

# Comparative study and determinants of infection control practices of mothers of under-five children in selected health care institutions in Ibadan

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## Abstract

Improving family and community health practices have been identified as childhood mortality reducing strategies. This cross sectional study was conducted among mothers of under-five children attending three selected Health Centers (HCs) in Ibadan.

Convenient sampling method was used to select 220 mothers who provided information by means of a structured questionnaire. Data analysis was by descriptive statistics of frequency tables, ANOVA to compare mean knowledge, attitude and practice scores in the three HCs and Spearman rho's correlation for test of relationship between variables. The mean +SD age of respondents was 29.5 + 5.7 years, 95.5% were married and most of the participants were traders. The major source of information was health talks at immunization clinics (69.1%). Respiratory tract infection was the most listed (65.9%) common childhood disease. The overall mean percent score + (SD) for knowledge, attitude and practice of infection control were 55.9 + 15.0, 42.4 + 11.8 and 31.1 + 15.7 respectively. Mean knowledge score of 63.2 + 17.0 by participants at the university HC was significantly higher than that of participants in the other two HCs,  $F = 9.32$ ,  $p < 0.01$ . Correlation showed significant relationship between knowledge and attitude  $p < 0.001$ , knowledge and practice  $p < 0.001$  as well as attitude and practice  $p = 0.006$ . Only eight (3.6%) would wash their hands always after attending to the need of a sick child though 189 (85.9%) acknowledged hand washing as a strategy for infection control. Findings indicate the need to explore strategies to improve attitude and practice of mothers.

**Keywords:** Infection control; Infant care; Mothers

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## Introduction

Death in children under five years has declined steadily worldwide from 93 per 1,000 live births in 1990 to 72 in 2008.<sup>1</sup> Global Health Observatory reported that 6.6 million under five children died in 2012, giving an estimate of 18,000 deaths every day.<sup>2</sup> There is a wide gap between high income and low income countries, while high income countries record 6 deaths per 1000 live births, low income countries record 82 deaths per 1000 live births. The risk is highest in the African Region with 95 deaths per 1000 live births.<sup>2</sup> Therefore children in the developing countries are 10 to 13 times more likely to die before their fifth birthday than their counterparts in industrialized countries.<sup>2,3</sup> This report may be so because in the developing countries a mother may have two or three children that are under five years. If one of them is sick, the risk of infecting the others is very high.<sup>1</sup> Most common causes of under-five children illnesses globally are respiratory infections (mostly pneumonia), diarrhea, measles, malaria and any of these may be complicated by malnutrition.<sup>4,5</sup>

It is worthy of note that while improved medical treatment combined with greater access to health care have helped children in many parts of the world, in others many children continue to die needlessly. Some are never seen at a health facility either because services do not exist, or the families lack access to these services, or because families and other caregivers do not recognize the warning signs of life-threatening illness.<sup>6</sup> In Tanzania, as many as 40% of children who died were never taken for treatment and in Bolivia, the figure has been as high as 74%.<sup>3</sup> The Nigeria Demographic Health Survey (NDHS 2010) indicated that infant and under five mortality were 75 deaths /1000 live births and 140 deaths / 1000 live births respectively for the 2006-2010 period.<sup>7</sup> The Nigeria national strategic health development plan 2010–2015 reported that many of these deaths can be avoided, because the diseases (diarrhoea, Acute Respiratory Infection and malaria) that are responsible for this escalating mortality can be treated at low cost.<sup>8</sup> However these conditions continue to cause under five mortality, mainly due to very poor response at the household level and poor quality health services at the facility level.<sup>8</sup>

The Integrated Management of Childhood Illness (IMCI), developed by WHO and UNICEF, is one of

the cornerstones of the drive to reach the child health-related Millennium Development Goals to reduce children mortality. Components of IMCI focus on improving not just case management skills of healthcare staff and overall health systems, but has also focused on improving family and community health practices.<sup>3</sup> In view of the fact that mothers' practices have been considered vital to child health this study evaluated knowledge, attitude and practices of infection control measures among mothers attending three health centres in Ibadan with the intention of providing information of factors associated with under-fives mothers' knowledge and practice of infection control.

## Background

In Nigeria there is a wide margin in under-five children mortality rate based on socio economic groups. The mortality rate in the high socio economic group is 87/1000 live birth while among the lowest socio economic group it is 219/1000 live births; almost three times that of the high socio economic group.<sup>9</sup> This pattern of disparity either by socio economic status or educational status has been widely reported in various studies in other nations looking at different aspects of childhood illnesses.<sup>10,11</sup> The observed disparities therefore indicate that the family and community in which a child is born have great influence on child survival.

