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Outcome of Training Intervention on Teachers' Knowledge, Perception and Self-Efficacy for Preventing Childhood Lead Poisoning in Ido Local Government Area, Ibadan Nigeria

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ABSTRACT

Exposure of school children to lead from various sources, including the school environment, is perilous to their health. In this study, teachers' knowledge of Lead Poisoning (LP) was assessed and the effects of training on their knowledge, perceptions and self-efficacy for preventing childhood LP in Ido Local Government Area (LGA), Oyo state was determined. The quasi-experimental study involved an Experimental Group (EG) of 27 teachers nominated by 15 purposively selected schools in Ido LGA and a Control Group (CG) of 30 teachers from 15 schools in Egbeda LGA. The two groups completed a pre-test using a validated questionnaire and the results were used to design a 4-day Training Intervention for the EG. A post-test was conducted among the two groups using the same questionnaire. Data were analyzed using descriptive, Chi-square, ANOVA and t-test statistics. The EG and CG Mean Knowledge (MK) scores at pre-test using a 74-point knowledge scale were 20.2±16.3 and 14.6±14.4 respectively. Mean scores at post-test for the EG and CG were 71.8±3.1 and 19.2±17.8 respectively ($p<0.05$). A significant difference was found between the EG's pre-test (20.2±16.3) and post-test (71.8±3.1) scores ($p<0.05$). The control's mean pre-test and post-test knowledge scores of 14.6±14.4 and 19.2±17.8 respectively were not significantly different. Perception of the EG that LP is more serious in children than adults changed from 5% at pre-test to 100% at post-test ($p<0.05$), while for the control perceptions were 13.3% and 23.3% for pre-test and post-test respectively with no significant difference. The EG participant's self-efficacy relating to level of confidence in advocating for school-based LP control rose significantly from 29% at pre-test to 100% at post-test ($p<0.05$); values among the control at pre-test and post-test were 26.7% and 23.3% respectively ($p>0.05$). Training intervention was effective in improving teachers' knowledge and influenced their perception and self-efficacy relating to the control of LP. Teachers can be used to upgrade their peers' knowledge.

Keywords: Childhood lead poisoning, Primary school teachers, Training intervention, Perception.

INTRODUCTION

Lead is a widely distributed natural resource of great economic importance (Adeniyi and Anetor, 1999). It is, for instance, used for the production of goods which contribute to the enhancement of people's quality of life such as roofing materials, water pipes and paint. The numerous uses of lead makes it a ubiquitous substance in most environments (Sridhar, 2000); these environments include water (Nduka and Orisakwe, 2007), soil (Adogame, 1997) air (Ogunsola, 1994) and old buildings with lead-based paint. Important as it is,

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however, lead has deleterious effects on people especially children when ingested (Centres for Diseases Control and Prevention-CDC-1991). The health effects of childhood lead poisoning include irreversible cognitive impairment (Needleham et al,1996; Lanphear et al,2003), anaemia (Nitin et al 2005) and renal problems (Lin et al 2003).

Primary school children are among the populations that are highly vulnerable to lead poisoning. Children of school age spend a sizeable part of their life in school where they could be exposed to lead poisoning. Sentinel studies conducted in Nigeria have shown, for instance, that nursery/primary school children in Lagos are at risk of lead poisoning (Irene, 2000). In Kaduna, Northern Nigeria, a study carried out by Nriagu (1992) revealed a blood lead concentration of 25ug/dl among 15-30% children. The reported blood lead concentrations were higher than the 10ug/dl permissible blood lead concentration set by the World Health Organization (WHO, 2004). Up to 70.0% of young children studied in Jos, Plateau state Nigeria were also found to have blood lead concentrations above the WHO permissible limits. (Wright, Thacher, Pfiner, Fischer and Pettifor, 2005). It has been reported that the high blood lead concentration in Nigerian children could be due to the fact that most paints produced in Nigeria have blood lead concentrations beyond hazardous level (Adeneye, 2007).

