International Journal of

Nutrition and Metabolism

Academic Journals

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1987a,b; Tijani, 1993,1995), (Kumasi et al., 2001)
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Moran GJ, Amii RN, Abrahamian FM, Talan DA (2005). Methicillinresistant Staphylococcus aureus in community-acquired skin infections. Emerg. Infect. Dis. 11: 928-930.

Pitout JDD, Church DL, Gregson DB, Chow BL, McCracken M, Mulvey M, Laupland KB (2007). Molecular epidemiology of CTXM-producing Escherichia coli in the Calgary Health Region: emergence of CTX-M-15-producing isolates. Antimicrob. Agents Chemother. 51: 1281-1286.

Pelczar JR, Harley JP, Klein DA (1993). Microbiology: Concepts and Applications. McGraw-Hill Inc., New York, pp. 591-603.

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International Journal of Nutrition and Metabolism

ARTICLES

Review

Effects of exclusive breastfeeding on babies' health in Ife Central Local Government of Osun State

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The wealth of a nation depends largely on the extent of the health of its citizens and the children are the future generation who are expected to grow up into healthy productive adults, able to make full contribution towards the economic and social development of their countries. A child malnourished cannot grow up to meet this task. Therefore the challenges of the effects of exclusive breastfeeding on the health of babies in Ife Central Local Government of Osun State was examined through 50 nursing mothers that were randomly selected in Ife Central Local Community from four different hospitals both from postnatal and infant welfare clinic records. The paper also highlights the concept of breastfeeding, breast milk and the importance of breastfeeding as well. The result shows that the effect of it on the health of baby's growth cannot be overemphasized in its reduction of malnutrition in early childhood as well as the need to pay an appropriate attention to the health of the children right from the infant age. Suggestions were propounded on how to reduce mortality.

Key words: Exclusive breastfeeding, importance of breastfeeding, structure of the breast, breast-milk and breast-milk constituents.

INTRODUCTION

The act of breastfeeding has been in existence since the creation of the universe. Breastfeeding is no longer considered to be a lifestyle choice but a significant health and medical choice of both the mother and the baby (American Academy, 1998). United Nations International Children Education Fund (UNICEF) and the World Health Organization (1998) recognize the importance of breast-feeding through the age of two and beyond. The innocent declaration sponsored by UNICEF and WHO and adoted by 32 governments' world-wide and 10 United Nations agencies states, "As a global goal for optimal maternal and child health and nutrition, all women should be enabled to practice exclusive breastfeeding and all infants should be fed exclusively on breast milk from birth to six months of age".

Research in the united state, Canada, Europe and other developed countries among predominately middle class population provides strong evidence that human milk feeding decreases the incidence and severity of diarrhea, lower respiratory infection, otitis media, baterenia, bacterial meningitis, botulism, urinary tract infection and narcotizing enter colitis. There are a number of studies that shows possible protective effects of human milk feeding against sudden death syndrome, insulin-dependent diabetes mellitus, chronic disease, ulcerative colitis, lymphoma, allergic disease and other chronic digestive disease. Breast feeding has also been related to possible enhancement of cognitive development (UNICEF and WHO, 1998). Thereafter, mothers should continue to breastfeed while giving appropriate and ade-quate complementary foods for up to two years of age or beyond. Breast milk produced by the breast is the best to the baby in that it contains all the nutrients that the baby's body would need for growth and existence in their natural form. Breastfeeding is well recognized and serve as a means to protect, promote and support the health of infants

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and young children. Mother's milk fosters optimal growth and development of a baby's brain, immune system and general physiology and is a vital factor in preventing common illness, especially diarrhea and infection of the respiratory tract (including pneumonia), ear and urinary tract. The act of breastfeeding releases growth hormones, promotes healthy oral development and establishes a trusting relationship between baby and mother (American Academy of Paediatrics, 1998).

Exclusively breastfeeding for the first 6 months reduces the risk of environment borne illness, malnutrition, food sensitization and allergy. Breastfeeding also has definite benefits for mothers. It is a fundamental, physiologic continuation of pregnancy and childbirth. Thus, beginning exclusive breastfeeding shortly after birth lowers the mother's risk for excess post partum bleeding anaemia. Once mother and baby have learned to do it easily, breastfeeding can reduce a mother's stress by keeping her infants or young children healthy and well nourished. Exclusive breastfeeding for the first six months saves the mother's money, energy and time, nothing to buy, prepare or clean up. Exclusive breastfeeding can also boost a mother's own immune system, help delay a new pregnancy and reduce the insulin needs of diabetic mother from breast and brittle bones. Once breastfeeding has been established, mothers continue to need support to maintain their physical and emotional health. Frequent home visits by a health worker or trained volunteer in the early weeks can check on the health of mother and baby and the progress of breastfeeding and provide access to a supportive and informative friend.

Exclusive breastfeeding meets all the nutritional needs of a baby for the first six months. Breastfeeding continues to make a significant contribution to the baby's nutritional and emotional health into the second year and beyond. Breastfed babies have stronger immune systems and are healthier than bottle-fed babies. Special fatty acids in breast milk lead to increased intelligence quotients (IQs) and better visual acuity (Anderson et al., 1999). Research shows that breastfeeding could save the lives of over 1.5 million babies who die every year from diseases such as diarrhea and pneumonia. It is therefore the concern of this investigation to look at the effect of exclusive breastfeeding in Ife Central Local Government of Osun State.

Consequently upon the background, the study sought to investigate into the effects of exclusive breastfeeding on the health of the babies to determine the effect of exclusive breastfeeding on babies' health and to give advice to nursing mothers generally to enhance exclusive breastfeeding so that their babies can remain healthy.

Significance of the study

The study is meant to highlight the importance of exclusive breastfeeding on child survival by protecting against infection, reducing the chances of developing allergic disorder and encouraging maternal child bonding. The effect of early bowel motion and provision of nutrients necessary for adequate development can be ensured by the study on the effect of breastfeeding on child growth and development. The study would enlighten mothers on the effect of exclusive breastfeeding on health of the child who are on partial breastfeeding and make recommendation which will assist nursing mother to enhance exclusive breastfeeding so that their babies can remain healthy.

Concept of breastfeeding

Breastfeeding is a method of feeding babies with breast milk by putting the nipple and the aerola of the breast into the baby's mouth for suckling. Breastfeeding provides substances that are nutritionally perfect for human babies and protects them from illness. These are needed for growth and development of the infant's rapidly growing brain and central nervous system. Breastfeeding requires no preparation. It encourages contraction of the womb after delivery (thus helping the mother to regain her figure). It carries no risk of inducing cow's milk allergies or obesity and it promotes the vital psychological bonding between the mother and baby; that is so important for the later development. It also provides the loving interaction that forms the basis for establishing the child's personality and learning readiness.

According to Lee et al. (2000), "*breastfeeding is an art of feeding the baby with human breast milk. Traditionally, women were not separated from their babies but stayed at home to look after their babies or carry them on their back especially in places where it is customary for them. Rural women in many countries still maintain this practice. Breast milk is made from what the mother eats-better and qualitative food yields better production of milk*".

According to MacDonell and Ito (1998) "………*increased breastfeeding rates would save mothers' money and they will be able to spend such money on something better. It is known for years that the death rates in the third world countries are lower among breast-fed babies; they are healthier and have fewer infections than formula-fed babies*".

According to Bar-Oz et al. (2000), "*a breast fed baby's digestive tract contains large amounts of lactobacillus bifidus; beneficial in that it prevents the growth of harmful organisms. Human milk directly from the breast is always sterile, never contaminate by polluted water or dirty bottles, which can also lead to diarrhea in the infant. Human milk contains at least 100 ingredients not found in formula. No babies are allergic to their mother's milk, although they may have a reaction to something the mother eats. If she eliminates it from her diet, the problem resolves itself*".

According to Lawrence (1994), "*sucking at the breast promotes good jaw development as well. It is hard work to get milk out of a breast than a bottle, and the exercise strengthens the jaw and encourages the growth of straight, healthy teeth. The baby at the breast also can control the flow of milk by sucking and stopping. With a bottle, they most constantly suck or react to the pressure of the nipple placed in the mouth*".

Breast milk

Breast milk is the foundation of food security for all the babies of the world and is one of the world's most valuable, renewable natural resources. It is produced by women everywhere and indeed is the only food equally available to rich and poor alike. Breast milk is constantly changing, adapting to the specific immunological and nutritional needs of the rapidly growing baby because breast milk supply is regulated by demand. Fully breastfed babies are seldom "obese". Doctors and Scientists agree that breast milk is the best nourishment for babies. Human milk provides nutrients essential to building strong human bodies that cow's milk or formula simply cannot supply. Koren (2002) explicates that: "*Breast milk is perfectly suited to nourish infants and protect them from illness. Breast-fed infants have lower rates of hospital admissions, ear-inspections, diarrhea, rashes, allergies and other medical problems than bottle-fed babies do*". Additionally, Lawrence (2002) explicates human milk as contains just the right amount of fatty acids, lactose, water and amino acids for human digestion, brain development and growth while cow's milk contains a different type of protein than human's breastmilk, this is good for calves, but human infant can have difficulty digesting it. Bottle-fed infants tend to be fatter than breast-fed infants but not necessarily healthier. Breast-fed babies have fewer illnesses because human milk transfers to the infant a mother's antibodies to diseases. About 80% of the cells in breast milk are macrophages cells that kill bacteria, fungi and viruses. Breast-fed babies are protected in varying degrees, from a number of illnesses, including pneumonia, botulism bronchitis, staphylococcal infections, influenza ear infections and German measles. Furthermore, mothers produce antibodies to whatever disease is present in their environment, making their milk custom-designed to fight the diseases their babies are exposed to as well".

