

# Perceptions of Child Caregivers About Factors Influencing Childhood Corneal Blindness in a Rural Community in Southern Nigeria

CA Mbadugha,<sup>1</sup> D Patel<sup>2</sup>

<sup>1</sup>Consultant Ophthalmologist, Ajeromi General Hospital, Lagos, Nigeria

<sup>2</sup>Clinical Lecturer, MSc Course Director for Community Eye Health, International Centre for Eye Health, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT

## ABSTRACT

**Objectives:** Corneal scarring secondary to measles keratopathy and vitamin A deficiency is the leading cause of childhood blindness in Nigeria and can be prevented by simple primary health care measures. Nutrition, health education and measles immunization are crucial components of preventive eye health services in the prevention of corneal blindness. This study explores the perceptions of child caregivers in a rural community in southern Nigeria to the uptake of preventive health services and child weaning practices which may influence corneal blindness.

**Methods:** Qualitative methods were used to explore infant feeding practices and barriers to immunization services in a typical rural setting in southern Nigeria. The views of mothers, health workers and other important members of the community were sought. Document study was used to assess the implementation of the World Health Organization (WHO) recommendation that vitamin A prophylaxis be administered to all measles patients to prevent vitamin A deficiency.

**Results:** Traditional views had a strong influence on infant feeding practices and the utilization of immunization services. The interplay between nutrition and corneal blindness was unknown to mothers in this study. The strong influence of the views of members of the extended family on child rearing and health-seeking behaviour was also discovered.

**Conclusion:** This study highlights the need for cultural sensitivity in designing and implementing health programmes and clearly demonstrates the importance of community support and participation to ensure their effectiveness and sustainability. It was suggested that the target group of health education programmes be expanded to include influential members of the family and the community.

**Key words:** corneal blindness, exclusive breastfeeding, measles keratopathy, vitamin A deficiency.

## INTRODUCTION

Corneal opacity is the leading cause of childhood blindness in Nigeria.<sup>1</sup> Poor socioeconomic factors and inadequate development of healthcare services are found to be linked with the high prevalence of corneal causes of blindness in low-income countries. In South Africa,<sup>2</sup> blindness in 11% of children in schools for the blind was attributed to corneal opacities, compared to 21.4%<sup>1</sup> in Nigeria and 62.4% in Ethiopia.<sup>3</sup>

The interplay between measles, harmful traditional eye medications and vitamin A deficiency is an important factor leading to bilateral corneal ulceration in Nigeria. About 86.7% of children blinded by corneal scars have a history of associated measles infection.<sup>1</sup> Studies have shown that 4 out of 100 African children with measles develop definite corneal ulceration,<sup>4</sup> and this is closely related to low levels of serum retinol.<sup>5</sup> The proportion of children immunized for measles at the age of one in Nigeria is estimated at only 62%.<sup>6</sup> Also, balanced nutrition with adequate vitamin A supplementation is crucial to the prevention of corneal blindness.

Exclusive breastfeeding (breastfeeding without supplements or water for the first six months of life) has been promoted by WHO and is associated with a 74% reduction in the risk of vitamin A deficiency, with benefits extending to the third year of life.<sup>7</sup> The percentage of Nigerian infants exclusively breastfed for the first six months of life is estimated at 17% and the reported vitamin A supplementation coverage rate is 55%.<sup>6</sup> Also, the use of harmful traditional eye medications in Nigeria is widespread.<sup>8</sup> All these are key risk factors for the high rate of measles-related corneal blindness in Nigerian children.

If the rate of corneal blindness is to be reduced in southern Nigeria, it is essential to understand the perceptions and willingness of parents and child care providers to accept interventions such as immunization and vitamin A supplementation, and even change their health-seeking behaviour. The aim of this study was to identify modifiable barriers to the reduction of the prevalence of corneal blindness.

**METHODOLOGY**

The study was carried out in accordance to the Declaration of Helsinki. Ethical approval was obtained from the relevant local government health authorities and hospital administration prior to the commencement of the study. Informed consent was also obtained from all the respondents at every stage of the study.

