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Infant Sleep Practices and Knowledge of Sudden Infant Death Syndrome among Mothers of Infants Attending the Paediatric Clinics of a Tertiary Hospital in Sokoto, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Authors KOI, AA and FBJ designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors PKI, MOU and UMS reviewed the manuscript. Authors EUY, MAS and MAJ managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: Sudden infant death syndrome (SIDS) is a sudden unexpected death of an infant, the cause of which remains unexplained after a thorough investigation. Supine sleep positioning recommended by the American Academy of Pediatrics since 1992 has significantly reduced the incidence of the problem in developed countries. In developing countries like Nigeria, poor practice of recommended sleeping position has been documented.
Objective: To assess the knowledge of SIDS and infant sleep practices amongst mothers seen in Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto.
Methods: This was a 4-month cross-sectional study from November 2015 to February 2016.

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Mother infant pairs seen in the paediatric follow up clinic and immunization clinic of the hospital were consecutively selected and the mothers were interviewed after giving informed consent. Demographic data and responses were entered into a questionnaire. Data was analyzed with SPSS version 20.

Results: Of the 396 mothers interviewed, 360 (91%) had antenatal care. Eighty-one percent of infants shared a bed with parents or siblings. Only 34 mothers (8.6%) were aware of the recommended position. Infant sleep position was lying on side in 198 (50%), no particular position in 92 (23.2%), supine in 80 (20.2%) and prone in 26 (6.6%) Only 132 mothers (33.2%) had heard of SIDS and 30 (7.6%) thought it was caused by suffocation while another 30 (7.6%) thought it was caused by aspiration.

Conclusion: There is paucity of knowledge of SIDS and recommended infant sleep practices amongst mothers in the study area. Focused health education on SIDS prevention is necessary.

Keywords: SIDS; infant sleep position; mothers; practice; Sokoto.

1. INTRODUCTION

Sudden infant death syndrome (SIDS) is a sudden unexpected death of an infant, the cause of which remains unexplained after a thorough investigation which includes a complete autopsy, investigation of the scene of death, and review of the medical history [1]. Sudden unexpected infant death describes any sudden and unexpected death, whether explained or unexplained, that occurs during infancy. Sudden unexpected infant death (SUID) includes all deaths that fall into 3 categories which are: those that have been classified SIDS, those deaths from unknown causes that have not been investigated completely and those deaths that result from suffocation, asphyxia, entrapment, infection, ingestions, metabolic diseases, and arrhythmia-associated cardiac channelopathies [2,3].

The American Academy of Pediatrics (AAP) first recommended that infants be placed to sleep on their back in 1992. Before the Back to Sleep campaign in U.S by the American Academy of Pediatrics (AAP) in 1992, SIDS rate was about 7,000 infants/year but since 1994, this has progressively declined to 2,234 infants/year in 2001. But other causes of sudden unexpected infant death like accidental suffocation and strangulation in bed have increased in incidence. The AAP has expanded its recommendations on SIDS in 2011 to include more on a safe sleep environment that can reduce the risk of all sleep-related infant deaths [1,2].

One of the recommendations is to expand the national campaign to reduce the risk of SIDS, with an emphasis on the safe sleep environment. Health care workers are encouraged to engage in public education for anyone involved in the care of infants. It was also recommended that all physicians, nurses, child care professionals, and other health care professionals should receive education on safe infant sleep and implement safe sleep practices as needed [2]. In developing countries like Nigeria, poor practice of recommended sleeping position amongst mothers of infants has been documented in 2 previous studies in Southern Nigeria [4,5]. Moreso, the poor socioeconomic conditions and ignorance that provide the background for SIDS are common in Nigeria [6].

This study was therefore carried to assess the knowledge of SIDS and infant sleep practices amongst mothers seen in Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto, a tertiary centre in North-western Nigeria. This will expose the gaps in mothers' knowledge and serve as a template for health information on SIDS to be provided by health workers in the area.