Structure of the breast

The mammary glands consist of the following tissues: (1) Glandular tissue, (2) fibrous tissue and (3) fatty or adipose tissue. The glandular tissue consist of about 20 lobes in each breast, each lobe is made up of number of lobules. The lobules consist of a cluster of alveoli which open into small ducts, which unite to form large excretory ducts called the lactiferous duct. The lactiferous duct converge towards the centre of the breast where they form dilatations or reservoirs for milk during lactation; leading from these dilatations are narrow ducts which open onto the surface at the nipple. The fibrous tissue supports the glandular tissue and the ducts. Therefore neither the fatty nor adipose tissue covers the surface of the glands and is found between the lobes. The amount of fatty tissue determines the size of the breasts. At the centre there is small conical eminence of the nipple. The base of the nipple is surrounded by a pigmented area, the areola, which varies in colour from a deep pink to a light brown colour, on the surface of the area there are numerous sebaceous glands called areola glands (Montgomery's tubules) which in pregnancy lubricate the nipple.

Blood supply includes lymph drainage and nerve supply, and arterial blood supply. The breasts are supplied with blood from the thoracic branches of the axillary's arteries and from the internal mammary and intercostals arteries. Various drainages describes an anaestomotic circle round the base of the nipple called the circulus venosus. Branches from this area carry various bloods to the circumference and end in the auxiliary and mammary veins; lymph drainage is mainly into the auxiliary lymph vessels and glands.

Nerve supply branches from the fourth, fifth and sixth thoracic nerves which contain sympathetic fibers. There are numerous sensory nerves ending in the breast especially around the nipples, when these are sucked, the impulse pass to the para ventricular, stimulates receptors nucleus of the hypothamus and the flow of the hormone oxytocin is increased thereby promoting the release of milk.

Breast milk constituent

The mother's breasts contain milk naturally rich in fats with an average content of 3.8g per 100 mls lipids supplying about 50% of the calorific contents. Breast milk contains a broad spectrum of fatty acids: c4, c6 to c22, c24. Importance consistent fatty acids are palmtic acid (average 24%, oleic acid, generally limiting for the absorption of fats, is most frequently located (67%) in the most favourable position on the triglycerides). The protein content of breast milk drops as lactation progresses. It is at the highest during the first few days of colostrums dropping to an average of 1.2 g/100 ml, in nature milk. The majority of these proteins are composed of soluble proteins which are easily digestible and do not conjugate in the stomach and these require less hydrochloric acid. The carbohydrate in breast-milk mainly composes of lactose, and the infants system is very well adapted because of its high secretion of lactose and the total mineral salts content is low (0.23 g per 100 ml) and the

ratios of its mineral are such that it has good homostatic balance and optimum mineralization are achieved. The mentioned statistics may vary substantially according to the mother but the same characteristics are retained.

IMPORTANCE OF EXCLUSIVE BREASTFEEDING

To the baby

1. Exclusive breastfeeding meets all the nutritional needs of the baby for the first six months.
2. Breastfeeding continues to make a significant contribution to the baby's nutritional and emotional health into the second year and beyond.
3. Breastfed babies have stronger immune systems and are healthier than bottle-fed babies
4. Special fatty acids in breast milk lead to increased intelligence quotients (IQs) and better visual acuity.
5. Research shows that breastfeeding could save the lives of over 1.5 million babies who die every year from diseases such as diarrhea and pneumonia.
6. Good mother child relationship that promotes interaction and attachment between mother and child (bonding).
7. The breastfed baby has skin and eye contact with the mother.
8. The breastfed baby is less likely to develop a severe infection. It is a scientific truth that human milk contains antibiotics against disease.
9. The activity of sucking at the breast enhances development of baby's oral muscles, facial bones and aids in optimal dental development.
10. The benefits of breastfeeding appear to last even after the baby has been weaned.

To the mother

1. Breastfeeding her child reduces her chances of loosing blood after delivery.
2. Breastfeeding reduces her chances of having cancer of the breast.
3. Breastfeeding makes the mother and child to love each other closely.
4. A breastfeeding mother regains her shape faster.
5. Breastfeeding especially exclusive breastfeeding is easy for the mother because she does not have to worry about boiling, washing or cleaning bottles.
6. It saves time, energy and costs less (very cheap as it does not warrant any special preparation).
7. Apart from its importance in growth, development and protection for the helpless infant, it has economic value especially in low socio-economic society.
8. It aids expulsion of placenta where there is retained placenta.
9. It aids involution of the uterus due to release of oxytoxin during breastfeeding.

To the family

1. Breastfeeding saves a lot of money for the family, instead of buying expensive milk formula; the money can be used to do so many other things.
2. Breastfeeding helps the family to space birth so that the family will have children only when they are ready. The mother will be able to gain her strength before having the next baby.
3. Breastfeeding reduces visit to the hospital and saves a lot of money, which would have been spent to buy drugs and cure illness in the child.

To the community

1. Breastfeeding reduces poverty in the community and household by saving money on buying or importing formula, feeding bottles/teats/sterilizing/chemical etc.
2. Breastfeeding promotes development in the community by ensuring survival of healthy children that grow to become healthy and productive leaders of tomorrow.
3. Breastfeeding protects the environment since there are no empty cans and wastes left over for disposal.
4. Breastfeeding encourages and promotes child spacing therefore a healthy population.
5. Breastfeeding communities have lower child death rates.
6. Breastfeeding promotes mother-child bonding which assures the community of emotionally stable and happy population.
7. Breastfeeding the right way promotes better overall health of women and more efficient role in the community.

Breastfeeding as it affects child survival

Child survival is the preservation of a child in a healthy state without any physical, mental, social or emotional handicapped, so that the child can achieve his full potentials. The BHFL recommends that a child should be breastfed exclusively in the first 6 months of life, thereafter partially breastfed well into the second year of life. Exclusive breastfeeding means no other drink (including water) or food should be on demand with any restrictions on duration of feeding. No pacifier or dummies should be given. Breastfeeding affects child survival by:

1. Protection against infections: Human milk contains phagocytic cells and secretes onto bodies, which protect a child fed exclusively on breast milk from gastrointestinal respiratory and middle ear infections.
2. It also contains lactoferrin which binds excess iron in the gut, preventing the growth of organism requiring iron, thus reducing the incidence of gastroenteritis. Bifidus factor

also present in human milk stimulates the growth of pathogenic organisms. By reducing the incidence of infection, human milk improves the physical and mental well being of the child.

3. Reducing the chances of developing allergic disorders, colostrums, and the milk secreted in the first two days after delivery, contain a growth which stimulated the growth of the gastrointestinal tract of the newborn and prepare the gut for digestion and absorption. This leads to decrease in absorption of intact proteins thus avoiding sensitization to foreign proteins and higher tendency of allergic disorders such as asthma and diabetic mellitus. Allergic disorders are associated with decrease physical growth, mental development and emotional disturbance in a child.

4. Encouraging maternal child bonding.

5. The skin to skin contact is an important part of breastfeeding and it encourages emotional attachment between the child and mother and reduces the chances of child abuse, therefore improving child survival.

6. Encouraging early bowel motion: Colostrums promotes early bowel when compared to other milk. Delayed bowel movement is a known cause of neonatal jaundice, which may cause kernicterus affecting child survival.

7. Providing nutrients necessary for adequate development:

(a) Water: Human milk contains a lot of water, which help in quenching thirst and preventing dehydration.

(b) Protein: Human milk when compared with other milk contains easily digestible and absorbable proteins. It also contains the essential amino acids for brain development.

(c) Carbohydrates: Human milk contains a lot of lactose, which supplies energy; glucose is also present in large quantity and aid in brain development, enhancing child survival.

(d) Fat: Human milk contains polyunsaturated fatty acids which help in brain development, enhancing mental well-being of the child.

(e) Minerals: The proportion of calcium and phosphate in human milk ensures adequate bone growth. The sodium content is just sufficient for the need of the child.

(f) Encouraging family planning: Breastfeeding for at least 10 times, during daytime and at night increases prolactin production which inhibit ovulation and thus prevent pregnancy. This encourage child spacing and therefore increases child survival.