UNICEF reported that 90% of children die at home each year without reaching health facility,<sup>12</sup> hence there is need to provide parents and caregivers with essential knowledge and necessary commodities that can save the lives of their children. In a study exploring mothers' knowledge and recognition of pneumonia in children under five years of age, it was concluded that pneumonia death could be reduced in children under-five years by improving recognition of the signs by parents.<sup>6</sup> Mothers are vital in the efforts to reduce under-five childhood mortality. This study therefore sought to explore the following specific objectives:

- To assess and compare the participants' knowledge of infection control of children's diseases among the three selected institutions.
- To assess and compare the participants' attitude to infection control of children's diseases among the three tertiary institutions.
- To assess and compare the participants' practice of infection control of children's diseases among

mothers attending the three tertiary institutions.

- To identify factors associated with knowledge and practice of infection control among the mothers.

## Methods

This descriptive cross-sectional study was conducted in three purposively selected health centres in Ibadan. These are the Primary health care center, Idi Ogungun (HC1), University of Ibadan health centre (HC2) and the Ibadan Polytechnic health care centre (HC3). The three health centres are all situated within Ibadan metropolis. Each of them is well equipped to handle outpatients, a few inpatients, few minor surgeries and immunization.

The structured questionnaire used for data collection was developed after extensive literature review. It has four sections that assessed information on:

1. Bio-data of the mother
2. Knowledge: using 20 items, each correct answer attracting one mark, plus one question used to identify source of information.
3. Practice: using 10 statements with a response scale of Always (2 marks), occasionally (1 mark) and Never (0 score)
4. Attitude: using eight statements on the Likert scale.

Permission for conduct of the study was sought from the head of each of the health centres. Detailed information about the study was provided to the respondents who were mothers that brought their children in for immunization. Only respondents that indicated willingness to participate were recruited for the study. Participation in the study was voluntary and confidentiality of participants' information was ensured.

Convenience sampling method was used to recruit 220 mothers willing to participate in the study over a period of four weeks. Information about the study was given before the commencement of the immunization schedule for the day and mothers that indicated willingness were given questionnaire after taking the child's scheduled immunization for that day. Trained research assistant helped in the collection of data.

Data obtained was cleaned, coded and entered in SPSS version 16. Knowledge was scored giving a score of one for correct response and zero for wrong

responses. Hence minimum obtainable knowledge score was zero and maximum obtainable score was 20. Percentage score was computed from raw score, 0-49% was categorized as poor knowledge and  $\geq 50\%$  was considered as good knowledge. Practice statements were graded as always scored two marks, occasionally one mark and never zero, for positively skewed questions and reverse for negatively skewed statements. Maximum obtainable score was 18 marks and zero for minimum obtainable score. Percentage score was computed and score of 0-49% was categorized as poor practice and  $\geq 50\%$  was considered as good practice. There were eight attitudinal statements using the Likert scale. For positively skewed questions strongly agree was scored 4, agreed 3, Neutral 0, disagreed 2 and strongly disagreed 1. It was the reverse for negatively skewed statements. Hence maximum obtainable score was 32 and minimum was zero. Score of 0-49% was categorized as negative attitude and  $\geq 50\%$  was considered as positive attitude.

Descriptive analysis of socio-demographic characteristics as well as cross tabulations of some of these characteristics with the HCs, and Chi square was used for test of association. One way ANOVA was used for comparisons of mean scores of knowledge, attitude and practice in the three health centres.

## Results

### *Socio demographic characteristics of participants*

There were 220 respondents seen in three health care centres as follows: 42.3% were seen at the Primary health care centre (HC1), 30% at University health centre (HC2) and 27.7% at the Polytechnic health centre (HC3). Mean (SD) age of all respondents was 29.5 (5.7) years, with minimum age of 19 years and maximum of 50 years. Table I shows details of respondents' socio demographic data. The most occurring age group was 19 – 29, while 210 (95.5%) were married and most of the participants were traders.

