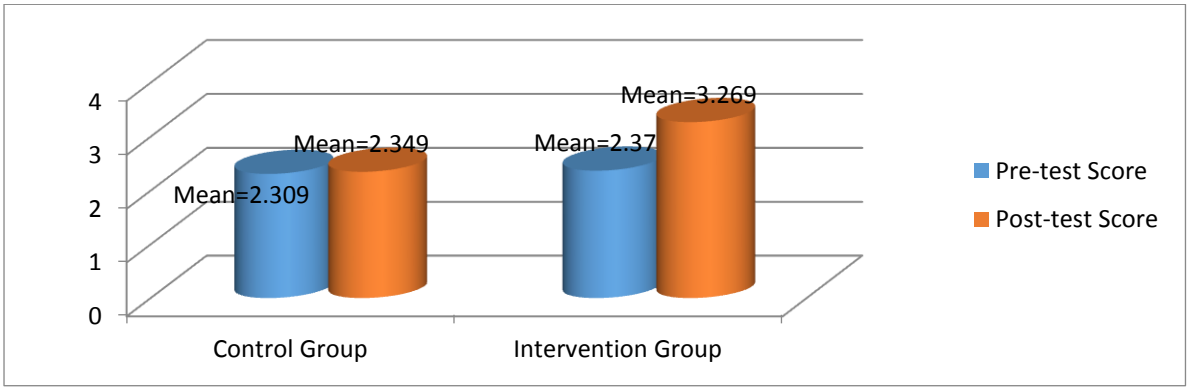

Figure 2: Bar chart presentation of pre and post-test scores of attitudes of patients towards tuberculosis treatment of the intervention and control groups

The figures in the chart indicates that the post mean score intervention group (Mean= 3.269; Sd= .327) made a differential improvement against the control group (Mean=2.349; Sd=.311).

Table 3
Pre and Post test scores of attitudes of patients towards tuberculosis between the intervention and control group

Groups		Pre-test scores		Post-test scores			t-value	p-value
	N	Mean	Std Dev.	Mean	Std Dev.	Mean diff		
Intervention group	50	2.370	.3962	3.269	.327	.899	9.609	0.000
Control Group	50	2.309	.4214	2.349	.311	.040		

t- value is significant at p<0.05

Table 3 presents the independent t- test analysis of difference in scores between the intervention and the control groups. The intervention groups appeared to have made differential improvements over the control groups. This is because the intervention group recorded a higher mean difference score of 0.899 as against the control group with a mean difference of 0.040. The difference in the post-test means scores of the intervention and control groups was statistically significant, t-test statistical tool was used and the result showed that the difference was statistically significant at t=9.609, $\rho>0.05$. Thus, the null hypothesis which stated that Health education intervention strategy will have no significant effect on attitude of patients towards tuberculosis treatment in Lagos was

rejected. This result implies that exposing TB patients to health education programme could enhance their attitude towards tuberculosis treatment.

Research Question 3: Would Health Education Strategy have effect on adherence to anti-tuberculosis medications in patients with pulmonary tuberculosis in Lagos State

Research Hypothesis 3: Health Education Intervention Strategy will have no significant effect on adherence to anti-tuberculosis treatments in patients with pulmonary tuberculosis in Lagos state

The mean scores and standard deviation of participants for pre-test and post-test scores of the intervention and control groups were computed and results presented in figure 3 below.

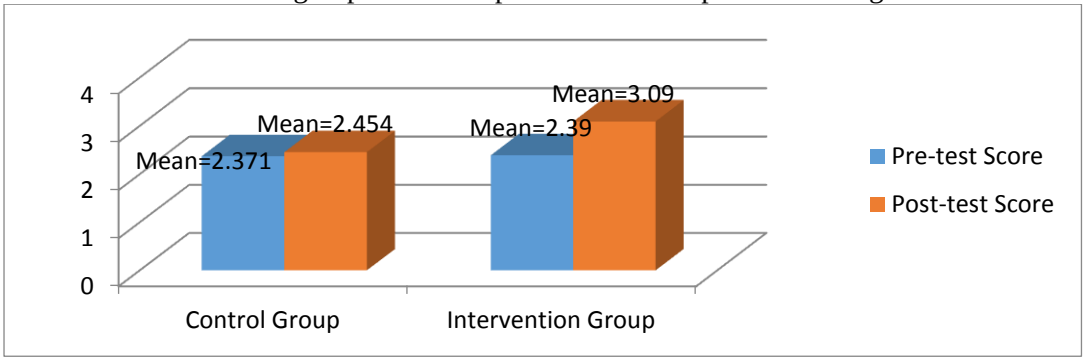

Figure 3: Bar chart presentation of pre and post-test scores of adherences to anti-tuberculosis medication of the intervention and control groups

The figures in the chart indicates that the post mean score intervention group (Mean= 3.09; Sd= .323) made a differential improvement against the control group (Mean=2.454; Sd=.334).
To test the corresponding hypothesis, t-test statistical tool was employed and the result is presented in table 4.