The specific objectives of the study were:

1. Assess the knowledge of SIDS amongst mothers of infants.
2. Assess the knowledge of recommended sleep position amongst mothers of infants.
3. Assess the type of infant sleep position and sleep environment being practiced by mothers of infants

2. MATERIALS AND METHODS

2.1 Study Area

Sokoto State is located in the dry Sahel region and is surrounded by sandy Savannah. Sokoto town lies between latitude 13º3′5″N and longitude 5º15′53″E of the Equator [7]. It has an annual average temperature of 28.3ºC, but very

high temperatures up to 45°C occur during the hot dry months. The dry season comprises the hot dry season from March to April and the cold dry season from November to February [8]. The rainy season starts late in May and lasts till September with a mean annual rainfall of 550 mm [8].

The study was carried out at the Paediatric follow up-clinic and Immunization clinic of Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto. The hospital is a tertiary health facility located in Sokoto, the Sokoto State capital. It is a referral centre catering for inhabitants of Sokoto, Zamfara and Kebbi States.[7] Though, a well-child clinic is not run in the hospital, apparently healthy children are seen usually at the follow up clinics and immunization clinics in the Departments of Paediatrics and Community Health respectively. The follow up clinic operates daily every weekday, while the immunization clinic runs twice a week.

2.2 Study Design

It was a 4-month descriptive and cross-sectional study conducted from November 2015 to February 2016.

2.3 Study Population

The study population comprised mothers presenting to the clinics with infants (< 1 year of age).

2.4 Sample Size

Since there was no previous study in the area, 50% prevalence was used as follows [9].

$$n = \frac{z^2 pq}{d^2}$$

Where n = minimum sample size
z = Standard normal deviate set at 1.96
p = Prevalence
q = 1 - p = 1 – 0.5 = 0.5
d = degree of accuracy desired = 0.05

$$n = \frac{(1.96)^2 (0.5)(0.5)}{0.05^2} = 384$$

Allowing for 10% attrition rate, the sample size to be selected (n_s) was:

384 + 38.4 = 422

2.5 Inclusion Criteria

Mothers with infants from birth to 52 weeks of age presenting to the clinics.

2.6 Exclusion Criteria

1. Infants brought to clinic by other caregivers.
2. Infants whose mothers' are health care workers and may know the AAP recommendations already leading to bias.
3. Children with disease conditions whose mothers may have been counselled to put them in a particular sleep position. For example, those with known congenital heart disease, cerebral palsy, or neural tube defects.

Mother-infant pairs were consecutively recruited from the clinic until the desired sample size was attained.

2.7 Instrument of Data Collection

A structured questionnaire designed to assess knowledge of the recognized risk factors for SIDS outlined in the AAP recommendations was used [2,10]. It also assessed the general knowledge of the mothers about SIDS and infant sleep practices adopted by the mothers. The demographic characteristics of the respondents including age, educational attainment and occupation were captured.

2.8 Socioeconomic Classification

The socioeconomic classification of the family was based on the method described by Oyedeji in Nigeria [11]. Scores were awarded from 1 to 5 (in descending order of status), each for the occupation and educational attainment of each parent of the infant. The mean of the four scores (two for the father and two for the mother) to the nearest whole number, was the social class assigned. Social classes 1 and 2 was taken as upper social class, social class 3 was regarded as middle social class and social classes 4 and 5 was taken as the lower social class.

2.9 Method of Data Collection

Each mother was interviewed by a researcher while seated comfortably in the consulting area of the clinic after their infants had been attended to. The questions were read to them and their

responses were entered into the proforma by the researcher.

2.10 Ethical Approval

This was obtained from the Ethics Committee of Usmanu Danfodiyo University Teaching Hospital, Sokoto. Informed consent (signed/ thumbprinted) was obtained from the mothers.