Qualitative methods were used to explore the knowledge, practices and attitudes of mothers, grandmothers, fathers and local health workers in relation to corneal blindness in childhood. This method is ideal for exploring explanatory depth, detail and meaning. A flexibility of approach arising from an emergent design enabled the researchers to discover the unexpected and yielded an in-depth investigation of the research question.

A non-probabilistic purposive sampling strategy from a variety of sources was used and continued to saturation till no new themes were discovered. Key informants were chosen to represent the range of those characteristics that appeared meaningful for the topic under study: age (younger mothers/older grandmothers), education (literate/illiterate) and profession (medical/non-medical). This approach allowed the researchers to obtain a theoretical representation of the study population and information from a variety of sources. Therefore, the sample size, though small, could yield valid and generalizable information.

Respondents were selected from the four villages that make up the study town – Ozubulu. The composite villages were approximately equal in terms of size, population, health infrastructure, socioeconomic status and ethnic background.

Two research assistants were recruited and trained for two and a half days. Data collection was carried out using in-depth interviews, semi-structured interviews (SSI) and focus group discussions (FGDs). Table 1 shows the data collection methods used for the different groups of respondents. In-depth interviews were conducted for the seven key informants. The location and timing of the interviews were at their convenience and lasted about one and a half hours. Four of the interviews were recorded electronically, while the other three were handwritten by a research assistant.

**Table 1. Categories of respondents**

Respondent category (CODE)	No	Data collection method	Respondent details
Key informants (KI)	7	In-depth interviews	Local Government Immunization. Female 50 yrs.  3 fathers with children less than 3 yrs old. Age range 33 - 45 yrs.  Retired educationist, grandfather church leader. Male 68yrs.  Medical doctor at public hospital. Male 35 yrs.  Private medical practitioner. Male church leader, 50 yrs.
Mothers (M)	30	Semi-structured interviews	Age range 18 - 40 yrs. Literate 9, illiterate 21, youngest children aged 0 - 3 yrs.
Grandmothers (GM)	20	Focus group discussions	4 focus groups – one per village. 5 participants per FGD. Age range 50 - 75 yrs. At least one grandchild aged 0 - 3 yrs.
Health workers (HW)	10	Focus group discussions	2 groups 5 health workers per group. All females. Age range 24 - 35 years.

Semi-structured interviews were conducted for the mothers, who were recruited from the community and health posts. The interviews were conducted in the local language (Igbo), using a topic guide to ensure adequate coverage of relevant points. Two focus group discussions (FGDs) were carried out for the health workers and 4 for the grandmothers. There were 5 participants in each of the FGDs, which lasted about an hour and a half, and were recorded electronically.

The adequacy of prevention of corneal blindness in measles patients (administration of vitamin A prophylaxis) was assessed by textual analysis or document study. A list of measles patients seen in the public and private hospitals in the study area, two years preceding the study was obtained from the medical records. Twelve case notes per hospital were selected from a list of randomly-generated numbers and then reviewed to determine the frequency of administration of high dose vitamin A prophylaxis as advocated by the World Health Organization (WHO).

Transcription of data recorded electronically during the interviews and FGDs was done immediately after the

interviews or discussions. The data was translated from Igbo to English and retranslated or verified by one of the key informants (KIEO - a retired educationist). Textual accounts of interviews, FGDs and observations provided rich descriptions and explanations of behaviour and events. The data was coded from source and then further organized according to subject matter (breastfeeding, measles, immunization). Immersion into the data was done by listening to tapes and reading transcript notes, and continually examined for descriptions and patterns by the researchers. Coding was done using place, category, interview or FGD number.

