

Full Length Research Paper

Factors associated with disease outcome in children at Kenyatta National Hospital (KNH)

Gichobi D.^{1*}, Wanzala P.², Mutai J.² and Kamweya A.³

¹Kenyatta National Hospital (KNH), Nairobi, Kenya.

²Centre for Public Health Research (CPHR), Kenya.

³Jomo Kenyatta University of Agriculture and Technology (JKUAT), Juja, Nairobi.

Accepted 20 November, 2019

Globally, 10.5 million children die annually. Approximately 6 million of Kenya's population are under five years with a child mortality rate of 74 per 1000 live births. Children attending Kenyatta National Hospital (KNH) have preventable and treatable illnesses. The aim of the study was to assess care taker factors associated with disease outcome among children at KNH. A cross sectional study was conducted; questionnaires were administered to the caretakers of the 156 children recruited in the study. Data entry was done in Microsoft Access and analyzed using statistical package for Social Science (SPSS). There was a significant association between diseases outcome and length of exclusive breast -feeding ($P < 0.025$), occupation of both fathers and mothers ($P < 0.026$ and $P < 0.001$, respectively) in the priority disease outcomes. There was a statistically significant association between duration of illness and that of seeking treatment before visiting KNH, ($P < 0.001$). Children who stayed more than 2 months before seeking health care at KNH had a 3-fold risk of becoming priority cases. Using formal education as the reference category for mother occupation, the odds of priority outcome for unemployed compared to formal education was 10.4 and informal education compared to formal education was 7.6. Caretakers delayed in seeking health care, prior to admission. Results from this study suggest that occupation of parents was a major determinant in regard to disease outcome. Communities need to be empowered to obtain and access basic health care services. More studies need to be done to identify specific caretaker factors associated with childhood illnesses. This will enable to evaluate further the possible interventions in the health care delivery among children. A longitudinal study is crucial to follow up children post admission addressing specific illnesses. Occupation of parents, occupation of parents and length of exclusive breast-feeding was a major determinant in regard to disease category.

Key words: Disease outcome, cross sectional, priority, emergency category.

INTRODUCTION

Globally, about 51 million people of all ages die annually. Approximately 3/4 of them are adults, 39 million and 12 million occurs in the developing and developed world, respectively. Almost 4 million of the child deaths in 2000 occurred in the neonatal period. Seven out of ten deaths are attributed to pneumonia, diarrhea, measles, malaria and malnutrition (WHO, 2003).

Tuberculosis, maternal, perinatal and neonatal conditions accounted for about 20 million lives (WHO, 2000).

In 2006, among the major communicable diseases, tuberculosis was responsible for more than 5% of the total global deaths (UNICEF, 2004 and UNAIDS, 2006). Much of the Middle East, Northern Africa, Latin America, Caribbean, East Asia and the Pacific are on track to reach the Millennium Development Goal 4 (MDG 4). Annually an estimated 11 million children under 5 years die in the world including 4.6 million in Sub-Saharan Africa (SSA). Globally, about 30,000 children die every day before they reach their fifth birthday. In 2000, child mortality was a problem in SSA (UNAIDS, 2006).

In Kenya the childhood illnesses accounted for 70% of outpatient morbidity among children (WHO, 2000). These

*Corresponding author: E-mail: gidennis@yahoo.com.

conditions disproportionately affected mainly the poor in the developing countries (Caulfield and Black, 2002). At the same time in 2000, socioeconomic inequalities in child health appeared to be widening (Wagstaff, 2000). In Kenya, child mortality rate (CMR) was 74 per 1000 live births (UNICEF, 2004).

In 2004, the least developed countries had a rate of 158 deaths per 1,000 births (UNICEF, 2004). In 2006, approximately 6 million of the Kenya's populations were children and the CMR was 74 per 1000 live births. A total of 9,656 children were admitted at KNH in 2007. Out of the 57,106 out-patients, those who had died elsewhere were 937 and 151 died at the casualty department with a CMR of 13.8% (KNH, 2007). In this study emergency and priority (outcome variables) were classified according to the WHO Emergency Triage and Treatment (ETAT) guidelines.

Statement of the problem

Low socioeconomic status contributes to poor access to health care facilities. Many caretakers wait for long from the onset of illness before they seek health care services. A lot of time is wasted by caretakers as they consulted other health care providers before coming to Kenya National Hospital for treatment. At the service level, poor access and use of health services causes the largest proportion of preventable deaths. Generally, household interventions are the first source of healthcare. When this care moves out of the home, private chemists, clinics and health facilities are used more in contrast to public health facilities.

