Indoor Environmental Conditions and Sanitary Practices in Selected Day care Centres in Ibadan, Nigeria

ZAINAB O.U. & G.R.E.E. ANA

Department of Environmental Health Sciences
Faculty of Public Health, College of Medicine
University of Ibadan, Ibadan, Nigeria
E-mail: fabyz@yahoo.com

Abstract

Rapidly urbanizing cities are witnessing an increase in Day care centres (DCCs) whose environmental conditions are substandard. This scenario has negative consequences on the health of the DCC attendees and yet information on some of the indicators such as the level of sanitary practices is not adequately documented. The objective of this study therefore was to assess the influence of sanitary practices on indoor air quality in selected DCCs in Ibadan, Nigeria. The study was descriptive cross-sectional in design. Ten DCCs were randomly selected and an environmental assessment form was used to document characteristics of the physical environment of the DCCs, waste management practices, sanitary environment and indoor building characteristics within the day care environment according to NERDC standards. Data were analysed using descriptive statistics and chi square. Lidless litter bins were present in close proximity to the rooms the children were kept in 100% of the DCCs sampled. There was stagnant water in the drainage of 10% of the DCCs. Toilets were present in 100% of the DCCs but inadequate in 60% of them. Sanitary score was below 50% in 40% of the DCCs. No significant association was found between the sanitary scores and the location of the DCCs. Low sanitary scores observed in 40% of day care studied could predispose the children to a myriad of infections. Routine inspection of the day care centres should

be carried out to ensure the centres conform to the stipulated guidelines.

Keywords: Day Care Centres, sanitary practices, indoor air quality, children, urban communities

Introduction

Every year, at least 3 million children under the age of five die due to environment-related diseases (Global Plan of Action for Children's Health and the Environment, 2010). As a result of improved female education and shift from agriculture to industrial employments, there has been a drastic change in the job market all over the world as a result, there has been an increase in maternal employment (Howes, 2003; Oguntola, 2010).The pressure of work and long hours outside the home has posed challenges to looking after children on a daily basis. Thus, over 50% of all children aged six months to five years spend the majority of their waking hours in early learning and child care environments (CPCHE, 2010).

Early Child Care (ECC) and Day Care Centres are Early Child Development (ECD) centres, locally tagged '*Jelesim*i', *'Ota-akara', 'Ibviosukumehu'* etc. in local Nigerian dialects; usually for children aged 0-3 years (UNESCO, 2006). They provide non-parental care, nurturance and learning opportunities that complement and/or supplement those provided at home (Howes, 2003). An inventory of ECC facilities in Nigeria conducted by the Federal Government, Nigerian Educational Research Development Council (NERDC) and UNICEF in 2003 showed that most of the ECC facilities are privately owned (approximately 42%) and 34% by the government, followed by 21% by local communities (UNESCO, 2006). Early child care(ECC) and development started in Nigeria in the '80s as part of the Survival Strategy, and was linked to the Primary Health Care system, (Apanpa, 2007). A day care centre provides a temporary, secure place where children, aged between five months and eight years, can be cared for while their parents study, attend appointments or carry out other time limited tasks (Onuba, 2010).

The average human spends approximately 90% of their time indoors (Leech et al., 2002; Brasche and Bischoff, 2005). Thus, indoor levels from indoor and outdoor pollutants and allergens have a very large effect on a person's total exposure (Zuraimi, 2008). The variety of unique features in design and usage of public and commercial buildings such as schools,

apartment buildings, hospitals, and shopping malls make a wide range of indoor air quality (IAQ) problems possible (EPA, 1991). In developing regions, a limited number of studies have been conducted regarding indoor air quality (IAQ) and health (Ajimotokan et. al., 2009).

The School of Occupational and Public Health, Ryerson University in 2008 stated that exploring the quality of childcare facilities has become an important aspect of public health by virtue of the fact that such a large proportion of children spend much of their early years in these environments (CPCHE, 2010). A study by Koch et. al., in 2003 found child-care center attendance to be a strong risk factor for both upper and lower respiratory tract infections however being a population based survey, no information on the day care environment was documented. These exposures may not only cause disease in childhood but also have an impact on health during adulthood (Pronczuk, 2009). With so many children being cared for outside of their own homes, it is important to determine how safe child care facilities are (Browning, et.al., 1996). Despite the growing importance of the day care environment, studies on day care centre environment are still very few. This study was designed to assess the influence of perception and sanitary practices on indoor air quality in selected day care centres in Ibadan, Nigeria.