How to achieve good and adequate lactation

1. Good nutrition food e.g. meat, fish, milk etc.

2. Adequate fluid intake because much fluid is needed for milk production.

3. Prevention of encouragement during the peurperium.

4. Making sure that mother rest well to promote good blood circulation.

5. Making sure that the mother is free from infection.

Steps to successful breastfeeding

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.

2. Train all health care staff in skills necessary to implement this policy.

3. Inform all pregnant women about the benefits and management of breastfeeding.

4. Help mothers initiate breastfeeding within half hour of birth.

5. Show mothers how to breastfeed and how to maintain lactation even if they should be separated from their infants.

6. Give newborn infants no food or drink other than breast milk unless medically indicated.

7. Practice rooming in allows mothers and infants to remain together 24 h a day.

8. Encourage breastfeeding on demand.

9. Give no artificial teats or pacifier to breastfed infants.

Factors that can affect breastfeeding

Infant's condition

(a) Sick babies for example, asphyxia, preterm, severe jaundice.

(b) Congenital abnormalities: cleft palate and cleft lips.

Mother's conditions

(a) Breast condition such as cracked nipple mastitis, engorgement of the breast.

(b) Medical conditions for example, maternal death, human immune virus (HIV).

(c) Social condition for example, abandoned child.

(d) Insanity.

(e) Tuberculosis.

DISCUSSION

This was written on the basis of information obtained through questionnaires and personal observation. Attempt was also made here to draw the relevance of finding to the issues discussed in the literature review.

A look at Table 1 shows that 30% of the respondents falls between the ages of 21 to 25 years, 30% are within 26 to 30 years, those respondents that fell between 31 to 35 years constituted 22%. This was followed by 10% that were between 36 to 40 years. The smallest percentages of 8% were just between 41 and 45 years (Table 1). With respect to marital status, 88% of the respondents were married, while 10% of the respondents were divorced, this was followed by 2% that is a widow (Table 1). About their religion, 78% of the respondents are Christians while 22% of the respondents are Muslims (Table 1).

Table 1. Acceptability of exclusive breastfeeding (research questions).

No.	Item description	No. of respondents that indicated Yes and their percentage (%)	No. of respondents that indicated No and their percentage (%)
1	Have you ever heard of exclusive breastfeeding?	43 (86)	7 (14)
2	Do you give your baby breast milk within the first 24 h after delivery?	47 (94)	3 (6)
3	Do you breastfeed exclusively for the first six months?	45 (90)	5 (10)
4	Do you believe it is possible to exclusively breastfeed a c child?	49 (98)	1 (2)
5	Do you think exclusive breastfeeding is best for the babies?	47 (94)	3 (6)
6	Have you ever practiced exclusive breastfeeding?	38 (76)	12 (24)
7	Do you think that exclusive breastfeeding has positive e effect on the health of the babies?	33 (66)	17 (34)
8	Do you think exclusive breastfeeding babies visit hospital al always?	37 (74)	13 (26)
9	Do you think that the state of health of the baby or mother can affect exclusive breastfeeding?	38 (76)	12 (24)
10	Do you believe that mothers' nutrition has effect on exclusive breastfeeding?	40 (80)	10 (20)
11	Do you think that exclusive breastfeeding increases babies' immunity?	44 (88)	66 (12)
12	Do exclusive breastfeeding reduce infant mortality and m morbidity rate?	32 (64)	18 (36)
13	Does exclusive breastfeeding enhance infant growth?	45 (90)	5 (10)
14	Does exclusive breastfeeding meets the nutritional d demand of babies?	41 (82)	9 (18)
15	Do you think ignorance on the part of the mothers has p any positive effect on exclusive breastfeeding?	42 (84)	8 (16)
16	Does exclusive breastfeeding help to foster maternal and c child love?	46 (92)	4 (8)
17	Can certain environmental factors such as mother hygiene, e environmental hygiene have effect on exclusive breastfeeding?	41 (82)	9 (18)
18	Can the socio-economic factor of the family affect exclusive re breastfeeding?	32 (64)	18 (36)
19	Can mother's occupation have effect on exclusive b breastfeeding?	37 (74)	1 3 (26)

In relation to occupation, 34% of the respondents were traders. The smallest percentages of 10% were just full-time housewife; 26% of the respondents were civil servants, 16% were students while 14% were self-employed (Table 1). With respect to qualification, 50% of the respondents went to tertiary institution, 36% had secondary school education; 12% of the respondents were primary school leavers and 2% had no formal education (Table 1). About the number of deliveries, 36% of the respondents had one delivery, 18% had two deliveries, 28% of the respondents had three deliveries; 14% of the respondents had four while 4% had more than four deliveries (Table 1). It can be concluded that most of the respondents fell between child-bearing age of 21 to 40 years. Most of the respondents were either civil servants or traders. Majority of the respondents have tertiary education.

From Table 2, 86% of the respondents heard about exclusive breastfeeding while 14% did not. On item 8, 94% of the respondents gave their babies breast milk within the first 24 h after delivery while 6% did not. It means therefore that exclusive breastfeeding has been widely acceptable, item number 9, 90% of the respondents breastfed their child exclusively for the first six months while 10% of them did not. On item number 10, 98% of the respondent believes it is possible to exclusively breastfeed a child while just 2% said it is not possible. On item number 11, 94% of the respondents have the opinion that exclusive breastfeeding is best for the babies while just 6% did not agree with the opinion. On item number 12, 76% of the respondents have ever practiced exclusive breastfeeding while 24% have never practiced exclusive breastfeeding; from the report therefore survival rate of child-birth is high.

The second research question states that: "Can exclusive Breastfeeding foster maternal and child health"? (Table 1). From the analysis of the data, it could be seen that 66% of the respondents agreed that exclusive breastfeeding has positive effect on the health of the babies while 34% of the respondents disagreed with this assumption. On item number two, 74% of the respondents had the opinion that exclusive breastfed babies do not visit hospital always while 26% of them disagreed with the opinion. The third item in this table wished to know whether the state of health of the baby or mother can affect exclusive breastfeeding. 76% agreed that the state of health of the baby or mother can affect exclusive breastfeeding while the remaining 24% disagreed. From this study, it could be inferred that the exclusive breastfeeding protect children from illness that can lead to high death. Concerning the fourth item on this table, 80% of the respondents believed that mother's nutrition has effect on exclusive breastfeeding while just 20% disagreed with the believe.

The third research question states that: "Can exclusive breastfeeding increase child immunity thereby reducing infant morbidity and mortality rate"? The results were as shown in Table 1 items 11 and 12 on the questionnaire. From the analysis of the data, 88% of the respondents had the opinion that exclusive breastfeeding increases babies' immunity while 12% said "No" in their own case.

On item number two, it reveals that 64% of the respondents

Table 2. Background Information of respondents (nursing mothers).

Parameter	A	B	C	D	E	
Age q1	21-25 years	26-30 years	31-35 years	36-40 years	41-45 years	
Frequency	15	15	11	5	4	
Percentage	30	30	22	10	8	
	A	**B**	**C**	**D**		
Marital status Q2	Married	Divorced	Seperated	Widow		
Frequency	44	5	0	1		
Percentage	88	10	0	2		
	A	**B**	**C**	**D**		
Religion Q3	Christianity	Islamic	Traditionalist	Pagan		
Frequency	39	11	-	-		
Percentage	78	22	-	-		
	A	**B**	**C**	**D**	**E**	
Occupation Q4	Self-employ	Civil-servant	Student	Trading	Full-time housewife	
Frequency	7	13	8	17	5	
Percentage	14	26	16	34	10	
	A	**B**	**C**	**D**	**E**	**F**
Qualification Q5	Pry school	S.75, WASC/GCE	OND/NCE	HND/B.sc	M.sc/Ph.d	No formal Education
Frequency	6	18	15	9	1	1
Percentage	12	36	30	18	2	2
	A	**B**	**C**	**D**	**E**	
No. of delivery Q6	One	Two	Three	Four	More than four	
Frequency	18	9	14	7	2	
Percentage	36	18	28	14	4	

believe that exclusive breastfeeding reduce infant mortality and morbidity rate while the remaining 36% disagreed with the believe. From this Table 1, it could be seen that exclusive breastfeeding increases babies immunity thereby reducing mortality and morbidity rate among children.

The fourth question states that "can exclusive breastfeeding have great positive effect on child's growth and development? The data in the Table 1 showed the responses of the respondents to item one, majority of them said that exclusive breast-feeding enhance infant growth while minority of

them (10%) had no knowledge of it. On item number 2, 82% of the respondents agreed that exclusive breastfeeding meet the nutritional de-mand of babies, 18% of them disagreed with the opinion. The last item in Table 1, sought to know the views of the respondents on whether the

ignorance on the part of the mother has any positive effect on exclusive breastfeeding, out of the 50 respondents, 84% of them said "No" to the item. From this Table 1, it could be inferred that exclusive breastfeeding can have great effect on child's growth and development.