Childhood lead poisoning is particularly possible in old school buildings with flaking lead-based paint. There are other lead based materials in the schools and homes that increase children's vulnerability to lead poisoning. The school is however an important and powerful channel for the dissemination of information about childhood lead poisoning to pupils and their parents. Teachers are important agents for reaching primary school pupils with information about lead and its health implications. However, a study has found that in Lagos primary school teachers were not knowledgeable about childhood lead poisoning. Teachers are role models who have been appropriately trained to influence children's behavior. Most teachers in Nigeria are respected and whatever they say while in school is perceived to be credible by children. They, therefore, have pivotal roles to play in the prevention of lead poisoning in school settings. In order to be effective as stakeholders in childhood lead poisoning prevention and control, teachers' capacity need to be enhanced through training. However their levels of knowledge, perceptions and self-efficacy relating to childhood lead poisoning have not been well explored. There is also dearth of information about the effects of a training intervention on teachers' knowledge, perceptions and self-efficacy for preventing childhood lead poisoning among primary school children in Nigeria. This study was therefore designed to diagnose primary school teachers' training needs and to assess the effect of a training intervention on their knowledge, perceptions and self-efficacy relating to the prevention of childhood lead poisoning in Ido Local Government Area Oyo state, Nigeria.

METHODOLOGY

Description of study area and study population

The study was carried out in Ido LGA, Oyo State. Ido LGA came into being in May, 1989. The LGA with its headquarters at Ido was carved out of the former Akinyele LGA. The area was formerly known as Akinyele west LGA during the second republic before it was merged again with Akinyele LGA by the Buhari/Idiagbon regime in 1984. Ido LGA is located in the rainforest belt of south western Nigeria.

Study population

The study population consisted of teachers of public primary schools in Ido local Government Area. Overall there were 589 teachers in the LGA as at the time of this study, comprising of 226 males and 363 females.

Study design

The study was an intervention study, with a quasi-experimental design. There were two study arms or groups- the experimental and the control group. The experimental group consisted of the primary school teachers in Ido LGA nominated by the head teachers of schools that consented to be involved in the study. The LGA was purposively selected. The investigator had participated in a 12 months mandatory concurrent field work programme of the Department of Health Promotion and Education in Ido LGA. During the period he noted the problems, needs, characteristics and peculiarities of the primary school systems. Most of the primary schools were built and painted many years ago. Several of them were noted to be potential sources of lead poisoning with pupils being at high risk of lead poisoning. Egbeda LGA and the primary school teachers were also purposively selected. Egbeda shares the similar characteristics, problems and needs with Ido LGA. In addition it is reasonably far away from Ido LGA. This situation was advantageous in helping to reduce diffusion of information from the experimental group. The experimental group received training intervention while the control group did not receive training or any other educational intervention until after

been administered a post-test. Both groups were however subjected to a pre-and-post-training assessment.

Sampling procedure and sample size

The list of public primary schools in Ido LGA was used to facilitate the selection of schools to be involved in the study. The steps involved in the selection were as follows:

(i) Categorization of the schools into two – those established before year 2000 and those established after year 2000. Those established before year 2000 were thought to be more likely to be sources of lead poisoning because of the age and powdery nature of the painted walls. They were therefore listed to constitute the sampling frame which the actual target schools would be selected. All nine schools established after year 2000 were excluded from the study.

(ii). All the 66 eligible schools were then stratified into three based on their rural, semi-urban and urban locations.

(iii). Five schools were selected from each of the locations by balloting. This way 15 schools were selected in Ido LGA to be involved in the study. Similar steps were used to select schools in Egbeda LGA to constitute the control.

Methods and Instrument for Data Collection

The method used for the diagnosis of the participants' training needs was interview facilitated by means of a questionnaire that played a dual role of needs assessment and pre-post-test questionnaire. The questionnaire was developed after a thorough review of the literature. It consisted of five sections- section A, B, C, D and E. Section A focuses on demographic information, while section B- contains questions relating to awareness and knowledge of lead and lead poisoning. Section C contains questions for documenting perceptions relating to childhood lead poisoning and section D contains questions for assessing participants' self-efficacy in performing lead poisoning control and prevention tasks. Lastly section E focuses on school health programming. The questionnaire included a 74-point knowledge scale, with a point allotted to each correct response.

Data analysis

The quantitative data collected were collated, screened, coded and entered into the computer using the Statistical Package for Social Science (SPSS) version 11 and Epi info version 6. The knowledge section comprised of 74 items which were assigned a score of one point for every correct answer and 0-point for every wrong answer, altogether making up a 74-point knowledge scale. The open ended sections of the questionnaire were however coded accordingly. The Statistical Package for Social Sciences (SPSS) version 11.0 and Epi info version 6 were used to facilitate the analysis of the data. The maximum score a trainee could have was 74 points and data were analyzed using descriptive, Chi-square, ANOVA and t-test statistics. The level of significance was set at 5%.