2.11 Data Analysis

The data was analyzed with SPSS version 22. Quantitative data were expressed as means and standard deviation while categorical variables were expressed as proportions. Chi-square or where necessary, Fisher's Exact test, was used to test for statistical significance. A p-value of <0.05 was considered statistically significant.

3. RESULTS

3.1 Socio-demographic Parameters

Of the total number sampled, only 396 mother infant pairs were analysed as 26 of them had missing data and were excluded. Those with missing data included those mothers who did not know their age and those who could not proffer the educational status or occupation of the father of the infant.

There were 226 males and 170 female infants. The infants mean age was 21.4 ± 14.4 weeks with a range of 1 – 52 weeks. The mother's mean age was 29.0 ± 5.3 years, ranging from 17 – 45 years. A total of 212 mothers accounting for 53.5% were of Hausa-Fulani tribe. Two hundred (50.5%) belonged to the middle social class, while 160 (40.4%) and 36 (9.1%) were of lower and upper class respectively. Majority of the mothers, 360 (91%) had ante-natal care. This information is provided in Table 1.

3.2 Knowledge of Sudden Infant Death Syndrome (SIDS)

Knowledge of sudden infant death was low amongst the mothers as only 132 of them (33.2%) had heard of SIDS and 71 (17.9%) of them said they knew the cause. Of those who felt they knew the cause, 30 (7.6%) thought it was caused by suffocation while another 30 (7.6%) thought it was caused by aspiration and 11 (2.7%) attributed it to spiritual attack. The source of their information on SIDs was mainly from nurses (22.7%), friends (18.2%) doctors (16.7%) internet (15.2%) mass media (12.1%) grandmother (10.6%) and books (4.5%). Those of higher social status and higher educational status were proportionally more exposed to the knowledge of SIDS ($p = 0.03$; $p = 0.13$ respectively). This is shown in Table 2.

3.3 Knowledge of Recommended Infant Sleep Position amongst Mothers

Of the total, 132 mothers (33.2%) said they were aware there was a recommended sleep position while 264 (66.7%) were not aware of any recommendation. Out of the 132 mothers who said they were aware, only 34 of them (8.6% of total population) correctly identified the recommended position as supine. The source of information in those 34 mothers who knew the recommended supine position was from grandmothers (12/34; 35.3%), friends (12/34; 35.3%), nurses (6/34; 17.6%), and doctors (4/34; 11.8%). It is seen in the Table 3 that those of lower social class and educational status were more aware of the back to sleep position as the recommended one. This was statistically significant. Knowledge that a particular position was recommended and awareness of the correct position was not related to ANC attendance ($p = 0.5$).

3.4 Infant Sleep Position being Practised by Mothers

Half (198/396; 50%) of the mother's placed their infants to sleep on their side, followed by 92 mothers (23.2%) who did not have any particular position while 80 (20.2%) placed infants on their back to sleep and 26 (6.6%) used the prone position. This is shown in Fig. 1.

In Table 4, the factors associated with mother choice of infant sleep position are shown. The choice of position was significantly related to the infant's age, mother's tribe and social class. Most of the babies placed in prone position to sleep were below 6 months of age. The prone position was mostly used by the Igbos and other tribes. Most of those who attended ANC did not know the recommended position, and those who were aware of a recommended position mostly used the side or back position. Of the 34 mothers who were aware of the recommended back (supine) position, 22 of them (78.5%) actually put their infants to sleep in that position ($p < 0.001$) as shown in Table 5.