Themes and sub-themes were identified and initially listed on post-it notes. Comparing and contrasting the content of data to find similarities and differences facilitated identification of sub-themes. A matrix from the themes and sub-themes was devised on which the coded data were charted. Codes allowed a quick retrieval of those segments of text that were relevant for answering a particular research question. A thematic framework was then developed which was interpreted to yield results. Figure 1 below depicts the process of data analysis.<sup>9</sup>

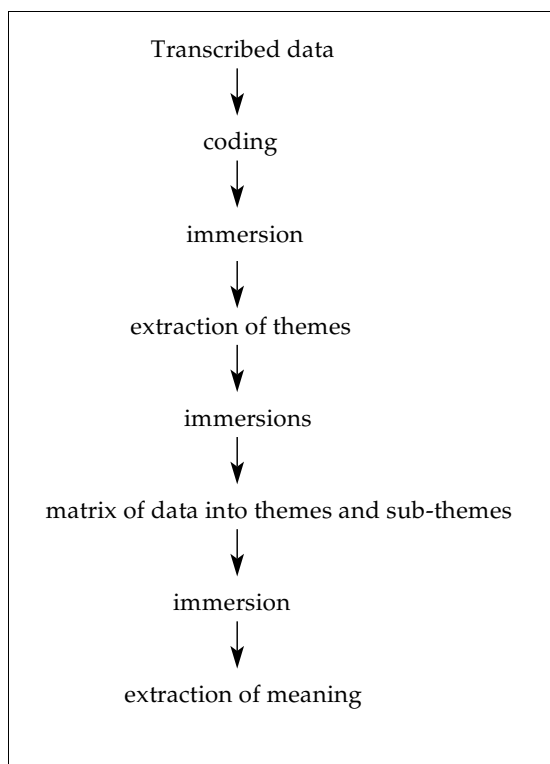


Figure 1. Process of data analysis

Data and method triangulation were achieved as illustrative quotes for themes could be obtained from the various categories of respondents and these data were obtained by

a variety of methods. Having the translation from Igbo to English corroborated by a key informant and having the raw data and thematic framework reviewed by the researcher assistants enhanced researcher triangulation.

## RESULTS

The results of this study are discussed under the following key themes:

- Barriers to exclusive breastfeeding
- Weaning practices
- Perceptions about nutrition, measles and blindness
- Barriers to immunization

### Barriers to Exclusive Breastfeeding (for infants under 6 months of age)

There was overwhelming evidence of the influence of traditional belief systems on the decision to breastfeed exclusively. The predominant belief observed was the value placed on water by the community. Infant 'water supplementation' belief was so strong that it was almost a taboo to speak against it. This sometimes resulted in a divide between the young and the old, as well as between parents (see Box 1). There was an attribution of spiritual powers to water and a perceived need for water to assuage thirst by everyone. Water was thought of as a useful substitute for breast milk when mothers were unavoidably away. There were several myths concerning colostrum and breast milk affecting the practice of breastfeeding.

#### Box 1. Community's Regard for Water

When we had our children, the first thing a baby was given in our days was water. Water is the source of life for fishes.

Nza GM1

In those days we used to give male children water from Ulasi River to enable them grow up bold and strong

Am GM4

I find it hard to accept that babies do not need water while being breastfed. They have to drink water sometimes.

KI Fa2

If I am away, my baby can be given water to fill his tummy so that he does not cry until I come back

ANC 5

My mother-in-law is not in support of the idea (of exclusive breastfeeding). She says that I should give my baby water but I don't. I cannot be sure however that she does not give my 3 month old baby water to drink when I am away. I am afraid to confront her but I suspect she may do...

IM 01

Discarding of the colostrum was practised by some women as a means of 'washing the breast', while some women were

prevented from breastfeeding their children for fear that their breast milk was poisoned and would kill their child. Most of these women presumed to have 'poisoned breast milk' had previously lost a child in infancy and the death was attributed to ingestion of 'poisoned breast milk'.