The fifth research question state that: "Can exclusive breastfeeding encourages mother and baby's friendly? Table 1 shows that 92% of the respondents agreed and observed that exclusive breastfeeding help to fosters maternal and child love while minority of 8% of them said "No" to the item.

The sixth research question states that: "Can socio-economic status or occupation of the mother have effect on exclusive breastfeeding? From the analysis of the data, 82% of the respondents agreed that certain environmental factors such as mother's hygiene, environmental hygiene have effect on exclusive breastfeeding while 18% has no response. On item number two in Table 1, 64% of the respondents are of the opinion that socio-economic factor of the family affect exclusive breastfeeding, out of the 50 respondents, 74% of them said yes while the remaining 26% said "No" to the item. From this Table 1, it could be seen that socio-economic status or occupations of the mother have effect on exclusive breastfeeding.

Conclusion

This study primarily has been carried out to analyze the effect of exclusive breastfeeding on the health of babies in Ife Central Local Government, Osun State. An attempt has been made to study the practice of nursing mothers in four maternity and hospitals in Ife Central Local Government, respectively.

From the report of the study, most nursing mothers (94%) now believe much in breastfeeding their babies exclusively in the first six months of birth. It was also discovered from both the study and research work that exclusive breastfeeding reduces infant mortality and morbidity rate, 64% of the respondents believed that exclusive breastfeeding reduces child morbidity and mortality rate. It also reduces breast and ovarian cancers in mothers and foster child and mother love.

Based on the findings, it was observed that there is drastic reduction in the number of babies suffering from gastroenteritis, which resulted from bottle-feeding. Considering all the findings and results obtained from research work in collaboration with the explanation, it can thus be concluded that babies on exclusive breastfeeding has high immunity rate that can protect them from certain infectious disease. Exclusive breastfeeding also meets the nutritional demand of babies, enhance infant growth and at the same time reduces infant mortality morbidity rate.

RECOMMENDATIONS

From the findings of this study, the following recommendations are given:

1. All pregnant mothers should seek antenatal care as early as possible so that they will be given health education on the benefits and importance of exclusive breastfeeding to babies.
2. Breastfeeding community support group need to be formed and be trained on how to give support to people in their different community regarding exclusive breastfeeding.
3. Government should create more crèches at the different working offices to enable the mothers go there to breastfeed their babies.
4. More health workers should be posted to the rural areas so that the nursing mothers at the grassroots level can be educated about exclusive breastfeeding.
5. There is need to train more health workers in the area of lactation management in order to continue the awareness campaign on exclusive breastfeeding.
6. Government should build more hospitals to enable mothers to enjoy the awareness on exclusive breastfeeding.
7. Healthcare institutions should have a written breastfeeding policy that are routinely communicated to all the staff and also train all the staff in skills necessary to implement these policies.

REFERENCES

American Academy of Pediatrics (1998). Breastfeeding and the use of human milk pediatrics.

Anderson J, Johnstone BM, Remley DT (1999) Breastfeeding and Cognitive development: A meta-analysis. Am. J. Clin. Nutr. 70(4):525-35

Lee A, Moretti ME, Collantes A, Chong D, Mazzotta P, Koren G, Merchant SS, Ito S (2000). Choice of Breastfeeding and Physicians Advance. A Cohort Study of Women Receiving Prophyltaisvracil. Pediatr. J. 106(1 pt 1): 27-30.

Bar-Oz B, Ito S, Parks V, Maurer MP, Koren G (2000). Estimation of neonatal exposure after accidental ingestion of lufenuron in a breastfeeding mother. J. Hum Lact. 16(3):229-30.

Lawrence PB (1994). Breast milk. Best source of nutrition for term and preterm infants. Pediatr. Clin. North Am. 41(5):925-41.

Lawrence C (2002). Drug Transfer into human milk, pediatric pathology. Edward Arnold Ltd Press, London.

MacDonell JW, Ito S (1998). Breastfeeding Anaphylaxis case study. J Hum. Lact. 14(3):243-4.

World Health Organization (1998). The Optimal duration of Exclusive Breastfeeding: result of a WHO Systematic Review. Geneva: WHO.

Full Length Research Paper

Dietary pattern, lifestyle, nutrition status and prevalence of hypertension among traders in Sokoto Central market, Sokoto, Nigeria

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Poor diet (high consumption of sugar, salt, saturated fat, etc) and unhealthy lifestyle (smoking, alcohol consumption and physical inactivity) have been identified as major risk factors of cardiovascular disease and other non-communicable diseases (NCDs). NCDs are the leading causes of death globally, killing more people each year than all other causes combined. This study was conducted to assess the dietary pattern, lifestyle, nutrition status and prevalence of hypertension among traders in Sokoto, Nigeria. A cross sectional descriptive study was conducted among 390 traders selected by multistage sampling technique from November to December, 2012. Anthropometric and blood pressure measurements were done for the participants, together with questionnaire administration. High prevalence of unhealthy eating habits was recorded among the participants; 50.7% eat their largest meal at dinner, 49.9% eat snacks everyday, 66.7% eat fatty foods, 27.1% and 33.0% drink fruit juice and carbonated drinks, respectively thrice weekly or more, 56.0 and 58.8% eat fruits and vegetables, respectively less than thrice in a week or not at all. Also, 50.7% live a sedentary lifestyle, 5.2% currently smoke cigarette and 10.8% had consumed alcohol within the past 30 days. Similarly, the prevalence of overweight (28.9%), obesity (28.1%) and hypertension (29.1%) was high among the participants. This study demonstrated high prevalence of unhealthy eating habits and lifestyle; together with high prevalence of overweight, obesity and hypertension among traders in Sokoto. Health education and other interventions to promote healthy eating habits and lifestyle, especially among high risk groups are suggested.

Key words: dietary pattern, lifestyle, nutrition status, hypertension, prevalence.

INTRODUCTION

Nutrition as the science of food and its relationship to health has been recognized in recent years as the cornerstone of socioeconomic development (Parks, 2009). Adequate nutrition is important for a variety of reasons, including optimal cardiovascular function, muscle strength, respiratory ventilation, protection from infection, wound healing and psychological well-being (Martin, 2006). Adequate nutrition entails a diet that contains the

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constituents (carbohydrate, fats, proteins, vitamins and minerals) that are required for body building, energy supply, body defense and regulatory functions in quantities commensurate with the body need. Malnutrition refers to either inadequate intake of nutrients due to lack of food, ignorance, socio-cultural factors, and diseases among other causes, resulting in underweight and other nutrient deficiency diseases; or intake of nutrients in excess of body requirements due to poor dietary habit (erroneously perceived as a sign of affluence), resulting in overweight and obesity.

Poor diet (high consumption of sugar, salt, saturated fat, etc) and unhealthy lifestyle (smoking, alcohol consumption and physical inactivity) have been identified as major risk factors of cardiovascular disease and other non-communicable diseases (NCDs). Central to the aetiogenesis of diet induced cardiovascular disease is atherosclerosis, and the factor most important in causing atherosclerosis is a high blood plasma concentration of cholesterol in the form of low density lipoproteins (LDLs).

Cholesterol is present in the diet of all people, besides the cholesterol absorbed from the gastrointestinal tract which is called exogenous cholesterol, an even greater quantity is formed in the cells of the body (principally by the liver), this is called endogenous cholesterol. An increase in the amount of cholesterol ingested daily increases the plasma concentration slightly. When cholesterol is ingested, the rising concentration of cholesterol inhibits the most essential enzyme for endogenous synthesis of cholesterol, 3-hydroxy-3-methylglutaryl CoA reductase, thus providing an intrinsic feedback control system to prevent excessive increase in plasma cholesterol concentration. A highly saturated fat diet increases blood cholesterol concentration by 15 to 25%. This results from increased fat deposition in the liver which then provides increased quantities of acetyl-CoA in the liver cells for production of cholesterol. It is therefore important to maintain a diet low in saturated fat as to maintain a diet low in cholesterol in order to decrease the blood cholesterol concentration (Arthur and John, 2000).

This fact is corroborated by the findings in 'the strong heart study' that reported total fat, saturated fat and monounsaturated fatty acid intake as strong predictors of coronary heart disease (CHD) mortality in American Indians aged 47 to 59 years independent of other established CHD risk factors (Xu et al., 2006). Reports from several studies also show very strong association between diet and development of non-communicable diseases. In a study among female nurses, overweight or obesity was the single most important predictor of diabetes mellitus; also, lack of exercise, a poor diet, current smoking and abstinence from alcohol were all associated with a significant increased risk of diabetes, even after adjustment for the body mass index (Hu et al., 2001).

Similarly, in another study in Taiwan by Hung et al. (2004), consumption of preserved and overheated foods was found to be associated with increased risk of esophageal cancer, whereas intake of fresh fruits, vegetables, and tea was inversely associated with this risk. Fruits and vegetables contain phytochemicals and antioxidants that protect the body cells from developing cancer. Non-communicable diseases are the leading cause of death globally, killing more people each year than all other causes combined. According to the World Health Organization (WHO) estimates, 36 million, out of the 57 million deaths (almost two thirds) that occurred globally in 2008 were due to non-communicable diseases (NCDs), comprising mainly cardiovascular diseases, cancers, diabetes mellitus and chronic lung diseases (WHO, 2011a).