RESULTS

The socio-demographic characteristics of the participants are presented in Table 1. A majority (66.6%) of participants in the experimental group were females. There were also more females (56.7%) than males among the control group. The difference was not significant. The ages of the experimental group ranged from 30.0 to 60.0 years with a mean age of 42.4±6.1. The control group's age range was 25.0 to 54.0 with a mean age of 41.0±6.5. More of the participants were within the 45-49 years age bracket among the experimental (29.6%) and control group (40.0%) groups. There was no significant difference in the ages of both the experimental and control group. A majority of experimental group (88.9%) and all the participants in the control (100%) were married with no significant difference. A majority (70.1%) of the experimental group consisted of National Certificate in Education (NCE) holders; among the control NCE holders also accounted for a great proportion (73.3%), with no significant difference. The details of the socio-demographic information of the participants are contained in Table 1. Only 41.0% in the experimental group and 50.0% in the control group had ever heard about lead at pre-test (Figure 1).

The experimental and control groups' overall mean knowledge scores, mean scores by sex and by education at pre-test are presented in Tables 2 and 3. No significant differences were observed on comparing the overall mean knowledge scores and mean knowledge scores by sex in the experimental and control group using the student t-test. Similarly no significant difference was observed on comparing the experimental group's mean knowledge scores by level of education (Tables 2 and 3).

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Table 1-
Socio-demographic characteristic of experimental and control groups at pre-test

Characteristic	Experimental (N=27)		Control (N =30)		P-value
	No	%	No	%	
Sex:					
Male	9	33.3	13	43.3	> 0.05
Female	18	66.7	17	56.7	
Age group:					
< 45	16	59.3	17	56.7	> 0.05
> 45	11	40.7	13	4 3.3	
Marital status:					
Never married	1	3.7	0	0	>0.05
Married	24	88.9	30	100	
Widowed	2	7.40	0	0	
Educational qualification:					
NCE	19	70.1	22	73.3	
HND	1	3.7	0	0	> 0.05
B.Sc.	6	22.2	8	26.6	
PGDE	1	3.7	0	0	

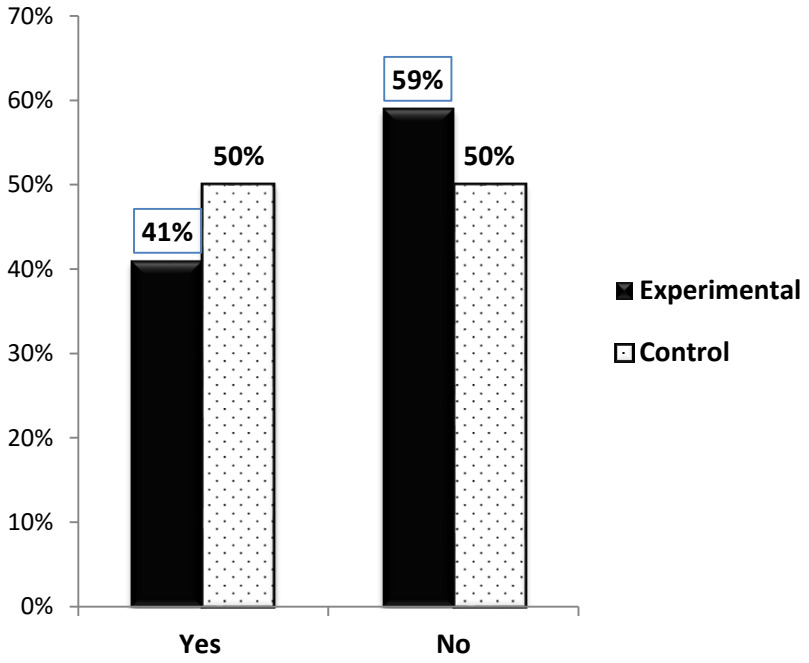

Figure 1:
Level of awareness about lead among the experimental and control groups

Table 2:
Comparison of mean knowledge score of the experimental and control groups at pre-and-post-test.