Table 1. Socio-demographic parameters of the mothers (n = 396)

Variable	Distribution	Number	%
Mother's age	15 – 19	10	2.5
	20 – 24	66	16.7
	25 – 29	144	36.4
	30 – 34	102	25.8
	35 – 39	64	16.2
	40 – 44	6	1.5
	>45	4	1.0
Tribe	Hausa/Fulani	212	53.5
	Yoruba	64	16.2
	Igbo	58	14.6
	Others	62	15.7
Educational status	None	24	6.1
	Islamic	46	11.6
	Primary	24	6.1
	Secondary	68	17.2
	NCE/OND*	82	20.7
	Degree/HND*	114	28.8
	Postgraduate	38	9.6
Social class	Upper	36	9.0
	Middle	200	50.5
	Lower	160	40.4
ANC attended	Yes	360	91.0
	No	36	9.0
Post-natal visit	Yes	284	71.7
	No	112	28.3

**NCE = National Certificate in Education; OND = Ordinary National Diploma, HND = Higher National Diploma*

Table 2. Showing the relationship of educational and social status to knowledge about SIDS

Variable	Heard about SIDS	Not heard about SIDS	Total	X^2	p-value
	No (%)	**No (%)**			
Education					
None	4 (16.7)	20 (83.3)	24 (100)		
Islamic	16 (34.8)	30 (65.2)	46 (100)		
Primary	8 (33.3)	16 (66.7)	24 (100)		
Secondary	20 (29.4)	48 (70.6)	68 (100)		
NCE/OND*	22 (26.8)	60 (73.2)	82 (100)		
Degree/HND*	44 (38.6)	70 (61.4)	114 (100)		
Postgraduate	18 (47.4)	20 (52.6)	38 (100)		
Total	**132 (33.2)**	**264 (66.7)**	**396 (100)**	9.8	1.3
Social class					
Upper	18 (50.0)	18 (50.0)	36 (100)		
Middle	70 (35.0)	130 (65.0)	200 (100)		
Lower	44 (27.5)	116 (72.5)	160 (100)		
Total	**132 (33.2)**	**264 (66.7)**	**396 (100)**	7.2	0.03

**NCE = National Certificate in Education; OND = Ordinary National Diploma, HND = Higher National Diploma*

Table 3. Showing the relationship of educational and social status to knowledge of the correct sleep position (n = 132)

Variable	Back position	Other positions	Total	X^2	p-value
	No (%)	No (%)			
Education					
None	2 (33.3)	4 (66.7)	6 (100)		
Islamic	8 (66.7)	4 (33.3)	12 (100)		
Primary	2 (33.3)	4 (66.7)	6 (100)		
Secondary	10 (38.5)	16 (61.5)	26 (100)		
NCE/OND	4 (22.2)	14 (77.8)	18 (100)		
Degree/HND	8 (18.2)	36 (81.8)	44 (100)		
Postgraduate	0 (0.0)	20 (100.0)	20 (100)		
Total	**34 (25.8)**	**98 (74.2)**	**132 (100)**	24.6	0.001
Social class					
Upper	0 (0.0)	16 (100.0)	16 (100)		
Middle	16 (21.1)	60 (78.9)	76 (100)		
Lower	18 (45.0)	22 (55.0)	40 (100)		
Total	**34 (25.8)**	**98 (74.2)**	**132 (100)**	14.2	0.001