According to the United Nations, nearly 870 million people of the 7.1 billion people in the world, or one in eight, suffered from chronic undernourishment in 2010 to 2012. Almost all the hungry people, 852 million, live in developing countries, representing 15% of the population of developing countries. In Africa, nearly one in four people are hungry; the number of hungry people grew over this period from 175 to 220 million, with nearly 20 million added in the last few years. Only 16 million undernourished people reside in the developed countries (FAO, 2012).

Ironically, overweight and obesity are linked to more deaths worldwide than underweight. For example, 65% of the world's population live in countries where overweight and obesity kill more people than underweight (this includes all high-income and most middle-income countries). Once considered a high-income country problem, overweight and obesity are now on the rise in low- and middle-income countries, particularly in urban settings. In 2008, more than 1.4 billion adults, 20 years and older, were overweight. Of these, over 200 million men and nearly 300 million women were obese. 35% of adults aged 20 years and over were overweight in 2008, and 11% were obese. Overweight and obesity are the fifth leading risk for global deaths. At least 2.8 million adults die each year as a result of being overweight or obese. In addition, 44% of the diabetes burden, 23% of the ischemic heart disease burden and between 7 and 41% of certain cancer burdens are attributable to overweight and obesity (WHO, 2013a).

Although tobacco deaths rarely make headlines, tobacco kills one person every six seconds. Tobacco kills a third to half of all people who use it, on average 15 years prematurely. Today, tobacco use causes 1 in 10 deaths among adults worldwide – more than five million people a year. Tobacco will kill over 175 million people worldwide between now and the year 2030 and by 2030, unless urgent action is taken, tobacco's annual death toll will rise to more than eight million. If current trends continue

unchecked, it is estimated that around 500 million people alive today will be killed by tobacco (WHO, 2008).

Alcohol consumption is the world's third largest risk factor for disease and disability; in middle-income countries, it is the greatest risk. Alcohol is a causal factor in 60 types of diseases and injuries and a component cause in 200 others. Almost 4% of all deaths worldwide are attributed to alcohol, greater than the deaths caused by human immunodeficiency virus/acquired immuned deficiency syndrome (HIV/AIDS), violence or tuberculosis. Alcohol is also associated with many serious social issues, including violence, child neglect and abuse, and absenteeism in the workplace. The harmful use of alcohol is a particularly grave threat to men. It is the leading risk factor for death in males aged 15 to 59 years, mainly due to injuries, violence and cardiovascular diseases. Globally, 6.2% of all male deaths are attributable to alcohol, compared to 1.1% of female deaths. Men also have far greater rates of total burden attributed to alcohol than women – 7.4% for men compared to 1.4% for women (WHO, 2011b).

Physical inactivity has become a public health problem all over the world. Globally, around 31% of adults aged 15 years and over were insufficiently active in 2008 (men 28% and women 34%). Approximately 3.2 million deaths each year are attributable to insufficient physical activity. The current high level of physical inactivity is believed to be partly due to insufficient participation in physical activity during leisure time and an increase in sedentary behavior during occupational and domestic activities (WHO, 2013b).

Globally, the overall prevalence of raised blood pressure in adults aged 25 years and over was around 40% in 2008. Across the WHO regions, the prevalence of raised blood pressure was highest in Africa, where it was 46% for both sexes combined. Both men and women have high rates of raised blood pressure in the Africa region, with prevalence rates over 40%. Worldwide, raised blood pressure is estimated to cause 7.5 million deaths, about 12.8% of the total of all deaths. This accounts for 57 million disability adjusted life years (DALYS) or 3.7% of total DALYS (WHO, 2013c).

Identification of these major risk factors and the implementation of control strategies (for example, community education and targeting of high risk individuals) have contributed to the fall in NCDs mortality rates observed in industrialized nations (Ford et al., 2007). In addition, dietary regimen (often combined with regular moderate intensity physical activity such as brisk walking, cycling etc, lasting for at least 30 min, to be observed at least thrice weekly) are now available for the prevention and/or treatment of many non-communicable diseases. One of such regimen is the Dietary Approach to Stop Hypertension (DASH) eating plan, which has been found to be more effective in lowering blood pressure if combined with reduced salt intake (National Institute of Health (NIH)/National Heart, Lung and Blood Institute (NHLBI), 2006).

Central to eco-social theory and epidemiological inquiry is a construct known as embodiment; it is the process through which extrinsic factors experienced at different life stages are inscribed into an individual's body functions or structures, and the result of such processes. It recognizes humans as simultaneously social beings and biological organisms, and as such their bodies tell stories about, and cannot be studied divorced from the condition of their existence. Such stories often, but not always match peoples stated account; and the bodies even tell stories that people cannot or will not tell either because they are unable, forbidden or chose not to tell (Krieger, 2005).

Embodiment therefore underline the use of a combination of appraisal of dietary intake (based on recall of type and frequency of food eaten) and appraisal of nutritional status (based on anthropometric, clinical and biochemical assessments) for a comprehensive assessment of malnutrition.

The market as a meeting place for distributors of goods (and even producers of some goods, especially food items produced by small scale farmers) and consumers, represents the soul of every community. Traders therefore represent an important productive sector of the economy. A study by Ulasi et al. (2011) reported a high prevalence of hypertension (42.0%) in a market population in Enugu, Nigeria. Another study by Odugbemi et al. (2012) also reported high prevalence of hypertension (34.8%), physical inactivity (92.0%), cigarette smoking by males (17.5%), obesity (12.3%) and overweight (39.9%) among traders in Lagos. However, previous studies among traders in Nigeria, majorly examined lifestyle and prevalence of non-communicable diseases (NCDs) or their risk factors, there is a dearth of literature on their dietary pattern and its correlation (if any), with the observed high prevalence of NCDs among them, even though they are prone to consuming the high energy dense foods that they sell to people. This study was conducted to assess the dietary pattern, lifestyle, nutrition status and prevalence of hypertension among traders in Sokoto, Nigeria.

METHODOLOGY

Study design and population

This cross sectional descriptive study was carried out among traders in Sokoto Central Market, Sokoto, North Western Nigeria, from November to December, 2012. The Sokoto Central Market is the largest market in North Western Nigeria, built on a 24 hectares land donated by the late Sultan Abubakar III. It was established to cater for the growing population of Sokoto town which has now grown into a city with a population of 427,760 by the 2006 National

Census (National Population Commission (NPC), 2006); and to prevent the frequent fire outbreak at the old market known as 'YAR DOLE', situated along Sultan Bello Way, about 400 m away from the new market. The market has 5,095 stalls (comprised of 3,346 lock up stalls and 1,749 open stalls) grouped into 16 clusters designated as Areas (A to S). The facilities in the market included; mosque, clinic, area court, police station, motor parks, administrative block, fire service unit, restaurants, 18 toilet blocks, workshop and information centre.

Traders aged 18 years and above, and have worked in the market in a stall for at least 6 months were considered eligible, while those aged below 18 years, or have spent less than 6 months, or sell in open spaces were excluded. The sample size was estimated at 367 and adjusted to 390 using the statistical formula for calculating sample size for cross sectional descriptive studies (Ibrahim, 2009), 39.5% prevalence of hypertension among traders from a previous study (Aghaji, 2008), precision level of 5% and an anticipated response rate of 95%. The eligible participants were selected by multistage sampling technique. At the first stage 8 of 16 areas were selected by simple random sampling using the ballot option. At the second stage, selection of stalls in each of the selected area was done by systematic sampling technique using the list of stalls in each area to constitute the sampling frame. Proportionate allocation (based on number of stalls) was applied in the selection of stalls in the selected Areas. From each stall selected, the first trader encountered and fulfilling the eligibility criteria for the study was enrolled. In the event of a selected stall being under lock, or not having an eligible trader, an eligible trader was selected from the next accessible stall.

Data collection

The methods of data collection comprised of personal interview and physical assessment (anthropometric and blood pressure measurements). A standardized, semi-structured, interviewer-administered questionnaire was used to obtain information on the socio-demographic characteristics of the study participants, dietary pattern and lifestyle. The questions on types of food consumed were adapted from the survey tool that was used for the Nigerian Food Consumption and Nutrition Survey (2001 to 2003) (International Institute of Tropical Agriculture (IITA), 2004). The questions on current eating habits were adapted from the National Institute of Health (NIH)/National Heart Lung and Blood Institute (NHLBI) format for the assessment of current eating habit for Therapeutic Lifestyle Change Diet (NIH/NHLBI, 2002). The questions on behavioural measurements were adapted from the WHO STEPS instrument for chronic diseases risk factors surveillance that was used for a national survey on health behaviour monitor among Nigerian adult population (NHF/FMoH, 2003). The instruments were pre-tested in a pilot study among 20 traders at Gawo Nama Market, Sokoto; the necessary adjustment was effected based on the observations made during the pre-test.