### Box 2. Myths Concerning Colostrum & Breast Milk

Some years ago, our women used to discard the first breast milk from the breast after delivery. It was referred to as washing the breast...  
KI EO

They also hold on to traditional beliefs that some women's breast milk is poisoned...  
HW5

Our people have a way of testing the breast milk at birth. Some milk is expressed and put in a container. An ant is put into the milk in the container. If the ant survives, the milk is good but if the ant dies, it means that the milk is poisonous. This test is carried out by an elderly woman and once the milk is certified good in the first pregnancy the test is not repeated in subsequent pregnancies. Some women are thought to have bitter breasts or poisonous breast milk. Any child fed on it is in danger of death. If there is no cure for this bitter breast, the child is taken to the grandmother for feeding. This condition is not so common but because it was believed that it could lead to the death of the child, it was taken quite seriously"...  
KI EO

### Weaning Practices

The better the nutritional practices of mothers, the better the nutritional stores of their children and the less likely it was that the child would develop malnutrition and vitamin A deficiency following an episode of measles. Complementary foods (usually corn porridge) were introduced from the age of 2 months. The timing of cessation of breastfeeding ranged from 9 to 20 months, and was a source of disagreement among the respondents (see Box 3). Suggestions on how to enrich complementary foods were appreciated but difficult to implement for some of the respondents.

### Box 3. Weaning Practices & Conflicts

I will advise that every baby should be breastfed till they are seven months of age before they are given corn porridge. The child should be breastfed for at least a year and five months before breastfeeding is stopped.  
Egb GM5

They are very nice (the health workers). They give us health talks about the types of food to give our children. We are taught not to give only corn porridge but softly cooked beans, vegetables and to add crayfish and eggs to enrich the corn porridge. I do not practice it. Some people can afford it. Suppose I have only ₦30 for a pot of soup I cannot extend it to buy these ingredients for enriching baby food.  
CMCA

Their concept of a balanced diet is variety. Breakfast – Rice, lunch – boiled yam, dinner – cassava. To them they have eaten three different meals in a day and that should be alright not minding that all three of them are starchy foods.  
HW3

### Nutrition, Measles and Blindness

While some respondents were aware that measles causes blindness, they did not know of the link between nutrition and blindness in measles. There was however no food that was considered as taboo to children with measles. But there was no definite effort to ensure that they were fed vitamin A-rich foods.

### Box 4. Measles and Blindness

...our women are conscious of the fact that measles affects the eyes. That is why they use *uli* (local indigo dye) to paint the eyes in a bid to prevent the eyes from going blind.  
KI EO

It causes the children to have cowrie eyes (*anya mkpulu ego*). It affected my sister-in-law's son. He is almost blind in one eye.  
Am GM2

Herbal remedies were very often used in the treatment of measles, and were mostly prepared by the mothers. These remedies, though possibly harmless, were often the first resort of most mothers and could cause delay in presentation to the health centre, with its attendant consequences.

### Box 5. Measles and Herbal Remedies

When their children are sick, they (mothers) try local remedies first if they know what the problem is before they go to the health centres.  
KI EO

In our days *uli* (a local dye) was put in the eyes. It was also put around the joints on the body to prevent excessive weakness. It was believed that it was helpful. It cooled the eyes and stopped the irritation and itching of the skin...  
Nza GM3

Some people use sugarcane in treating measles. It prevents serious injury to the eye. The sugarcane is chewed by the parents and then spat into the eyes of the child.  
KI Fa3

The health workers had noticed that measles occurred more frequently and severely in children that were not immunized. It was therefore important to explore the perceptions, attitudes and barriers to immunization in this rural community. Factors affecting the uptake of immunization services included apathy to the free immunization process, religious beliefs, misconceptions due to a lack of awareness and the negative influence of some religious and community leaders (see Box 6).

Just as announcements made by religious and community leaders spread quickly, news of bad experiences and complications do as well. Bad experiences and misconceptions were a major barrier to immunization (see Box 7).