Methodology

Study design

The study employed a descriptive cross sectional design involving onsite observations of the day care centres and interviews.

Study area

The study was conducted in day care centres in Ibadan North Local Government Area of Ibadan, the capital city of Oyo State and the third largest metropolitan area in Nigeria, after Lagos and Kano, with a population of 1,338,659 according to the 2006 census (NPC, 2006). Ibadan covers a land area of 12 kilometres radius with Mapo hall as the centre.

Selection of Day care Centres

Forty-eight day care centres were identified in Ibadan North Local Government and 20% of the identified centres were included in the

sampling giving an approximately 10 day care centres that were randomly selected for the study.

Selection criteria for day care centres

1. The Day care centre must be located in Ibadan North local Government area.
2. The Day care centre must be in operation at least 6hrs daily and 5 days a week.
3. The Day care must voluntarily participate.

The rationale behind the eligibility criteria is to reduce the possible influence of confounders and effect modifiers in the study.

Onsite Observations

A 5 sectioned environmental assessment form was developed, and used for the study. The form was designed to:

1. document characteristics of the physical environment of the DCCs;
2. waste management practices;
3. health facility/ amenities;
4. sanitary conditions; and
5. indoor building characteristics.

Indicator	Score	
	Present	Absent
Dumpsite	0	1
Litter	0	1
Stagnant water	0	1
Water facility	1	0
Changing Area	1	0
Waste management	Adequate	Inadequate
Method	1	0
Toilet Facility	1	0
Total Score	7	

BOX 1: Sanitary Conditions

Indicator	Score	
	Present	Absent
Floor Area	< *16m^2= 0	>16m^2= 1
Molds Indoor	0	1
Damp walls	0	1
Rug	0	1
Fan	Dirty/Absent 0	Present/Clean 1
Toys	Dirty/Absent 0	Present/Clean 1
Total Score 6		

were ranked as indicated in boxes 1 and 2.

Data Management

Statistical package for social sciences SPSS version 15 was used for data analysis. Descriptive statistics was used in summarising data collected. Other analysis carried out include chi square.

Results and Discussion

Characteristics of day care centres

All (100%) the day care centres were located close to a motor road. Eighty percent of these roads were tarred and 20% of them were untarred. Fifty percent of these roads were located 5m from a major traffic road. A greater proportion of the buildings were built with concrete. Roofing material ranged from asbestos boards to concrete or corrugated roofing sheets. All the day care centres operated a natural ventilation strategy. Based on classifications of Ibadan by Fourchard in 2003, the day care centres were grouped into high, medium and low density areas. Forty percent of the day care centres were located in high density areas in Ibadan. Details of the result are presented in Table 1.

Table 1: General characteristic of Day care Centres

Day care centre characteristics	Rank and Proportion (%)	
Density Area	High	40
	Medium	30
	Low	30
Physical Environment		
Noise Sources	Generator	20
	Religious Houses	10
	Business activities	20
Building Characteristics		
Building material	Concrete	90
	Wood	10
Roofing material	Asbestos	70
	Concrete	20
	Zinc	10
Floor Covering	Rug	30
	Carpet	10
	None	60

Sanitary conditions at Day care Centres

All (100%) observed Day care centres had lidless litter bins in the rooms where the children were attended to. Litter was found in the surrounding of 20% of the day care rooms. There was stagnant water in the drainage of 10% of the DCCs with waste in 40%of the centres. Toilets were present in all observed day care centres but were inadequate in 40% of them based on the fact hat these few didn't have separate toilets for male and female and no running source of water. Ninety percent of day care centres had no defined changing area for children who were not potty trained. Tables 2 and 3 show the sanitary scores and a summary of the sanitary conditions in the day care facilities sampled.

Table 2 shows that 4 of the 10 day care centres had sanitary scores below 50% indicating less than acceptable sanitary conditions. There was no significant association between the density areas and the sanitary scores ($P>0.05$). From figures 1 and 2 only 10% of DCCs had toys and fans which were dirty. In Table 3, seven of the DCCs recorded poor indoor sanitary conditions and Figure 3 shows that 70% of the DCCs depended on wells as their main source of water supply.