Test period	N	Mean	SD	t-value	p-value
Pre-test (Experimental)	27	20.2	16.2	16.167	< 0.05
Post-test (Experimental)	27	71.8	3.1		
Pre-test (Control)	30	14.6	14.4	1.0951	> 0.05
Post-test (Control)	30	19.2	17.8		

Table 3:
Comparison of mean knowledge scores of experimental and control groups at post-test

Test period	N	Mean	SD	Test-statistics	P- value
Post-test (Experimental group)	27	71.8	3.1		
Post-test (Control group)	30	19.2	17.8	15.05	< 0.05
Experimental group's mean scores by sex: Post-test					
(Male Experimental group)	9	72.0	3.3		
Post-test (Female Experimental group)	18	71.6	3.1	0.279	>0.05
Control groups mean scores by sex:					
Post-test (Male control group)	13	21.7	18.8	0.725	>0.05
Post-test (Female control group)	17	17.0	15.1		
Control groups mean scores by education					
Post-test (B.Sc./B.Ed.)	22	16.9	14.2		
Post-test (PGDE)	8	25.5	16.3	1.164	>0.05
Experimental groups mean knowledge scores by education:					
Post-test (NCE)	19	71.3	3.6		
Post-test (HND)	1	74.0	0.0	0.6	>0.05
Post-test (B.Sc./B.Ed.)	6	72.7	0.8		
Post-test (PGDE)	1	74.0	0.0		

Participants' perceptions relating to lead and lead poisoning at pre-test

Table 4 shows participants' perception relating to lead poisoning at pre-test. Twelve (44.4%) participants in the experimental group compared with 33.3% in the control group perceived school children in their LGA to be exposed to lead poisoning with no significant difference. Few participants (33.3%) in the EG and 20.0% in the CG were not sure whether lead poisoning constitute a serious health problem to children in Nigeria. The difference was not statistically significant.

Participants' perceptions relating to lead poisoning in their LGAs at post-test is shown in Table 5. All the 27 participants in the experimental group compared with 10 in the control group were of the perception that children in Ido LGA were exposed to lead; the difference was however statistically significant. All the participants in the experimental group and only five in the control group were of the perception that only government could help prevent lead poisoning, with a significant difference (Table 5).

Participants' level of confidence in performing lead poisoning prevention and control tasks at pre-test

Table 6 shows participants' level of confidence in performing tasks related to lead poisoning prevention and control programme at pre-test. There was no significant difference between the experimental and control groups level of confidence in educating parents about ways of preventing lead poisoning as six participants in the experimental group (22.2%) compared with eight in the control group (26.3%) perceived themselves to be very confident in educating parents about ways of preventing lead poisoning. Participants who perceived themselves very confident in counselling parents that lead poisoning can be treated among the experimental and control groups were 29.6% and 33.3% respectively with no significant difference (Table 6).

Participants' level of confidence in performing lead poisoning prevention and control tasks at post-test is shown in Table 7. All the 27 participants in the experimental group perceived themselves very confident in educating parents of pupils about ways of preventing lead poisoning, counselling parents that childhood lead poisoning can be treated and telling school authority to take actions aimed at preventing lead poisoning among school children. This was not the case among the control group as few participants had the same level of confidence as the experimental. The differences between the experimental and control groups; levels of confidence were significant (Table 7).

Table 4:
Experimental and control groups' perceptions relating to childhood lead poisoning at pre-test

Perception	Experimental (N=27)		Control (N=30)		X^2	P-value
	No	%	No	%		
School children in this Local Government Area are not exposed to Lead poisoning:						
Agree	15	55.6	20	66.7	1.46	> 0.05
Disagree	12	44.4	10	33.3		
Lead poisoning is not a serious health problem among children in Nigeria:						
Agree	18	66.7	24	80.0	1.45	> 0.05
Disagree	9	33.3	6	20.0		
Lead poisoning is more serious in adults than children:						
Agree	22	81.5	26	86.7	0.34	> 0.05
Disagree	5	18.5	4	13.3		
Lead poisoning cannot occur in any of the primary schools in this LGA:						
Agree	10	37.0	19	63.4	4.10	> 0.05
Disagree	17	63.0	11	36.6		
Parents have no role to play in the prevention of Lead poisoning:						
Agree	11	29.6	17	56.7	5.11	> 0.05
Disagree	19	70.4	13	43.3		
Teachers have no role to play in the prevention of Lead poisoning:						
Agree	8	29.6	16	53.3	4.25	> 0.05
Disagree	19	66.7	14	46.7		
Only the government can prevent Lead poisoning:						
Agree	10	37.0	17	56.7	3.38	> 0.05
Disagree	17	63.0	13	43.3		
Parents, teachers and government cannot work together to prevent lead poisoning because such a cooperative effort cannot work in Nigeria:						
Agree	14	51.9	17	56.7	2.64	> 0.05
Disagree	13	48.1	13	43.3		
Only Doctors can help prevent lead poisoning:						
Agree	11	40.7	19	63.3	3.58	> 0.05
Disagree	16	59.3	11	36.7		
Lead poisoning can be prevented through immunization						
Agree	18	66.7	26	86.7	3.23	> 0.05
Disagree	9	33.3	4	13.3		