The age distribution, occupation, and number of children of respondents seen in the three hospitals were not significantly different. However, educational status was significantly different, Pearson's Chi-square = 16.266, df 6,  $p = 0.01$ . More graduates attended HC2; 30% of the respondents from this centre were graduates. More than half (57%) of the respondents that attended (HC1) were self-employed traders. Table I

**Table I. Comparison of socio-demographic characteristics by health centres**

Socio-demographic variables	Primary health care centre (1)	University health service (2)	Polytechnic health service (3)	All participants	Pearson's chi-square
Age	frequency	frequency	Frequency	Total	
19-29	47	20	30	103	$\chi^2=2.2$ df 4 $p=0.69$
30-40	42	32	26	100	
41-50	3	1	3	7	
<b>Educational status</b>					
Primary school	21	6	16	43	$\chi^2=16.3$ df 6 $p=0.01^*$
Secondary school	42	23	23	88	
Post-secondary school	20	13	12	45	
University education	9	20	10	39	
<b>Occupation</b>					
Civil servant	18	17	11	46	$\chi^2=13.7$ df 8 $p=0.09$
Trading	50	21	26	103	
Artisans	9	12	12	33	
Student	5	7	8	20	
Housewives	5	3	4	12	
<b>Number of children</b>					
One child	28	23	13	64	$\chi^2=11.2$ df 6 $p=0.08$
Two children	16	18	19	53	
Three children	26	19	18	63	
Four children or more	23	6	9	38	

shows details of socio demographics by health facility. The major source of information for participants about childhood diseases and infection control was health talks by nurses at immunization clinics (69.1%) followed by information during antenatal clinic (49.5%), TV/Radio (32.3%), school (25.9%), a doctor (24.1%), hospital information handbill (22.3%), community health worker (20.9%) and by a nurse when the child was ill (15%).

#### **Knowledge of childhood diseases and infection control**

The six most common childhood diseases listed by respondents were respiratory tract infection by 65.9%, malaria by 58.6%, measles by 53.2%, gastro-enteritis by 36.4%, TB by 13.2% and typhoid by 12.3%. The six most listed communicable childhood diseases were: respiratory tract infections by 57.3%, measles by 54.5%, TB by 12.7%, malaria by 11.8%, chicken pox by 10.5%, and gastro-enteritis by 9.5%. Only 25

(11.4%) listed six childhood diseases, 18 (8.2%) listed five, 35 (15.9 %) listed four, while 59 (26.8%) listed three and another 59 (26.8%) listed two while only 21 (9.5%) listed just one and 3 (1.4%) listed none. Acknowledging communicable childhood diseases, the maximum listed was four by only 12 (5.5%), 33 (15%) listed three, 74 (33.6%) listed two, while 86 (39.1%) listed only one and 15 (6.8%) did not list any. One hundred and eighty nine (85.9%) acknowledged that hand washing is a strategy for infection control for all types of infection, 22 (10%) indicated it is not, while only two (0.9%) indicated "I don't know", 7 (3.2%) did not respond. Similarly 196 (89.1%) acknowledged that for hand washing to be effective plenty of running water and soap are essential.

The overall mean  $\pm$  SD percent knowledge score for participants was  $55.9 \pm 15.0$ , mean knowledge score of  $63.2 \pm 17.0$  by respondents at (HC2) was significantly higher than the mean score by respondents in the other two health centres,  $F = 9.3$ ,  $p < 0.001$ , Table II. However, there was no significant difference in the mean knowledge score of respondents in HC1 and that of respondents from HC2,  $p=0.69$ . All the socio demographic characteristics did not have significant

association with knowledge, attitude or practice of infection control except educational status that was significantly associated with knowledge,  $X^2 = 11.775$ ,  $df 3$ ,  $p=0.008$ . Also there is significant difference in the mean knowledge score by educational status,  $F=2.795$ ;  $p = 0.001$ .

#### **Practice of infection control when child is ill**

Seventy (31.8%) participants will always keep a child with upper respiratory infection away from other children. Most of the mothers 163 (74.1%) will never wash their hands after attending to the need of the sick child, table IV shows details of the mothers' practices. There was no significant difference in the mean practice score of respondents in the three health centres,  $F=2.4$ , significance level = 0.09, table II. Respondents at the University Health Centre (HC2) had the lowest mean practice score  $27.5 \pm 19.4$ .