Table 4. Factors associated with infant sleep position practiced by mothers

Variable	Infant sleep position practiced by mother				
	Back position	Side position	Prone position	No particular	P
	No (%)	No (%)	No (%)	No (%)	
Age of infant					
≤ 6 months	44 (55.0)	112 (56.6)	22 (84.6)	58 (63.0)	0.03
7 –12 months	36 (45.0)	86 (43.4)	4 (15.4)	34 (37.0)	
Sex of infant					
Male	48 (60.0)	114 (57.6)	20 (76.9)	44 (47.8)	
Female	32 (40.0)	84 (42.4)	6 (23.1)	48 (52.2)	0.05
Age of mother					
15 – 19	6 (7.5)	2 (1.0)	0 (0.0)	2 (2.2)	
20 – 24	20 (25.0)	30 (15.2)	4 (15.4)	12 (13.0)	
25 – 29	22 (27.5)	74 (37.4)	10 (38.5)	38 (41.3)	
30 – 34	20 (25.0)	50 (25.3)	6 (23.1)	26 (28.3)	
35 – 39	10 (12.5)	34 (17.2)	6 (23.1)	14 (15.2)	
40 – 44	2 (2.5)	4 (2.0)	0 (0.0)	0 (0.0)	
>45	0 (0.0)	4 (2.0)	0 (0.0)	0 (0.0)	0.11
Tribe					
Hausa/Fulani	58 (72.5)	116 (58.6)	2 (7.7)	36 (39.1)	
Yoruba	8 (10.0)	38 (19.2)	4 (15.4)	14 (15.2)	
Igbo	6 (7.5)	16 (8.1)	10 (38.5)	26 (28.3)	
Others	8 (10.0)	28 (14.1)	10 (38.5)	10 (17.4)	< 0.001
Social class					
Upper	2 (2.5)	22 (11.1)	4 (15.4)	8 (8.7)	
Middle	18 (22.5)	120 (60.6)	18 (69.2)	44 (47.8)	
Lower	60 (75.0)	56 (28.3)	4 (15.4)	40 (43.5)	< 0.001
ANC					
Yes	68 (85.0)	190 (96.0)	26 (100)	76 (82.6)	
No	12 (15.0)	8 (4.0)	0 (0.0)	16 (17.4)	< 0.001
Heard of SIDS					
Yes	24 (30.0)	70 (35.4)	10 (38.5)	28 (30.4)	
No	56 (70.0)	128 (64.6)	16 (61.5)	64 (69.6)	0.70
Aware of AAP					
Yes	28 (35.0)	82 (41.4)	4 (15.4)	18 (19.6)	
No	52 (65.0)	116 (58.6)	22 (84.6)	74 (80.4)	0.001
Knows correct position					
Yes	22 (78.6)	4 (4.9)	0 (0.0)	8 (44.4)	
No	6 (21.4)	78 (95.1)	4 (100)	10 (55.6)	< 0.001

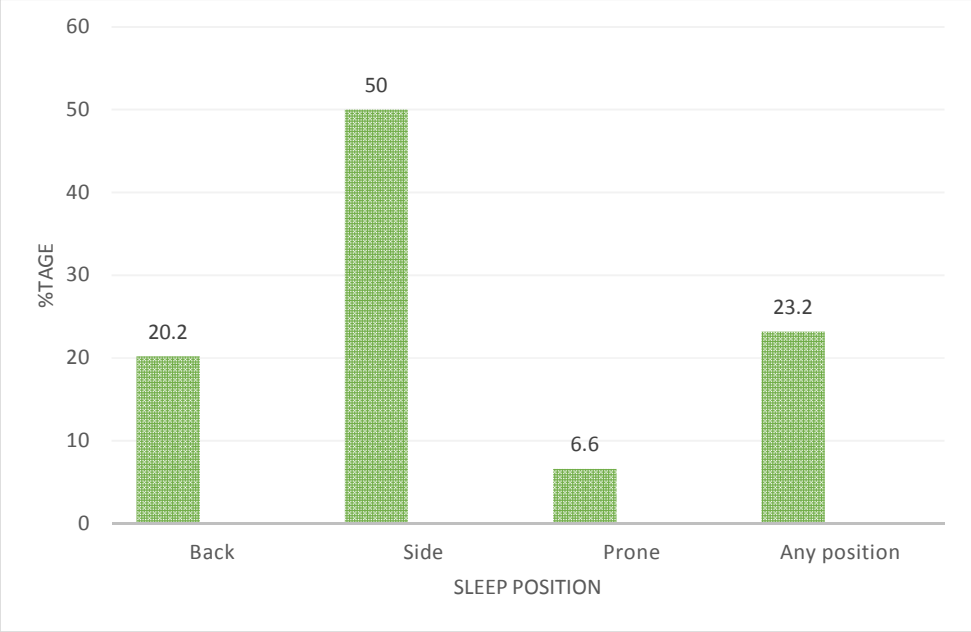

Fig. 1. Infant sleeping position as practiced by the mothers (n = 396)