Weight was measured with shoes off to the nearest 0.5 kg using a seca optimal scale; it was validated with a standard weight and corrected for zero error. Height was measured without shoes to the nearest 0.5 cm using a stadiometer. Blood pressure was measured using a sphygmomanometer (Dekamet MG3, England) and stethoscope (Littman quality) with all tight clothing and other similar materials removed from the arm and in the sitting position. The first measurement was taken after the participant had rested for at least 10 min in a sitting position with the arm rested on a table such that the middle of the forearm was about the level of the heart. The second measurement was taken at the end of the interview; the

mean of the 2 readings was used in the analysis. Four medical officers and four nurses assisted in data collection after pre-training on the objectives, selection of participants and use of survey instruments. Institutional ethical clearance was obtained from the Ethical committee of Specialist Hospital Sokoto; permission was obtained from the management of the market and informed written consent was also obtained from the participants before data collection.

Operational definition of terms

Body mass index (BMI) was calculated as weight (kg) divided by height^2 (m^2) and used as marker for nutritional status (Tsigos et al., 2008). Underweight was defined as BMI less than 18.5 kg/m^2, normal weight was defined as BMI of 18.5 to 24.9 kg/m^2, overweight was defined as BMI of 25.0 to 29.9 kg/m^2, while obesity was defined as BMI of 30.0 kg/m^2 and above. Hypertension was defined using the World Health Organization and International Society of Hypertension criteria (WHO and ISH, 2003) as systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg or both or self reported antihypertensive medication during the past 1 week.

Data analysis

Data was analyzed using the statistical package for social sciences (SPSS) version 17 computer statistical software package. Frequency distribution tables were constructed; cross tabulations were done to examine relationship between categorical variables. The Chi-square test was used to compare differences between proportions. Logistic regression analysis was used to determine the variables that predict nutrition status and hypertension among the participants. All statistical analysis was set at 5% level of significance (p < 0.05).

RESULTS

Only 381 of the 390 questionnaires administered were useable. The age of the traders ranged from 20 to 69 years (Mean = 35.38; SD = 8.34). Majority, 168 (44.1%) of the 381 participants were in the 30 to 39 years age group, followed by the 20 to 29 years age group (28.3%). There was a slight preponderance of males (53.0%) compared to females (47.0%). Most of the participants were married (62.7%), and practiced Islam as religion (66.1%). A larger proportion of the participants (47.8%) had secondary education, followed by primary education and below (39.4%), only a few among them (12.9%) had tertiary education (Table 1).

Dietary pattern of participants

Majority, 258 (68.8%) of the 375 participants that responded to the question on the number of times they eat in a day, eat thrice daily, 91 (24.3%) eat twice daily, while 25 (6.4%) eat more than three times in a day. Also, 268 (71.5%) reported meal skipping; while 120 (32.0%) reported overeating as a result of stress, majority 211 (56.3%) reported loss of appetite while stressed.

Table 1. Socio-demographic profile of participants

Socio-demographic profile	Frequency (%)
Age groups (in years)	
20-29	108 (28.3)
30-39	168 (44.1)
40-49	86 (22.6)
50-59	14 (3.7)
60-69	5 (1.3)
Sex	
Male	202 (53.0)
Female	179 (47.0)
Marital status	
Single	103 (27.0)
Married	239 (62.7)
Separated	13 (3.4)
Divorced	16 (4.2)
Widowed	10 (2.6)
Education	
Primary and below	150 (39.4)
Secondary	182 (47.8)
Tertiary	49 (12.9)
Religion	
Christianity	252 (66.1)
Islam	129 (33.9)

Table 2 shows the food habit of the participants, most 190 (50.7%) of the 375 participants that responded to the question on the time they eat their largest meal, eat their largest meal at dinner, 143 (38.1%) eat their largest meal at lunch, while 44 (11.2%) eat their largest meal at breakfast. Bread and tea are taken at breakfast by most of the participants (83.4%), likewise pap (65.2%). Fura is mostly taken at lunch (44.8%); likewise, tuwo, pounded yam, semovita, amala and rice (58.2%).

The frequency of snacking and consumption of specified snacks, fruits and vegetables are shown in Table 3. Almost half, 187 (49.9%) of the 375 participants that responded to the question on snacking reported eating snacks every day (mostly once a day). While most of the participants that reported eating doughnut and biscuit do so once in a week, a noticeable proportion of the participants reported eating fried foods (21.4%) and drinking fruit juice (27.1%) and carbonated drinks (33.0%) up to thrice and above in a week. Majority of the partici-pant reported consumption of fruits (56.0%) and vege-tables (58.8%) less than thrice in a week or not at all.

Participants' lifestyle

Figure 1 shows the lifestyle of participants, one hundred and ninety three (50.7%) of the 381 participants live a se-dentary lifestyle (by virtue of; use of motor cycle or car to work, lack of moderate physical activity at work, and lack of moderate leisure exercise). Sedentary lifestyle was marginally more prevalent among males than females (males 50.3%, females 49.7%) but the difference was not statistically significant (χ^2 = 1.196, p = 0.161). Twenty (5.2%) of the 381 participants reported current cigarette smoking. Current cigarette smoking was almost nine times more prevalent among males compared to females (males 8.9%, females 1.1%) and the difference was statistically significant (χ^2 = 11.590, p < 0.001). Forty one (10.8%) of the 381 participants reported alcohol consum-ption within the past 30 days. Alcohol consumption within the past 30 days was more prevalent among males than females (males 11.9%, females 9.5%), but the difference was not statistically significant (χ^2 = 0.562, p = 0.280). Majority, 254 (66.7%) of the 381 participants reported consumption of fatty foods; consumption of fatty foods was slightly more prevalent among males than females (males 68.8%, female 64.2%), the difference was also not statistically significant (χ^2 = 0.890, p = 0.202).

Participants' nutrition status and prevalence of hypertension

Figure 2 shows participants' nutrition status and prevalence of hypertension. Only 5 (1.3%) of the 381 participants were underweight, underweight was slightly more prevalent among females than males (males 1.0%, females 1.7%). One hundred and fifty nine (41.7%) had normal weight, with a larger proportion of participants with normal weight among males compared to females (males 48.0%, females 34.6%). One hundred and ten (28.9%) were overweight, and it was more prevalent among males than females (males 35.1%, females 21.8%). One hundred and seven (28.1%) were obese; obesity was almost thrice as prevalent among females compared to males (males 15.8%, females 41.9%) and the difference was found to be statistically significant (χ^2 = 33.227, p < 0.001). No uniform pattern of variation in nutrition status across the age groups was observed. Also, in logistic regression models, no predictor of nutrition status was obtained.

One hundred and eleven (29.1%) of the 381 participants were hypertensive; hypertension was more prevalent among females than males (males 26.2%, females 32.4%) but the difference was not statistically significant (χ^2 = 1.747, p = 0.113). The prevalence of hypertension increased progressively and statistically significantly across the age groups. The prevalence of hypertension

Table 2. Food habit of participants

Variable	Meal schedule			
	None [N (%)]	Breakfast [N (%)]	Lunch [N (%)]	Dinner [N (%)]
Eat largest meal (N = 375)	-	42 (11.2)	143 (38.1)	190 (50.7)
Eat bread and tea (N = 373)	34 (9.1)	311 (83.4)	8 (2.1)	20 (5.4)
Drink pap (N = 371)	89 (24.0)	242 (65.2)	15 (4.0)	25 (6.7)
Drink fura (N = 368)	146 (39.7)	36 (9.8)	165 (44.8)	18 (4.9)
Eat tuwo / pounded yam/semovita/amala/rice (N = 370)	-	9 (2.4)	215 (58.2)	146 (39.5)

Table 3. Snacking and consumption of specified snacks, fruits and vegetables.

Variable	Frequency of consumption				
	None [N (%)]	Once [N (%)]	Twice [N (%)]	Thrice [N (%)]	More than thrice [N (%)]
Eat snacks in a day (N = 375)	188 (50.1)	160 (42.7)	14 (3.7)	8 (2.1)	5 (1.3)
Eat doughnut in a week (N = 374)	137 (36.6)	123 (32.9)	42 (11.2)	42 (11.2)	30 (8.0)
Eat biscuit in a week (N = 369)	140 (37.9)	127 (34.4)	42 (11.2)	23 (6.2)	37 (10.0)
Eat fried yam or plantain in a week (N = 374)	63 (16.8)	142 (38.0)	89 (23.8)	35 (9.4)	45 (12.0)
Drink fruit juice in a week (N = 373)	103 (27.6)	100 (26.8)	69 (18.5)	32 (8.6)	69 (18.5)
Drink carbonated soft drink in a week (N = 373)	72 (19.3)	117 (31.4)	61 (16.4)	32 (8.6)	91 (24.4)
Eat fruits in a week (N = 375)	25 (6.7)	108 (28.8)	77 (20.5)	48 (12.8)	117 (31.2)
Eat vegetables in a week (N = 374)	46 (12.3)	108 (28.9)	66 (17.6)	37 (9.9)	117 (31.3)

Table 4. Predictors of hypertension among participants.