#### **Attitude to infection control practices**

Only 35 (15.9%) of the mothers disagreed with the statement "It is not possible for a mother to separate her children even if one has infectious diseases, she can only trust God to keep them" table IV shows details of mothers' attitude to infection control. Participants

**Table II. Comparison of mean percentage scores of knowledge, practice and attitude of respondents in the three health care centres**

	Knowledge Score				Practice Score				Attitudinal Score			
	Mean	SD	95% CI	F P value	Mean	SD	95% CI	P value	Mean	SD	95% CI	P value
HC1	52.8	13.1	50.0-55.6	<b>F= 9.3</b> <b>P&lt;0.01</b>	32.9	12.8	30.3-35.6	<b>F=2.4</b> <b>P=0.89</b>	43.4	11.6	41.0-45.8	<b>F=2.9</b> <b>P=0.06</b>
HC2	63.2	17.0	58.5-68.0		27.5	19.4	22.6-32.4		39.5	12.6	36.3-42.6	
HC3	53.8	13.9	50.1-57.5		31.9	15.0	28.0-35.9		44.1	10.9	41.2-46.9	
<b>Total</b>	<b>55.9</b>	<b>15.0</b>	<b>53.7-58.0</b>		<b>31.1</b>	<b>15.7</b>	<b>29.0-33.1</b>		<b>42.4</b>	<b>11.8</b>	<b>40.8-44.0</b>	

at the University health centre had the lowest mean attitudinal score  $39.5 \pm 12.6$ . The differences in the attitudinal scores between respondents in the three health centres was not significant,  $F = 0.29$ ,  $p = 0.056$ , table II.

#### **Associated Factors**

There was no significant association between the socio-demographic characteristics of age-group, marital status, number of children, occupational status with knowledge, attitudinal and practice scores of

infection control among the mothers. Only educational status had a significant association with knowledge of infection control;  $X^2 = 11.8$ ,  $df\ 3$ ,  $p = 0.008$ .

There was a significant correlation between knowledge and practice of infection control, knowledge and attitude to infection control as well as practice and attitude to infection control at 0.01 level,  $-0.349\ p < 0.001$ ;  $0.396\ p < 0.001$ ;  $-0.187$ ,  $p = 0.006$  respectively.

Among participants that had low knowledge score, 71.2% had a low practice score. Among the participants that had low knowledge scores, 58.3% had positive attitude while 88.6% of participants that had good knowledge scores had positive attitude. However, among participants with negative attitude 69.2% also had poor practice scores and 30.8% had good practice scores. Among those that had positive attitude 89.3% also had poor practice score while only 10.7% had good practice score.

## Discussion

Majority of the women who participated in the study were within the active reproductive age as is common with most studies among mothers of under-five children. The socio-demographic characteristics of the women in the three health centres were similar except for education. The University health centre by virtue of its location and population that is being served had more graduates. The primary health centre in a high density area outside the university had majority of the participants as traders. These differences of unique characteristics were only reflected in the knowledge of infection control. However this did not reinforce any significant difference in the practice and attitude of the mothers to infection control. This observation is contrary to the general belief that knowledge always influences practice and attitude positively. Literacy or level of education attained has been reported to be an advantage for understanding health messages and enhancing attitude as well as practice of health

**Table III. Mothers' practice of Infection control**

Infection control practices	Always		Occasionally		Never	
	Freq	%	Freq	%	Freq	%
I will keep a child with upper respiratory infection away from the other children	70	31.8	57	25.9	86	39.1
I use the same handkerchief to clean the nose of my children	27	12.3	18	8.2	174	79.1
I keep my child away from school if he or she has cough, or and running nose	73	32.2	108	49.1	33	15.0
I wash my hands after attending to the need of the sick child	8	3.6	42	19.1	163	74.1
I ensure that all the children eat very well especially if one of them is sick	2	0.9	20	9.1	194	88.2
When of my children have diarrhoea, I concentrate on care of the sick child and get help to care for the other children	102	46.4	49	22.3	62	28.2
If my child has measles I avoid contact with other children after the rashes appear	76	34.5	34	15.5	102	46.4
If my child has measles I avoid contact with other children before the rashes appear	108	49.1	39	17.7	60	27.3
I comply with immunization requirement for each of my children	3	1.4	24	10.9	188	85.5

behaviour.<sup>13</sup> However, a reported model on health literacy concluded that socioeconomic indicators are the basic factors influencing health literacy. Also health actions are defined not only by patient factors but also by external factors that can be attributed to the health care provider or the health system. The pathways are particularly useful in highlighting the role of health actions and providing a useful taxonomy of behavioural domains.<sup>13</sup> This model may be used to explain the findings of this study and the implication therefore is that there is need to explore other implicating variables that could influence practice other than knowledge.