DISCUSSION

The socio-demographic characteristic of the participants

A greater proportion of the participants in either groups were females. This reflects the observation that teaching is increasingly becoming a female dominated profession. A previous study carried out among teachers in some selected primary schools in Lagos, Nigeria by Irene (2000), showed a similar trend with the findings from this study as there were more females than males. The age structure of the experimental and control groups reflect an adult population. This strengthened the need for the adoption of the adult education approach characterized by flexibility, free and open atmosphere and mutual respect during the training intervention. The choice of teaching methods such as discussion and Socratic Method (question and answer) were partly used to suit the adult population instead of the monotonous use of lecture method.

Table 5:
Experimental and control groups' perceptions relating to childhood lead poisoning at post-test

Perception	Experimental (N=27)		Control (N=30)		X^2	P-value
	No	%	No	%		
School children in this Local Government Area are not exposed to Lead poisoning:						
Agree	0	0	17	63.3	27.7	< 0.05
Disagree	27	100	11	36.7		
Lead poisoning is not a serious health problem among children in Nigeria:						
Agree	0	0	25	83.7	40.0	< 0.05
Disagree	27	100	5	16.7		
Lead poisoning is more serious in adults than children:						
Agree						
Disagree	0	0	23	76.7	34.7	< 0.05
	27	100	7	23.3		
Lead poisoning cannot occur in any of the primary schools in this LGA:						
Agree	0	0	22	73.3	32.2	< 0.05
Disagree	27	100	8	26.7		
Parents have no role to play in the prevention of Lead poisoning:						
Agree	0	0	17	56.7	21.8	< 0.05
Disagree	27	100	13	43.3		
Teachers have no role to play in the prevention of Lead poisoning:						
Agree	0	0	18	60.0	23.6	< 0.05
Disagree	27	100	12	40.0		
Only the government can prevent Lead poisoning:						
Agree	0	0	19	63.3		
Disagree	27	100	11	36.7	2 .6	< 0.05
Parents and government cannot work together to prevent lead poisoning because such a cooperative effort cannot work in Nigeria:						
Agree	0	0	18	60.0	23.6	< 0.05
Disagree	27	100	12	40.0		
Only Doctors can help prevent lead poisoning:						
Agree	0	0	12	40.0	23.6	< 0.05
Disagree	27	100	18	60.0		
Lead poisoning can be prevented through immunization						
Agree						
Disagree	0	0	25	83.3	40.0	< 0.05

Oshiname, (1999) adopted the same training methods of teaching which suited his study population who were adult Patent Medicine Vendors (PMVs) in a rural setting in Oyo State.

Majority of the participants in the experimental and control groups were NCE holders. This is a normal development because the national minimum qualification for teaching in primary schools is the NCE (Federal Ministry of Education (FME), 2005). This requirement therefore may have accounted for a large proportion of NCE holders among the experimental and control.

In the developing countries, including Nigeria the level of awareness and knowledge about lead has been shown to be very low. Nriagu and colleagues (1996a) for instance noted that most health workers have never heard about lead poisoning let alone the general population. The pre-test results of this study confirm this observation by Nriagu and colleagues.

Table 6:
Experimental and control groups' level of confidence relating to lead poisoning prevention and control tasks at pre-test

Tasks and level of confidence executing it	Experimental (N=27)		Control (N=30)		X^2	P-value
	No	%	No	%		
Educating parents about ways of preventing Lead poisoning:						
Not confident	17	63.0	18	60.0	0.16	> 0.05
Confident	4	14.8	4	13.3		
Very confident	6	22.2	8	26.7		
Counselling parents that childhood Lead poisoning can be treated:						
Not confident	19	70.4	19	63.3		
Confident	0	0	1	3.3	1.07	> 0.05
Very confident	8	29.6	10	33.3		
Telling School authority to be doing something to prevent Lead poisoning:						
Not confident	17	63.0	17	56.7	0.24	> 0.05
Confident	4	14.8	5	16.7		
Very confident	6	22.2	8	26.7		
Educating pupils about the sources of Lead poisoning:						
Not confident						
Confident	18	66.7	17	56.7		
Very confident	2	7.4	4	13.3	0.79	
	7	25.9	9	30.0		> 0.05

Participants in the experimental and control groups in this study displayed low levels of awareness about lead and lead poisoning at pre-test. Irene's (2004) had a similar experience. She found a low level of awareness about lead and lead poisoning among teachers in some selected primary schools in Lagos, Nigeria. This low level of awareness may be a reflection of the level of awareness about lead and lead poisoning in the general population. The findings also corroborated those of Adebamowo, Agbede, Adebamowo and Sridhar (2006) who examined the knowledge, attitudes and practices relating to lead exposure in South Western Nigeria. A low level of awareness about lead and lead poisoning was reported by them.