Table 5. Mothers' knowledge of position recommended vs practice of sleep position

Position practiced	Correctly knows recommended position		Total
	Yes (%)	No (%)	
Lie baby on back	22 (78.5)	6 (21.4)	28 (100)
Other positions	12 (11.5)	92 (88.5)	104 (100)
Total	34 (25.8)	98 (74.2)	132(100)

Fisher's exact test = 45.1; p = 0.000

3.5 Sleep Surface being used by Mothers for Their Infants

For the sleeping surface being used by the population, 320 (81%) of infants shared a sleeping surface (a bed in 284 cases, 71.7%) with parents or siblings. This is shown in Fig. 2. Of mothers who shared a bed, 152 (47.5%) believed they needed to be closer to the baby for breastfeeding, for bonding and to stop baby's cries, while 78 (24.4%) felt the cot was expensive.

4. DISCUSSION

Majority of the mothers in this study had received ante-natal care, had delivered in the hospital and also had postnatal visits as expected because the study was conducted in a tertiary centre. However, these advantages did not positively influence the knowledge they had about SIDS, infant sleep position and their practice probably because specific advice was not given to them during these contacts with health workers in the hospital. Other studies done in the country did not assess whether the mothers had antenatal care and whether it affected their infant sleep practices [4,5]. It is expected that important health information should be transmitted during interaction with doctors and nurses especially with regards to infant sleep position and environment during antenatal care [12]. This is the reason for the additional recommendation by the American Academy of Paediatrics on health workers training and information on infant sleep position and environment [2].

Only 33.2% of the mothers had heard about SIDS especially those of higher social status, however, it was not optimal and did not influence their choice of infant sleeping position positively. The figure is similar to 35.1% and 39% of mothers who had heard of SIDS reported by Okpere from Port Harcourt and Yikilkan from

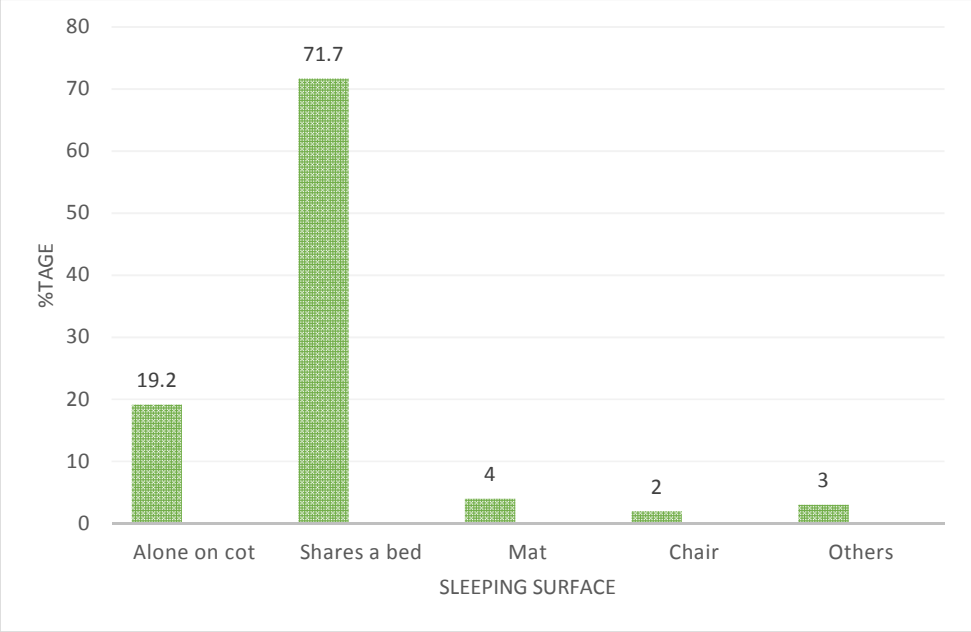

Fig. 2. Showing the type of sleeping surface being used by the mothers for their infants