The most common source of information about infection control was health talk by nurses at immunization clinics and ante natal clinics. In majority of developing nations where access to information about health issues on the internet is not widely explored, nurses are reckoned to be the major source of health information. Nurses should be encouraged to maintain this essential function to enhance health information especially with the vulnerable groups. Previous findings in other situations have also reported that nurses' teaching are usually effective.<sup>14</sup> However, in this study the information has only influenced knowledge but not adequately the attitude and practice of infection control. This calls for a review of strategies and modalities for client teaching in this environment.

### ***Knowledge of childhood diseases and infection control***

Respiratory tract infection has been identified as a major childhood disease and this was the most listed by mothers in this study. The mothers also recognized communicable disease among children with respiratory tract infections the most listed. However very few were able to identify up to four, majority listed only one. The implication of this is that though the mothers were able to list childhood diseases if they do not recognize these to be communicable disease then they will not act with caution to prevent transmission of the disease to other children. Having two to three under-five children have been considered by WHO as being responsible for high mortality of under-five.<sup>1</sup>

Hand-washing has been identified as a major strategy for effective infection control at family, community or facility level.<sup>11,15</sup> Majority of mothers in this study also

agreed that hand washing is a strategy for infection control for all types of infection; this conforms with findings among rural women in India.<sup>11</sup> However, contrary to the findings among rural women in India, women in this current study acknowledged that for hand washing to be effective there is need for adequate use of water and soap.<sup>11</sup> None the less, very few (< 5%) will always wash their hands after attending to the need of the sick child. These findings may be attributed to the opinion or conclusion of a systematic review<sup>15</sup> that "Hand washing is influenced by community perception of what is hygienic or not," for example in a community, stools passed by infants are considered harmless, hence in such a community hand washing will not be considered after cleaning baby after passing stool. Such a community would need cultural and behavioural change to accept hand washing.

Majority of mothers in this study have not fully complied with the immunization requirement of their children. These findings conform to that of previous study conducted among under-five children in a children's hospital in Ibadan, where majority of mothers have shown good knowledge of childhood diseases and knowledge of immunization schedules. However, less than half of the same population presented their children for immunization.<sup>16</sup> Another study reported that majority of the study participants fully immunized their last child while those that did not, indicated that sickness of the child was the main reason, though lack of knowledge of immunization benefits, as well as required doses were also identified.<sup>17</sup> These findings have implication for client teaching.

In conclusion the finding in the three settings are similar in many respects except for educational status which expectedly influence knowledge score but surprisingly did not bring about significant difference in attitude and practice in the three groups. It is therefore obvious that there are other interplay factors that must be explored to enhance attitude and practice of infection control and knowledge of childhood diseases among mothers of under-five children. Nurses who have been identified as major source of client information in the environment of this study, as it may be in many other developing countries, need to target teaching strategies that will not only impart knowledge but also motivate better or improved behavioural outcomes.

**Table IV. Mothers' attitude to infection control practices**

Attitudinal Statements	SA		A		N		D		SD	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
A child with an infectious disease like upper respiratory disease should be kept away from other children	62	28.2	59	26.8	13	5.9	46	20.9	34	15.5
Nutritional status of the child is one of the determinants of whether a child will be infected by infectious disease or not	109	49.5	53	24.1	16	7.3	22	10.0	12	5.5
The type of diet a child that is exposed to infection is taking has nothing to do with whether the will be affected by the infection or not	60	27.3	54	24.5	17	7.7	29	13.2	44	20.0
Immunization of a child is very vital in determining whether the child will be infected by another child or not	133	60.5	41	18.6	12	5.5	11	5.0	12	5.5
Children with any infectious disease should be kept away from day care or school	86	39.1	54	24.5	15	6.8	29	13.2	30	13.6
It is not possible for a mother to separate her children even if one has infectious disease, she can only trust God to keep them	113	51.4	52	23.6	11	5.0	-	-	35	15.9
For babies up to six months of age, exclusively breastfed babies will have advantage over babies that are not when in contact with an infectious disease	143	65.0	40	18.2	12	5.5	7	3.2	9	4.1
Continuing to breastfeed a child for up to two years is a strategy for infection control	98	44.5	54	24.5	17	7.7	26	11.8	17	7.7

Key: SA = Strongly Agree; A = Agree; N= Neutral; D = Disagree; SD = Strongly Disagree



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