**Box 6. Barriers to Immunization**

I think our people do not value free things. Some say that white people do not bring good drugs and that if the drugs were good, they would not be free of charge **HWFGD2 CM**

...On a national immunization day, 'Kick off Polio', the *Igwe* (Chief) of the town came to me that he had heard that the vaccines we were giving were poisoned and that family planning drugs (contraceptives) were put into the polio vaccine so that anybody that takes the polio vaccine will not reproduce but become sterile **KI IB**

Some people who are very serious church goers do not believe in the white man's medicine. They say that God is the healer. **IM 01**

The leader of the local church here is the main problem I am facing now. He has announced that people should stop taking our drugs... that all medical professionals give family planning pills to women and therefore commit abortion and that none of us is a Christian. **KI IB**

**Box 7. Bad Experiences and Misconceptions as a Barrier**

They say it is good but I had a bad experience with my first child. He was given an injection for prevention of disease in the leg and it crippled that leg. Since then, I refused all other immunizations for him. My other children were given only BCG. I refused all other prevention drugs. Two of them had measles but it was mild and I treated him. **ANC 09**

... The mild fever children have after immunization discourages mothers. The BCG wound which heals slowly and is not treated with drugs is another discouraging factor. Thus they say the injections lead to illness. **Im12**

They then say that they brought a well baby to the clinic and went away with a febrile child. **HWFGD2 PN**

The recent story going around is that the oral polio vaccine contains HIV virus. **HWFGD2 CM**

...Some feel it is not necessary as they themselves were not immunized as children. **CM CA**

**Box 8. Vitamin A Prophylaxis in Measles**

"I look out for ocular complications in my measles patients and I prescribe ocular antibiotic ointments routinely for all of them. I do not routinely give vitamin A to them. Vitamin A supplementation is given as part of the immunization regimen. I know that in the teaching hospitals measles patients are given vitamin A prophylaxis but I do not give it here in my private practice and I have not seen them develop ocular complications... **KI Dr AI**

In all the cases of measles we have treated, I do not recall giving them vitamin A prophylaxis. We presume that the current regimen used for immunization includes vitamin A and that these children have received that. **KI Dr D**

**DISCUSSION**

Corneal scarring has been the leading cause of blindness in Nigerian children for over three decades. This scenario will undoubtedly persist unless effective preventive eye health strategies are set in motion. Good nutritional practices for children and high measles immunization coverage are central to corneal blindness prevention.

This study revealed an overwhelming influence of tradition on child health and child-rearing practices. There was a dominant concept of the vital role of water in infant feeding practices and it was almost a taboo to speak against giving babies water. This led to family conflict, with the health workers having great difficulty convincing mothers to breastfeed their babies exclusively. Water supplementation is a major reason for the low exclusive breastfeeding rates found in Africa and Asia.<sup>10,11,12</sup> It has however been found unnecessary and of no added benefit.<sup>13, 14</sup> In a study carried out in the middle-belt region of Nigeria, 90% of babies were given water and glucose drinks in the first week of life.<sup>15</sup> Prevention of thirst and diarrhoea were some of the reasons proffered for this practice.<sup>15,16</sup> Grandmothers strongly influenced mothers to give water supplementation in this study, unlike in Lesotho where grandmothers felt that giving babies water was a new practice that had been introduced by the nurses.<sup>17</sup>

Husbands and grandmothers were reported to have prevented some mothers in this study from exclusively breastfeeding their children. This is to show that spouses and grandmothers wield a strong influence on infant feeding practices and utilization of child health services. Most Nigerian maternal and child health services target mothers only and neglect extended family members who may influence the mothers' choices. It is rare to find Nigerian fathers in attendance at antenatal, postnatal or child welfare clinics. Clearly, this is an indication that health promotion strategies should target other influential members of the community.<sup>18, 19, 20, 21.</sup>

**Document Study on Vitamin A Prophylaxis Administration**

None of the patients who was seen in the 2 years preceding this study in both the private and public hospitals had any documentation of vitamin A prophylaxis administration. The doctors in the two hospitals were aware of the WHO recommendation for vitamin A prophylaxis in measles infection, but did not routinely give vitamin A prophylaxis to cases of measles they saw despite the availability of vitamin A capsules (see Box 8).