Variable	Odds ratio (OR)	Sig. (p-value)	95% CI Lower Upper
Age	4.158	<0.001	0.105-0.293
Sex	0.134	0.893	- 0.088-0.101
Marital status	0.010	0.992	- 0.059-0.060
Sedentary lifestyle	1.636	0.103	- 0.165-0.016
Cigarette smoking	0.133	0.894	- 0.189-0.216
Alcohol consumption	1.016	0.310	- 0.050-0.157
Overweight / obesity	2.822	0.005	0.061-0.345

hypertension among the participants in their 20s, 30s, 40s, 50s and 60s were; 11.1, 29.8, 41.9, 64.3 and 80.0%, respectively (χ^2 = 38.415, p < 0.001). Hypertension was statistically significantly (χ^2 = 24.597, p < 0.001) twice as prevalent among participants with overweight and obesity (39.2%) compared with those with underweight and normal weight (15.9%). In logistic regression models, the predictors of hypertension among the participants included age (OR = 4.158, p < 0.001, 95% confidence interval (CI) = 0.105 to 0.293) and overweight/obesity (OR = 2.822, p = 0.005, 95% confidence interval (CI) = 0.061 to 0.345) as shown in Table 4.

DISCUSSION

High prevalence of unhealthy eating habits was recorded among the participants in this study. While the relatively high prevalence of snacking (49.9%) among the participants in this study is at variance with the very high prevalence of snacking (92.4%) reported in a study by Chung et al. (2003) among female college students in
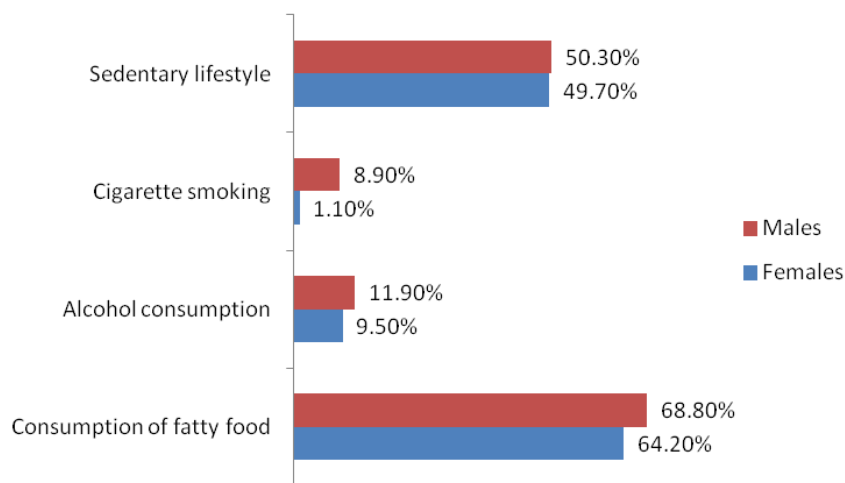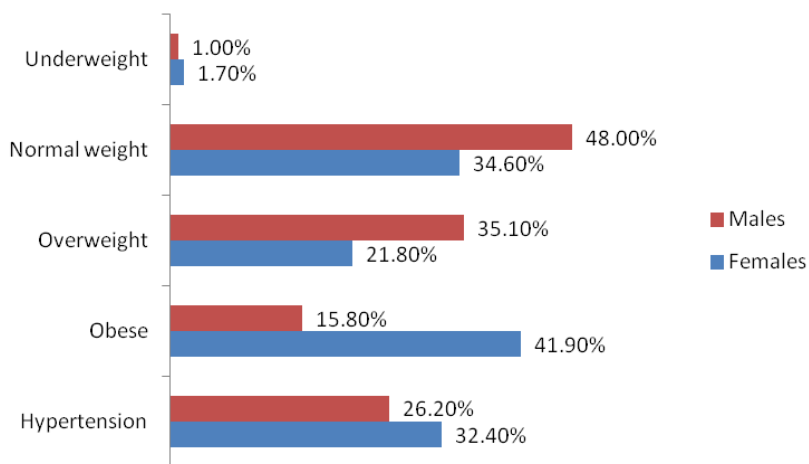
Figure 1. Participants' lifestyle.

Figure 2. Participants' nutrition status and prevalence of hypertension.

students in Seoul, South Korea, it is in agreement with 33.0% prevalence of snacking reported in another study by Olumaikaye et al. (2010) among adolescents in Osun State, Nigeria. In contrast to the findings in this study wherein majority (56.3%) of the participants reported loss of appetite while stressed, Potocka and Moscioka (2011) reported stronger tendency to habitual and emotional eating among Polish employees with high job stress compared to those with medium level of job stress. This could be due to differences in socio-cultural factors in the two study settings.

Contrary to the high prevalence of consumption of fruit

juice (27.1%) and carbonated drinks (33.0%) thrice in a week and above among the participants in this study, Arulogu et al. (2011) reported a lower prevalence (17.1%) of consumption of carbonated drinks in a study among a younger population (undergraduates of the University of Ibadan, Nigeria). The high prevalence of consumption of high energy dense foods and drinks among the participants in this study is of serious concern, considering the fact that apart from the increased impairment of glucose metabolism with advancement in age, epidemiological studies have provided evidence of a trend towards increased incidence and prevalence of type 2 diabetes in

African populations, linked to unhealthy eating habits and lifestyles (sequel to urbanization and industrialization), compared with the 1990s when it was considered a rare medical condition in sub-Sahara Africa (Sobngwi et al., 2001).

The International Diabetes Federation (IDF) had estimated that in 2003 the number of people age 20 to 79 years with diabetes in Sub-Saharan Africa was over 7 million for a population of more than 295 million, giving a prevalence rate of 2.4%. About 65% of those affected with diabetes lived in the urban areas, whereas 35% lived in the rural communities. Nigeria is the first of the top five countries with the highest number of people affected by diabetes in Sub-Saharan Africa with about 1.2 million people affected by the disease. The other countries included; South Africa, the Democratic Republic of Congo, Ethiopia and Tanzania with 841,000, 552,000, 550,000 and 380,000 people, respectively affected by diabetes (IDF, 2003).

The high proportion of participants that eat fruits (56.0%) and vegetables (58.8%) less than three times in a week or not at all, and those that eat fried foods (45.2%) twice or more in a week in this study compares well with the findings in a study by Ganasegeran et al. (2012) that reported consumption of fruits less than thrice in a week by 73.5% of participants, and consumption of fried foods twice or more in a week by 50.5% of participants.

A relatively low prevalence of current cigarette smoking (5.2%) and alcohol consumption (10.8%) was recorded among the participants in this study compared to the high prevalence of smoking (29.3%) and alcohol consumption (38.4%) reported in a study among 11 to 16 years old adolescents in Boenos Aires, Argentina (Mulassi et al., 2010). This could be due to the fact that most of the participants in this study practiced Islam (which prohibits alcohol consumption) as religion. The low prevalence of cigarette smoking among the participants in this study could be related to the low prevalence of alcohol consumption among them. Substance use disorders (such as alcohol consumption and smoking) have been found to be related and co-morbid (Schneider et al., 2009). The high prevalence of daily consumption of snacks (49.9%) among the participants in this study agrees with the high prevalence of snacking (84.3%) reported in a study among employees of Federal Airport Authority of Nigeria in an urban population in Nigeria by Abidoye et al. (2002). A high prevalence of sedentary lifestyle (50.7%) was observed among the participants in this study. This is almost double the 29.6% prevalence of sedentary lifestyle reported in a study among bankers (a profession considered to be largely sedentary in nature) in Ilorin, Nigeria (Jogunola and Awoyemi, 2010).

The high prevalence of overweight (28.9%) and obesity (28.1%) recorded in this study compares well with the reported 31.3 and 16.3% prevalence of overweight and obesity, respectively, among female traders in Ibadan, Nigeria (Balogun and Owoaje, 2007). This could be related to the high prevalence of unhealthy eating habits and sedentary lifestyle among the participants in this study. A study by Bhargava et al. (2002) had reported negative association between physical activity and body weight.

While the 29.1% prevalence of hypertension observed among the participants in this study is higher than the 13.16% prevalence of hypertension reported by Asekun-Olarinmoye et al. (2013) in a rural adult population of Osun State, Nigeria, it compares well with the 31.0% prevalence of hypertension reported by Ogah et al. (2013) in rural and urban populations of Abia State, Nigeria, and less than half of the 68.9% prevalence of hypertension reported by Ordinioha and Brisibe (2013) among an elderly population of traditional chiefs in an urban population in south - south Nigeria.