Table 4
Pre and post test scores of adherences to anti-tuberculosis treatments of patients with pulmonary tuberculosis in Lagos state between treatment and control groups

Groups	N	Pre-test scores			Post-test scores			t-value	p-value
		Mean	Std Dev.	N	Mean	Std Dev.	Mean diff		
Intervention group	50	2.390	.391		3.090	.323	.700	7.653	0.00
Control Group	50	2.371	.399		2.454	.334	.083		

t- value is significant at p<0.05

Table 4 presents the t- test analysis of difference in scores between the intervention and the control groups. The intervention groups appeared to have made differential improvements over the control group. This is because the intervention group has a higher mean difference score of .700 as against control group with a mean difference of .84. To determine if the difference in the post-test means scores of the intervention and control groups was statistically significant, t-test statistical tool was used and the result showed a difference in the mean scores of the intervention and control group was statistically significant at t=7.653, ρ>.05. Thus, the null hypothesis which stated that Heath education intervention Strategy will not have any significant effect on TB patients' adherence to anti-tuberculosis treatments Lagos state was rejected while the alternative was retained.

Discussion

The first finding that health education intervention has significant effect on knowledge of tuberculosis among patients support the findings of Adegbesan (2014) who reported that extensive

health education and psychological interventions plays a vital role in enhancing the knowledge of patients in adhering to their regimens. He further stated that knowledge of signs and symptoms of tuberculosis, transmission mode, prevention and treatment process could help the patients to adopt behaviours that can help to improve good quality health outcomes. In the same vein, Awofeso (2008), reported in her study that misconceptions about the cause and mode of transmission are key factors inhibiting treatment adherence among tuberculosis patients. Therefore, health intervention which focus more on improving the knowledge of patients towards tuberculosis and treatment could help predict positive health outcomes. Bello and Itiola (2010) also stated that simple measures such as providing the patients with information about side effects before starting treatment and reinforcing this information during subsequent consultations could also help the patients to adhere to their medications.

The second finding that health education intervention has significant effect on attitude of patients towards treatment is in line with the findings of Fatiregun and Ejeckam (2010) who reported in her findings that attitude of patients can affect treatment adherence. The findings of posttest in the study revealed that patients in the control group have negative attitude towards treatment as soon as they see significant improvement in their health conditions and also when they experience side effects in their regimen. Therefore, adequate information and health education can help to correct such attitude thereby, improving treatment adherence. Adejumo, Daniel, Otesanya, Ashipa, Adejumo, and Abdur-Razzaq (2016), also corroborate the findings that health education helps individuals to make informed health decision which could bring about positive change in attitude and behaviour. The health education intervention put in place education sessions which involves counseling the patients on the right attitudes and importance of treatment adherence.

The last finding that health education intervention have significant effect on treatment adherence among tuberculosis patients support the findings of Biswas (2010) who state that health behaviours such as complying with anti-tuberculosis medication, following health diet, performing physical exercise, maintaining environmental and personal hygiene, preventing disease transmission, avoiding risk factors of tuberculosis and keeping up with medical appointments can be significantly improved among patients if proper and combined health education strategies are put in place. Oladele (2014) also backed the findings with the assertion that health education intervention such as training and teaching, awareness campaign through posters, handbills, reminders, health promotion and improvement help in fighting misconceptions about disease conditions, improve health behaviours and making informed health decision. Treatment plays important roles in tuberculosis patients, from curing the disease, restoring quality lif and productivity, preventing death and even possible relapses, reducing transmission of tuberculosis and also to prevent multi-drug resistance tuberculosis.

Conclusion

Health education intervention include tuberculosis care manual based on adherence-related information, knowledge and attitudinal modifications which target information gaps and focus on delivering accurate information regarding tuberculosis disease, its treatment and transmission, medication, side effects or drug interaction. This intervention proved that combined health education intervention is effective in promoting adherence among tuberculosis patients, increase the knowledge and improve the attitude of patients towards inculcating behaviours that can help patients recover from the disease. Therefore, health education intervention has significant effects on knowledge, attitude and treatment adherence in patients with pulmonary tuberculosis in Lagos state Nigeria

Recommendations

Based on the findings of the study, it therefore recommends that:

1. Health educator should form part of the health care workers in designing health intervention that can help to improve medication adherence among tuberculosis patients. The role of the health educator will serve as link to bridge the gap between knowledge of treatment adherence in patients
2. Combined health education strategies such as provision of tuberculosis care and management manual to the patients could also help to improve medication adherence among patients.

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