Traditional beliefs also influenced the timing of presentation to the hospital for treatment of ailments. Measles, though recognized as a potentially blinding and fatal disease, was still managed by the use of herbal and home remedies, and it was only when these appeared ineffective that mothers took their children to the hospital. Some mothers erroneously believed that measles was caused by excessive heat. Breast milk, sugar cane juice, sugar solution were sometimes instilled in the eye to treat the viral conjunctivitis associated with measles. A local dye, *uli* (indigo – obtained from the indigo plant, *Papilionaceae indigofera*) was commonly instilled into or painted around the eyes to prevent measles from affecting the eyes. Home remedies are often prepared under aseptic conditions and may be a source of infection.<sup>22</sup>

The community's belief system also affected the acceptability and utilization of immunization and other health services. This traditionally self-reliant community had a clear apathy to, and misconceptions about the free immunization services provided by the local government. Charging a minimal fee may remove apathy and enhance utilization of services. The vaccines were suspected to be poisonous and hazardous. Such misconceptions, distrust, negative beliefs and attitudes are not unique to Nigeria.<sup>23, 24, 25</sup>

Some children with sub-clinical polio had exacerbated muscle weakness following the intra-muscular injection of the DPT (diphtheria, polio, tetanus) vaccine and this was a barrier to the uptake of immunization. Some mothers even confused this with the effects of measles and said that measles disfigures or cripples children. There is therefore a need for rigorous screening to exclude ill babies from the immunization exercise, honesty and empathy when complications arise, and adequate long-term support by health workers. A more proactive and innovative approach needs to be adopted. Community outreaches, home visits and house-to-house immunization exercises should be encouraged. The help of influential members of the community should be enlisted in health programmes to increase community participation and a sense of ownership, which is crucial for the sustenance of health care programmes.

Vitamin A prophylaxis is recommended by WHO for the management of measles in areas where vitamin A deficiency has been reported.<sup>26</sup> The document study and interview with doctors revealed that vitamin A prophylaxis was not a part of their clinical protocol for the management of measles. Vitamin A prophylaxis is however given to children with measles in the tertiary hospital in the region. There is a need for the development of a standardized clinical protocol for doctors at all levels of health care. This is crucial because vitamin A deficiency is not only associated with corneal

blindness, but also has far reaching consequences for mortality.

## CONCLUSION

Understanding the beliefs and attitudes of individuals and their communities is essential if we are to bring about a change in health-seeking behaviours as proposed by the Hubley Belief Model.<sup>9</sup> Design of preventive eye health services should take the tradition and culture of the people into consideration to avoid conflicts within the community and, consequently, underutilization of services. Preventive eye health services may need to be remodelled to improve cultural sensitivity and ensure community support and participation. Maternal-child care programmes should involve fathers and grandmothers, who influence the mothers' choices and decisions greatly.

## REFERENCES

1. Ezegwui IR, Umeh RE, Ezepue UF. Causes of childhood blindness: Results from schools for the blind in south eastern Nigeria. *Br J Ophthalmol* 2003; 87: 20–23.
2. O'Sullivan J, Gilbert C, Foster A. The causes of childhood blindness in South Africa. *S Afr Med J* 1997; 87(12): 1691-5.
3. Kello AB, Gilbert C. Causes of severe visual impairment and blindness in children in schools for the blind in Ethiopia. *Br J Ophthalmol* 2003; 87(11): 1432-1436.
4. Foster A, Sommer A. Childhood blindness from corneal ulceration in Africa: Causes, prevention and treatment. *Bulletin World Health Organ* 1986; 64: 619-623.
5. Hatun S, Tesiz T, Kinak B, Cengiz AB. Vitamin A levels in children with measles in Ankara, Turkey. *Turk J Pediatr* 1995; 37(3): 193-200.
6. UNICEF. *The State of the World's Children 2009. Maternal and Newborn Health*. United Nations Children's Fund.
7. Mahalanabis D. Breastfeeding and vitamin A deficiency among children attending a diarrhoeal treatment centre in Bangladesh. *BMJ* 1991; 303(6801): 493-496.
8. Osahon AI. Consequences of traditional eye medications in UBTH Benin City. *Nig J Ophthalmol* 1995; 1: 51-54
9. Lewis K, Patel D, Yorston D, Charteris D. A qualitative study in the United Kingdom of factors influencing attendance by patients with diabetes at ophthalmic outpatient clinics. *Ophthalmic Epidemiol* 2007; 14(6): 375-380.
10. Vaahtera M, Kulmala T, Hietanen A, Ndekha M, Cullinan T, Salin ML, Ashorn P, Breastfeeding and complementary feeding practices in rural Malawi. *Acta Paediatr* 2001; 90 (3): 328-332.
11. Kulsoom U, Saeed A. Breastfeeding practices and beliefs about weaning among mothers of infants aged 0-12 months. *J Pak Med Assoc* 1997; 47(2): 54-60.