Comparative analyses of the mean knowledge scores of the experimental and control groups at pre-test showed that there was no significant difference in their mean knowledge scores. This signified that the two groups were comparable at baseline in terms of knowledge about lead and lead poisoning. Shuey et al (1999) reported a similar trend in knowledge between their experimental and control groups' pre-test scores.

This baseline knowledge scores for the experimental and control group served as the basis for tracking any changes in knowledge in the two groups which could be attributable to the training intervention. There were some areas in which the experimental group had higher correct responses than the control and vice-versa at pre-test. This however cannot be regarded as unusual as no two groups, like individuals, are exactly alike in all respects (Oshiname, 1999). The baseline knowledge at pre-test however proved advantageous as it constituted the starting point for teaching the issues and concepts the teachers were not familiar with in terms of lead and lead poisoning. This way the training programme progressed from known to the unknown issues.

Sex and educational qualification were not determinants of the level of knowledge regarding lead and lead poisoning among the teachers at pre-test and post-test. This is evident from the comparison of the mean knowledge scores by sex and by education respectively in the experimental and control groups. The teachers in the study had almost the same highest level of education. Educational qualification therefore played no role in this baseline knowledge.

Table 7:
Experimental and control groups' level of confidence relating to lead poisoning prevention and control tasks at post-test

Task and perceived level of confidence of executing it.	Experimental (N=27)		Control (N=30)		X^2	P-value
	No	%	No	%		
Educating parents about ways of preventing Lead poisoning:						
Not confident	0	0	20	66.7	32.2	< 0.05
Confident	0	0	2	6.7		
Very confident	27	100	8	26.7		
Counselling parents that childhood Lead poisoning can be treated:						
Not confident	0	0	20	66.7	32.2	< 0.05
Confident	0	0	2	6.7		
Very confident	27	100	8	26.7		
Telling School authority take actions to prevent Lead poisoning:						
Not confident	0	0	18	60.0	34.7	< 0.05
Confident	0	0	5	16.7		
Very confident	27	100	7	23.3		
Educating pupils about the sources of Lead poisoning:						
Not confident	0	0	17	56.7		
Confident	0	0	8	26.7	40.0	< 0.05
Very confident	27	100	5	16.7		
Discussing the consequences of Lead poisoning on children with parents of pupils:						
Not confident	0	0	20	66.7		
Confident	0	0	3	10.0	34.7	< 0.05
Very confident	27	100	7	23.3		

A study conducted in Chicago, USA, however showed that educational qualification was a determinant of the level of knowledge regarding lead and lead poisoning among parents (Mehta and Helen, 1998). This can happen when the populations concerned are of different levels of education.

A comparison of the mean knowledge scores of the experimental and control groups at post-test, showed a significant difference between the experimental and control groups. It could therefore be argued that the increase in knowledge among the experimental group was because it was selectively exposed to training. Various studies (Okonofua, *et al*, 2003; Ajuwon *et al*, 2007 and Oshiname and Brieger, 1999) across the world which adopted the quasi-experimental design of this sort yielded this pattern of knowledge gain reported among the experimental and control groups at post-tests.

The comparison of the mean knowledge scores at pre-test and post-test within the experimental and control groups indicated a significant difference only in the experimental group. This is to be expected. After the pre-test, the experimental group was exposed to training and this intervention increased their knowledge about lead and lead poisoning. Similar results were obtained by, Strange, Forrest and Oakley, (2002) who conducted a study to assess the effects of a peer-led sex education training intervention on participants' knowledge and attitudes relating to sexual health issues and their perceptions of the impact of the peer education programme on them. They observed a significant difference in the pre-test and post-test scores of the experimental group only.

In this study no significant change was recorded for the control whereas both groups, experimental and control, had similar demographic characteristics and other characteristics capable of influencing knowledge acquisition. Measures were also put in place to check diffusion of information from the experimental to the control group by selecting two similar settings that were reasonably far apart geographically. The two groups were also assumed to have been exposed to similar external factors that would have influenced their knowledge regarding lead and lead poisoning prior to intervention.