Turkey [5,10]. It was seen in this study that a larger proportion got their information on SIDS from relatives and friends which may explain the low level of knowledge and appropriate practice. Similar to Okpere's finding from Port Harcourt, [5] grandmothers, followed by nurses were the highest sources of knowledge to the mother on infant sleep position in this study. This is unlike in the United States where mothers were reported to have received advice on sleep position mostly from doctors and very few received this advice from family, friends or the media. [13]

Only 8.6% of respondents in this study were aware of the "Back to sleep" position which is low compared to 18.8% in Okpere's study in Port Harcourt, Nigeria [5]. This may be related to the amount of exposure to correct information about the subject and also their own inherent beliefs. [5,14] Similar proportion of mothers in this and Okpere's study (59.1% vs 59.2%) had tertiary education but this did not positively impact on their knowledge [5]. It was surprising however, that those mothers of lower educational and social status were more aware of the recommended position in this study. However, the source of their information was not assessed according to social and educational status.

For the actual choice of sleep position being practiced by the mothers, commonest position was lying baby on the side in 50%, similar to 51.8% in Ibeziako's study in Enugu. [4] The main reason was that it was more comfortable for the baby. The prevalence of lying the baby on the back to sleep was low at 20.2%. This was similar to 18.1% and 21.5% in the studies by Okpere and Ibeziako [4,5]. Prone sleep position accounted for 6.6% in this study which was much lower compared to 44.3% in Okpere's study and 26.7% in Ibeziako's which were reported from the South-South and South-East part of the country which comprises mainly the Igbo ethnic group [4,5]. In this study, among the 3 major tribes, the Ibos constituted a higher percentage of those who favoured the prone position. More studies will be needed on this aspect to elucidate if there are cultural factors that favour a particular sleeping position. The influence of grandmothers on increased use of prone sleeping position was reported in a study from the United States [15] and this may also be a factor in this environment.

The rate of placing infant on the back to sleep in this study (20.2%) is lower than 46% reported by Yikilkan [10] from Turkey and 61% by Van Kohorn [13] from the United States. Prone sleeping position was however higher at 17% as reported by Van Kohorn [13] than 6.6% reported in this study. Information on correct sleep position was significantly associated with the correct practice, buttressing the fact from previous studies and the AAP recommendations that widespread education on SIDS can help in

changing practices and reduce the incidence [2,16]. In a study by Van-Kohorn et al. [13] amongst African-American mothers, it was found that receiving information of correct sleep position from multiple sources was significantly correlated with correct practice. However, the number of sources of information for mothers was not assessed in this study.

More respondents from the lower social class used the supine position. Having a formal education alone did not increase the likelihood of using the correct position and this was significant, supporting the fact that specific factual information has to be given to mothers. This should be done after assessing their own views and worries about their infants sleep position [14]. There was a higher rate of sharing a sleeping surface in 81% in mothers seen in UDUTH, Sokoto compared to 63.5% and 66.9% reported by Okpere and Ibeziako in Port Harcourt and Enugu/Abakaliki [4,5]. A lower rate of bed sharing of 16% was reported by Yikilkan [10] from Turkey and a range of 12% to 48% in the United States [17]. The high rate of bed sharing in this and other studies from Nigeria could be due to large family size and prevailing poverty which also hampers the financial ability to purchase a cot [6].

5. CONCLUSION

There is paucity of knowledge among mothers of infants seen in UDUTH, Sokoto on infant sleep practices and SIDS. Similar to other studies in Southern Nigeria, knowledge of the recommended supine sleep position was low and there was a high rate of bed sharing. Practice of the supine sleeping position was not influenced by higher level of education and social status but by knowledge of the correct position. Most of the knowledge on sleep position was gotten from grandmothers and not from health workers. There is need for doctors nationwide to take more interest on SIDS prevention through advocacy, public enlightenment and research.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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