12. Agnarsson I, Mpello A, GunnLausson G, Hofvander Y, Greiner T. Infant feeding practices during the first six months of life in a rural area in Tanzania. *East Afr Med J* 2001; 78(1) 9-13.
13. Sachder HPS, Krishan J, Puri RK et al. Water supplementation in exclusively breast fed infants during summer in the tropics. *Lancet* 1991; 337(8747): 929-933.
14. Brown KH, de Kanashiro HC et al. Consumption and hydration status of exclusively breastfed infants in a warm climate. *J Paediatr* 1986; 108: 677-680.
15. Ojofeitimi EO, Olaogun AA, Osokoya AA, Owolabi SP. Infant feeding practices in a deprived environment: A concern for early introduction of water and glucose D water to neonates. *Nutr Health* 1999; 13(1): 11-21.
16. Badruddin SH, Inam SN, Ramzanali S, Hendricks K. Constraints to adoption of appropriate breastfeeding practices in a squatter settlement in Karachi *Pakistan*. *J Pak Med Assoc* 1997; 47(2): 63-68.
17. Almroth S, Mohale M, Latham MC. Unnecessary water supplementation for babies: Grandmothers blame clinics. *Acta Paediatr* 2000; 89(10): 1405-1407.
18. Kessler LA, Gielen AC, Diener-West M, Paige DM. The effect of a woman's significant other on her breastfeeding decision *J Hum Lac* 1995; 11:105-109.
19. Semega-Janneh IJ, Bohler E, Holm H, Matheson I, Holboe-Ottesen G. Promoting breastfeeding in rural Gambia: Combining traditional and modern knowledge. *Health Policy and Planning* 2001; 16(2): 199-205.
20. Arora S, McJunkin C, Wehrer J, Kuln P. Major factors influencing breastfeeding rates: Mothers' perception of fathers' attitude and milk supply. *Paediatrics* 2000; 106(15): E67.
21. McIntyre E, Hiller JE, Turnbull D. Attitudes towards infant feeding among adults in a low socio-economic community. What social support is there for breastfeeding? *Breastfeed Rev* 2001; 9(1): 13-24.
22. Yorston D, Foster A. Traditional eye medications and corneal ulcerations in Tanzania. *J Trop Med Hyg* 1994; 97: 211-214.
23. Nuwaha F, Mulindwa G, et al. Causes of low attendance at national immunisation days for polio eradication in Bushenyi District, Uganda. *Tropical Med Int Health* 2000; 5(5): 364-369.
24. Prishin R, Dyer JA, Blakely CH, Johnson CD. Immunisation status and socio-demographic characteristics: The mediating role of beliefs, attitudes and perceived control. *Am J Public Health* 1998; 88(12): 1821-1826.
25. Gore P, Madhavan S, Curry D et al. Predictors of childhood immunisation completion in a rural population. *Soc Sci Med* 1999; 48(8): 1011-1027.
26. Yorston D. Measles and childhood blindness. *Community Eye Health Journal* 1991; 8: 2 - 4 .