Participants' perceptions relating to lead and lead poisoning were compared at baseline between the

experimental and control groups. The comparison showed that the two groups had similar perceptions at baseline judging by the proportions of participants with the right and wrong perceptions at pre-test. This ensured proof of the comparability of the two groups at pre-test. Moyer and Nath, (2006) similarly had this experience. The perception that children in the two study locations were not exposed to lead poisoning by the experimental and control groups at pre-test corroborated Mahon's findings (1997) in Philadelphia USA. The respondents in her study did not perceive children to be exposed to lead poisoning in any way either.

On comparing the prevalence of the perceptions between the experimental and control groups at post-test, relating to lead poisoning it was noted that majority of the participants in the experimental group had the right perceptions when compared with the control group. This observation corroborated what Dreyer (2001) found in an intervention aimed at assessing the effect of training on teachers' perceptions of violence against women in South Africa. Dreyer noted that there was a change in perception after exposure to a training intervention.

The results of this study have demonstrated once again the positive effects of training on people's perception of phenomena. The significant change in perception could be explained by the tenets of the Health Belief Model (HBM). The experimental group's level of knowledge regarding lead and lead poisoning was increased significantly due to their selective exposure to the training intervention. The increase in their level of knowledge in turns had modifying effects on their perception of vulnerability, threat and severity of lead poisoning in children. The resultant effects of positive changes in perception often lead to the adoption of preventive behaviours (Rosenstock, 1991).

The willingness of the experimental group to conduct a similar training programme for the benefits of their peers undoubtedly resulted from their changed perceptions during the training, relating to consequences of childhood lead poisoning and the roles which teachers can play in mitigating the impact of childhood lead poisoning in school settings.

Self-efficacy is a measure of the level of confidence in performing a particular task (Tschannen-Moran, Hoy and Hoy, 1998). The HBM explains the role of self-efficacy in the uptake of preventive health behaviour. Various strategies including training with special focus on role- modeling technique have been employed in the past to upgrade people's level of confidence in performing tasks (Shuguang and Van de Ven, 2003). In this study, the outcome of training intervention on participants' reported levels of confidence in performing lead poisoning prevention and control tasks were also assessed.

On comparing the level of confidence among the experimental and control groups at pre-test, it was noted that there was no significant difference in the proportion of those that perceived themselves very confident in performing these tasks at pre-test. What can be concluded from this is that the two groups were similar regarding their self-efficacy at baseline. Miles and Huberman, (1984) reported a similar development in the level of confidence between their experimental and control groups at baseline. At post-test there was a marked increase in the proportion of those that perceived themselves very confident in performing lead poisoning prevention and control tasks compared with their control counterparts among the experimental group as almost all of the participants did, compared to very few in the control group. Sterling et al (2000), whose work focused on lead abatement training for underserved population also noted that training intervention was effective in increasing trainees' ability to perform certain skills.

These vast changes in the proportion of those that perceived themselves very confident in performing tasks relating to the prevention and control of lead poisoning could be explained by the knowledge and skills acquired by the participants in the experimental group during the training intervention, which was facilitated by means of role-play and other active teaching methods. The role modeling technique however could be seen to be effective in enforcing skill mastery. This finding corroborated the experiences of Schwoerer, May, Hollensbe and Mencl, (2005) that training could be effective in increasing trainees' level of self-efficacy in performing tasks.

The implications of the findings of this study for future health promotion and education activities are presented in the sub-section. Firstly the results have implications for public enlightenment. The level of awareness and knowledge of lead and lead poisoning was found to be very low among the study population (experimental, control and even among the trained peers) at pre-test. The proportions of wrong perceptions associated with lead and lead poisoning were also high at pre-test among all the groups. There is therefore a need for large scale public enlightenment campaigns using the multi-media approach to reach various segments of the population about lead and lead poisoning. This has been recommended by Adebamowo et al, (2005). In Nigerian communities teachers are often the most enlightened citizens. So what can be deduced from the teachers' misconceptions about lead is that the

larger population would also be characterized by wrong perceptions of lead.

Secondly, apart from the family, schools create opportunities for providing health instructions and experiences that prepare young people for their roles as healthy and productive adults (Allenswort, Lawson, Nicholson and Wyche, 1997). The Ido schools, and of course the Nigerian schools at large, are channels that can be used for the dissemination of information related to childhood lead poisoning.