The findings in these studies not only highlight the high burden of hypertension across the populations in Nigeria, but also corroborate the documented pattern of rise in the prevalence of hypertension with age, and preponderance of its prevalence in urban compared to rural populations in several studies across the globe. To put it succinctly, there is high burden of hypertension and it has become a big challenge to public health in Nigeria, with its pre-valence in rural and semi-urban populations across the country approaching the estimated national prevalence of 42.8% in 2008 (World Health Organization (WHO), 2011c). This underscores the need for a re-invigorated and consistent implementation of public health interventions for its prevention and control in Nigeria.

Conclusion

This study demonstrated high prevalence of unhealthy eating habits and lifestyle; together with high prevalence of overweight, obesity and hypertension among traders in Sokoto. Health education and other interventions to promote healthy eating habits and lifestyle, especially among high risk groups are suggested.

ACKNOWLEDGEMENTS

REFERENCES

Abidoye RO, Madueke LA, Abidoye GO (2002). The relationship between dietary habit and body mass index using the Federal Airport Authority of Nigeria as the sample. Nutr. Hlth. 16(3):215-27.

Aghaji MN (2008). Hypertension and risk factors among traders in Enugu, Nigeria. J. Coll. Med. 13(2):111-115.

Arulogun AS, Owolabi MO (2011). Fast food consumption pattern among undergraduates of the University of Ibadan: implications for nutrition education. J. Agric. F. Tech. 1(6):89-93.

Arthur CG, John EH (2000). Textbook of medical physiology. 10th ed. Philadelphia: WB Saunders Company.

Asekun-Olarinmoye E, Akinwusi P, Adebimpe W, Isawumi M, Hassan M, Olowe O, Makanjuola O, Alebiosu C, Adewole T (2013). Prevalence of hypertension in the rural adult population of Osun State, southwestern Nigeria. Int. J. Gen. Med. 6:317-22.

Balogun MO, Owoaje ET (2007). Work condition and health problems of female traders in Ibadan, Nigeria. Afr. J. Med. Med. Sci. 36(1):57-63.

Bhargava A, Guthrie JF (2002). Unhealthy eating habits, physical exercise and macronutrient intakes as predictor of anthropometric indicators in the Women's Health Trial Feasibility Study in Minority Population. Br. J. Nutr. 88 (6):719-28.

Chung HT, Song MK, Park MH (2003). A study of anthropometric indices and eating habits of female college students. J. Comm. Nutr. 5(1):21-28.

FAO (2012). The state of Food Insecurity in the World 2012. Food and Agriculture Organization of the United Nations. Rome. Available at: http://www.fao.org/docrep/016/i3027e/

Ford ES, Ajani UA, Croft JB, Critchley JA, Labarthe DR, Kottke TE, Giles WH, Capewell S (2007). Explaining the decrease in U.S. deaths from coronary disease, 1980-2000. N Engl. J. Med. 356:2388–2398.

Ganasegeran K, Al - Dubai SA, Qurechi AM, Al – Abed AA, An R, Aljunaid SM (2012). Social and psychological factors affecting eating habits among university students in a Malaysian medical school: a cross sectional study. Nutr. J. 11:48.

Hu FB, Manson JE, Stampfer MJ, Colditz G, Liu S, Solomon CG, Willett WC (2001). Diet, lifestyle, and the risk of type 2 diabetes mellitus in women. N. Engl. J. Med. 345(11):790-7.

Hung HC, Huang MC, Lee JM, Wu DC, Hsu HK, Wu MT (2004). Association between diet and esophageal cancer in Taiwan. J. Gastroenterol. Hepatol. 19(1):632-7.

Ibrahim T (2009). Research methodology and dissertation writing for health and allied health professionals. Abuja: Cress Global Link Limited.

IDF (2003). Diabetes Atlas 2003. 2nd ed. International Diabetes Federation, Brussels.

IITA (2004). Nigeria Food Consumption and Nutrition Survey 2001 – 2003. International Institute of Tropical Agriculture, Ibadan, Nigeria.

Jogunola OO, Awoyemi AO (2010). Prevalence of sedentary lifestyle among bankers in Ilorin metropolis. Nig. J. Med. Rehab. 15(1&2):44-50.

Krieger N (2005). Embodiment: a conceptual glossary for epidemiology. J. Epidemiol. Comm. Health 59(5):350-55.

Martin AC (2006). Clinical chemistry and metabolic medicine. 7th ed. London, UK: Edward – Arnold (Publishers) Ltd.

Mulassi AH, Hadid C, Borracci RA, Labruna MC, Picarel AE, Robilotte AN, Redruello M, Masoli O (2010). Eating habits, physical activity, smoking and alcohol consumption in adolescents attending school in the province of Boenos Aires. Arch. Argent. Paediatric. 105(1):45-54.

National Institute of Health (NIH) / National Heart, Lung and Blood Institute (NHLBI) (2006). Your guide to lowering your blood pressure. DASH eating plan. US Department of Health and Human Services. Available at: http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/

National institute of Health (NIH) / National Heart, Lung and Blood Institute (NHLBI) (2002). Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). Circulation 106: 3143 – 3421.

NHF and FMoH (2003). Health behavior monitor among Nigerian adult population. Nigeria Heart Foundation and Federal Ministry of Health, Abuja, Nigeria.

NPC (2006). National Population Commission of Nigeria. Available at: http://www.population.gov.ng

Odugbemi TO, Onajole AT, Osibogun AO (2012). Prevalence of cardiovascular risk factors amongst traders in an urban market in Lagos, Nigeria. Niger. Postgrad. Med. 19(1):1-6.

Ogah OS, Madukwe OO, Chukwuonye I, Onyeonoro UU, Ukegbu AU, Akhimien MO, Onwubere BJ, Okpechi IG (2013). Prevalence and determinants of hypertension in Abia State, Nigeria: results from the Abia State Non- Communicable Diseases and Cardiovascular Risk Factors Survey. Ethn. Dis. 23(2):161-7.

Olumakaiye MF, Atinmo T, Olubayo–Fatiregun MA (2010). Food consumption patterns of Nigerian adolescents and effect on body weight. J. Nutr. Educ. Behav. 42(3):144-51.

Ordinioha B, Brisibe S (2013). Prevalence of hypertension and its modifiable risk factors amongst traditional chiefs of an oil – bearing community in south – south Nigeria. Sah. Med. J. 16(1):24.27.

Park K (2009). Park's textbook of preventive and social medicine. 20th ed. Jabalpur, India: M/s Barnasidas Bhanot.

Potocka A, Moscioka A (2011). Occupational stress, coping strategies and eating habits among Polish employees. Med. Prac. 62(4):377-88.

Schneider M, Bradshaw D, Steyn K, Norman R, Laubscher R (2009). Poverty and non-communicable diseases in South Africa. Scand. J. Pub. Health 37(2):176-186.

Sobngwi E, Mauvais-Jarvis E, Vexiau P, Mbanya JC, Gautier JF (2001). Diabetes in Africans. Part 1: epidemiology and clinical specificities. Diab. Metabo. 27:628–34.

Tsigos C, Hainer V, Basdevant A, Finer N, Friend M, Maths-Vliegen E, Micic D, Maislos M, Roman G, Schutz Y, Toplak H, Zahorska-Markiewicz B (2008). Management of Obesity in Adults: European Clinical Practice Guidelines. Obesity Facts 1(2):106-116.

Ulasi II, Ijoma CK, Onwubere BJC, Arodiwe E, Onodugo O, Okafor C (2011). High prevalence and low awareness of hypertension in a market population in Enugu, Nigeria. Int. J. hypertens. Article ID 869675, 5 pages.

WHO (2013a). Obesity and overweight. WHO Fact Sheet. World Health Organization. Geneva, Switzerland. Available at: http://www.who.int/mediacentre/factsheet/

WHO (2013b). Global strategy on diet, physical activity and health. WHO Fact Sheet. World Health Organization, Geneva, Switzerland. Available at: http://www.int/dietphysicalactivity/

WHO (2013c). Raised blood pressure. Global Health Observatory. World Health organization. Geneva, Switzerland. Available at: http://www.int/gho/ncd/risk_factors/

WHO (2011a). Global status report on non-communicable diseases in 2010. World Health Organization, Geneva, Switzerland.

WHO (2011b). Global status report on alcohol and health. WHO Library Cataloguing -in- Publication Data. World Health Organization, Geneva, Switzerland. Available at: http:www.who.int/substance_abuse/publications/global_alcohol_report/

WHO (2011c). Non-communicable Diseases, Country Profiles 2011. World Health Organization, Geneva, Switzerland.

WHO (2008). WHO report on the global tobacco epidemic 2008. World Health Organization, Geneva, Switzerland. Available at: http://www.who.int/tobacco/mpower/

WHO/ISH (2003). World Health Organization /International Society of Hypertension statement on management of hypertension. J. Hypertens. 21(11):1983-1992.

Xu J, Eilat-Adar S, Loria C, Goldbourt U, Howard BV, Fabsitz RR, Zephier EM, Mattil C, Lee ET (). Dietary fat intake and risk of coronary heart disease: the strong heart study 1'2'3'4. Am. J. Clin. Nutr. 84(4):894-902.

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