Table 2: Sanitary conditions of Day care Centres

DC	Dump	Litte	Stagnan	Water	Waste	Changing	Toilet	Tota	%

	site	r	t water	facility	management method	area	facility	l score	
1	1	1	0	1	1	0	0	4	57.1
2	1	0	0	0	1	0	0	2	28.6
3	1	0	1	1	1	0	0	4	57.1
4	1	0	0	1	1	0	1	4	57.1
5	1	0	0	1	1	0	0	3	42.9
6	1	0	0	1	1	0	1	4	57.1
7	1	0	0	1	1	0	0	3	42.9
8	1	0	0	1	1	0	1	4	57.1
9	1	1	0	1	1	1	1	6	85.7
10	1	0	0	1	1	0	0	3	42.9

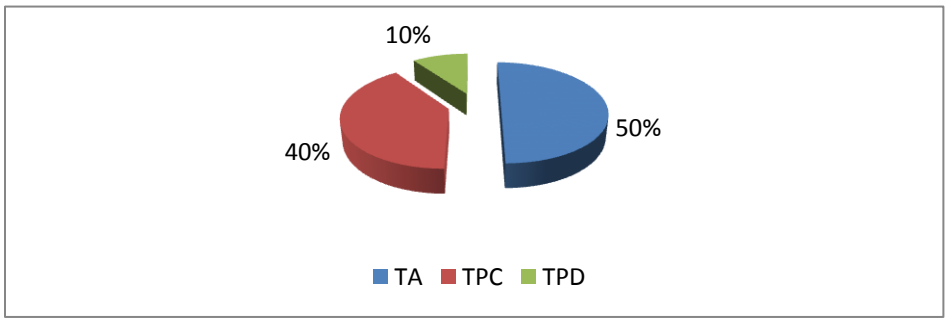

Figure 1: Condition of Toys in the Day care Centres

Key: Toys Absent (TA); Toys Present and Clean (TPC); Toys Present and Dirty (TPD)

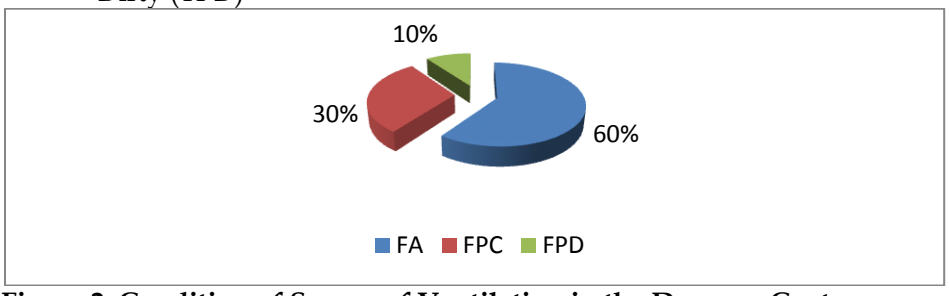

Figure 2: Condition of Source of Ventilation in the Day care Centres

Key: Fan absent(FA); Fan present and Clean(FPC) ; Fan present and dirty(FPD)

Table 3: Indoor conditions of Day care Centres

DC	Floor Area	Molds Indoor	Damp	Rug	Fan	Toys	Total	%

			walls				Score	
1	0	0	0	1	0	0	1	16.7
2	0	0	0	1	0	0	1	16.7
3	0	0	0	1	0	0	1	16.7
4	0	0	0	0	1	1	2	33.3
5	1	0	0	0	0	0	1	16.7
6	0	0	1	1	1	1	4	66.7
7	1	0	1	1	0	1	4	66.7
8	1	0	0	0	0	0	1	16.7
9	0	0	0	0	1	1	2	33.3
10	1	1	1	0	0	0	3	50.0