Teachers can help improve pupils' knowledge about lead poisoning. The education received by pupils could be put to practical applications by the time they become adults. Schools can and invariably do–play a powerful role in influencing students' health-related behaviors. These included behavours related to lead poisoning and prevention. Appropriate school interventions can foster effective education, prevent destructive behavior, and promote enduring health practices. For many young people in their formative years, the school may, in fact, be the most nurturing and supportive environment where they acquire factual health information as well as positive behaviors. The outcome of this study showed that before the school can be used to upgrade pupils' knowledge about lead poisoning the teachers in the schools should be empowered themselves regarding lead and lead poisoning prevention and control. Therefore elements of lead poisoning prevention and control should be infused into the various components of the school health programmes in primary schools.

Another major implication of the findings of this study is the need for teacher training and development. According to the FME, (2005) the professional development of teachers has been a knotty issue in education as there appears to be very few opportunities for teachers to upgrade their skills on the job. Most teachers indicated that they had not received any training on lead poisoning prevention and control. The results of this study have attested to the importance of staff development with special reference to positive changes in perception and increases in knowledge about lead poisoning. In order to ensure effective school health programming regarding lead poisoning prevention and control, there is a need for staff developmental programmes. The training should be scaled up by either replicating the training among teachers in other schools in the LGA or made part of a continuing education for practicing teachers. Creative approaches should however be designed to overcome this. Elements of lead poisoning prevention and control should be infused into teacher training curriculum as a pre-service training.

This study has shown that the school is a viable source of information regarding lead and lead poisoning using the teachers as channels of information. Teachers could be motivated to promote school-community involvement in lead control. Schools are part of a wider community. Schools and communities should always be encouraged to respond more effectively to the health-related needs of students (Anderson and Piran, 1999) including lead poisoning. School children constitute a captive audience that can in-turn serve as channels for reaching their peers and parents with lead poisoning prevention and control information.

The training was the first major programme teachers in the study location had ever experienced regarding lead poisoning prevention and control. There is dearth of information relating to the use of training of trainers approach involving teachers in Nigeria. The data obtained, procedures and approaches used can thus be adopted for planning, implementing and evaluating similar lead poisoning prevention and control training programmes. The training process also helped in inculcating leadership spirit or qualities in the trainees as exemplified by their involvement in planning and organizing roles during the training programme and at follow up.

Various lessons have been learnt from the training intervention which could be employed to improve the quality of future training programmes in a rural setting. In other to make a training programme of this sort to be successful in rural settings like Ido LGA where communities are farther apart, there should be provision for transportation and feeding allowances for the participants; this has potential for increasing attendance rate.

In conclusion, the level of knowledge relating to lead poisoning among teachers in Ido LGA prior to training intervention was low prior to intervention. This also applied to their level of confidence in implementing lead poisoning prevention and control activities. Misconceptions relating to lead poisoning were also noticeable in all the teachers that participated in the study, prior to the intervention. The training programme was found to be effective not only in upgrading the experimental group's knowledge of lead poisoning but was also effective in modifying their perceptions and enhancing their level of confidence in designing lead poisoning-related activities.

Based on the immediate outcome evaluation involving the comparative analyses within and between groups, it could be stated without fear of contradiction that it is the implemented training programme that led to the observed changes in the knowledge, perceptions and

self-confidence in the experimental group of teachers. The lack of significant change in knowledge, perception and confidence in the control group of teachers is a further demonstration of the positive effects of the training intervention only on the intervention group of teachers.

Recommendations:

1. The training intervention was effective in increasing the level of knowledge, correcting wrong perceptions and upgrading level of confidence of teachers in performing lead poisoning prevention and control tasks in schools. The training intervention should therefore be scaled up to include all the schools in the LGA.
2. Childhood lead poisoning prevention and control programmes should be incorporated into the school health programmes of primary schools in the LGA; this way, pupils would be involved in school-based lead poisoning prevention and control as part of curricular and co-curricular activities.
3. The study showed that the level of awareness about lead poisoning is low among the participants, which is an indication of the level in the general population. Therefore massive public enlightenment regarding lead poisoning should be carried out in Ido LGA using multi-media and multiple intervention approaches.

The school should be empowered to effectively carry out lead poisoning prevention and control activities. As indicated in the findings of this study, the school was the major source of information about lead and lead poisoning among the experimental and control groups. The increases in teachers' knowledge and the modification of their perception and attitudes as found in this study will help to facilitate school based lead and lead poisoning education in the schools

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