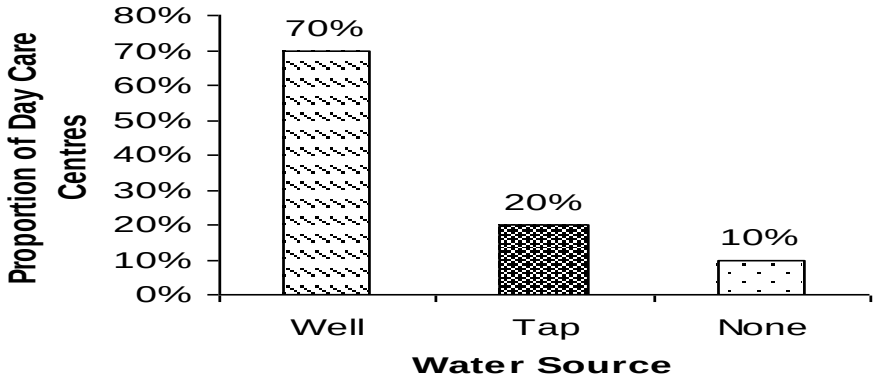

Figure 3: Source of Water supply in Day care Centres

This study set out to assess the day care environment, giving a clear picture of the environment in which children spend as much as 10 hours/day in some cases. To do this, we captured the quality of the day care environment in terms of the housing conditions as well as sanitary facilities and conditions.

Eighty percent of the day care centres sampled were beside motorways with 60% of the DCCs in high density areas being in close proximity to major road/ traffic. This was consistent with findings from the study reported by Pudpong et. al., 2011 in Bangkok, Thailand. In their study they reported that more day care centres in high density areas were less than 5m from the major traffic roads. The presence of these DCCs near such major traffic ways sometimes close to business centres and other commercial environments posses grave consequences to the safety of the children.

Floor coverings in the studied day care centres comprised rugs, carpets and bare terrazzo floor as opposed to ceramic, linoleum or wood as depicted in the study by Pudpong et. al., 2011 in day care centres in Bangladesh. In a similar study by Pudpong et. al.(2011), majority of the day care centres had concrete walls. Asbestos roofs were observed in 70% of the sampled DCCs and this is in violation of the NERDC guidelines which recommends modern ceiling boards, raffia, bamboo, wood, mats, and thick cartons to promote the green housing concept. The use of asbestos for roofing maybe associated with the age of the buildings as most of them were old hence remodelling seemed unnecessary. The presence of asbestos in childcare centres has been reported to be a major public health concern by Laquatra (2002). The floor area in 60% of the DCC was below NERDC,s recommended standard of $16m^2$ while the mean floor area was much lower.

What was predominant in the studied day care centres was the use of natural mean of ventilation which was grouped as one-sided or cross based on the WHO European standard on moulds and dampness in 2009. The day care personnel attributed the use of only natural ventilation methods in the day care centres to poor power supply. In one of the day care centres visited, the caregivers stated that the ceiling fans (a mechanical ventilation method) were not being used due to the fact that majority of the children had come down with cold- an upper respiratory tract infection (URTI) the day before. This is in contrast to the finding of the study of child care centres in Singapore by Zuraimi (2008) where the day care centres were found to operate natural ventilation, use air conditioners, or application of a hybrid ventilation system.

The sanitary conditions in the day care centres could have an effect on the indoor environment hence the occurrence of respiratory symptoms. Chauhan et. al. 2005 reported that poor sanitation may contribute to the risk of acute respiratory infections in children. As a matter of fact, a score of or below 50% in 40% of the day care centres reflects the hygiene practices demonstrated by the personnel in these day care centres.

No previous study on the water supply in day care centres was found to serve as a basis for comparison. The use of well water which was common in majority of the day care centres though permitted by NERDC is questionable. Use of water from these wells is often communal i.e not restricted to the day care centres or the school and also not treated. This scenario portends a great health risk particularly water needed by both the children and caregivers

Though NERDC standards had no specifications on changing/diaper areas, foreign standards from North Carolina, Colorado and other states in the United States have made specifications for this with good reason. Faecal contaminants have greater chances of being ingested by children in day care centres where there is no defined changing area. The absence of running water or appropriate cleaning facilities which is common in most centres makes food contamination probable.

Conclusion

The low sanitary score observed in 40% of the day care centres connotes a poor sanitary status for most of the day care centres and this could predispose the children to a myriad of health problems. Routine inspection of the day care centres should be carried out to ensure the centres conform to the stipulated guidelines. In addition, Longitudinal studies are important to test relationships between specific environmental contaminants and health outcomes among children in day care centres.

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