Justification

This study shed more light about disease outcome and suggests practical solutions towards reducing childhood illnesses and contributes to the improvement of the quality and care among children. Various studies from developing countries have reported that delay in seeking health care contribute to poor disease outcome. Data about disease outcomes should provide a base upon which interventions and strategies can be built. This study established important parameters that can be used in planning for health care especially in resource limited settings. The results from this study can be used for future studies to enable health care providers and policy makers to make informed decisions in formulating appropriate health care policies.

General objective

To investigate caretaker factors associated with disease outcomes among children at KNH.

Specific objectives

- i. To assess socio economic and demographic factors among the patient's caretakers.
- ii. To determine disease outcomes classification among children admitted at KNH.
- iii. To determine the relationship between socio economic, demographic factors and disease outcomes among children admitted at KNH.

Literature review

Children are dependent by nature in seeking health care. Children below two months of age are vulnerable as the severity of their illnesses is underestimated by their caretakers and die before appropriate care is sought (Amarasiri et al., 2001). Preventive factors are parental and dietary care, such as adequate breastfeeding leading to good nutrition. Exclusive breastfeeding from birth to the first 6 months provide the required nutrients and reduce infant mortality from infectious diseases and malnutrition (Caulfield and Black, 2002). Past experiences with similar childhood illnesses motivate a mother to play a waiting game to see if an illness can subside on its own, particularly in situations where the cost of care is a barrier to seeking health care (D' Souza, 2003).

In Western Nepal, it was found that medical shops and traditional healers were common sources of medical care (Goldman et al., 2002). Some illnesses are categorized as 'not for-hospital'. Most mothers waited up to three days before taking action for malaria, diarrhea, ARI and related conditions. They waited longer for conditions such as tuberculosis, yellow fever and malnutrition (Nyamongo, 2002). Some studies have shown that perceived illness severity, maternal recognition of certain signs and symptoms of childhood illness were critical factors that determined whether the child illness was categorized as a priority or as an emergency (Thind and Cruz, 2003). Family members are more likely to seek treatment from a health provider when a child experience fever and gastro intestinal symptoms such as vomiting or diarrhea as compared with respiratory symptoms. This was despite the fact that the symptoms were serious (Goldman et al., 2002).

Maternal education is no longer a significant factor in the control of the mother's childhood endowments but KDHS study revealed a significant association. Mother's education was a more decisive determinant of child survival than husband's occupation and education (KDHS, 2003). According to KDHS (2003) the length of birth interval had a significant impact on a child's chances of survival, with short birth intervals considerably reducing the chances of survival. Children born less than two years after a prior sibling suffer substantially higher risks of death than children born after intervals of two or

more years.

Mother's income contributes to a decrease in child mortality though what matters is the degree of the woman's control over the use. Women in urban settings exerted little control over household financial resources and received insufficient antenatal care (Beegle et al., 2001).

MATERIALS AND METHODS

The study area

The study was carried out at KNH paediatrics medical wards in Nairobi, Kenya.

Study design

A cross-sectional study design.

Study population

Children under five years old and their caretakers/guardians at Kenyatta National Hospital paediatric medical wards.

Sample size was 153

In 2007 the admitted patients in KNH were 9,656. Using the Fisher's exact test (Fishers et al., 1998), the minimum sample size was determined to be 153.

The formula for sample size determination was $n = Z^2 p Q / d^2$,

Where:

n = Required sample size

Q = $1 - p$

Z = Confidence level at 95% (standard value of 1.96)

p = Estimated prevalence of under five mortality in Kenya 11.5% (KDHS, 2003)

d = Level of precision at 5% (standard value of 0.05).

$n = 1.96^2 \times 0.115 \times (1 - 0.115) = 156$

$$\frac{0.05^2}{}$$

Since the study population is 10,000 finite population correction factor was used with an assumed study population of 9,656. The actual sample size was, $n_f = \frac{Nn}{N + (n - 1)}$

$$9656 \times 156 / 9656 + (156 - 1) = 153$$

Inclusion criteria

All children under five years old and their guardians/parents on admission.

Exclusion criteria

- i. Surgical or sick children with chronic illness.
- ii. Refusal to give informed consent.

iii. Unaccompanied and/or abandoned children.

iv. Patients with critical care needs until they were stabilized.

v. Children from home admitted before twenty four hours post delivery.

Sampling method

Subjects were selected on a systematic random sampling basis. A sampling frame was developed and divided the target population list into twelve months.

Ethical considerations

Data collection emphasized on issues of confidentiality by restricted access to the information collected and coding of questionnaires. Approval was sought from KEMRI Scientific Steering Committee and Ethical Review Committee for Scientific and Ethical issues.

Data collection

Semi-structured questionnaires and clinical assessment sheet.

Data cleaning and analysis

Logistic regression was done, multiple variables hypothesized to explain ETAT disease outcome classification after a clinical assessment. Backward conditional method was used to establish true predictors. The predictors of disease outcome were estimated by the calculation of Odds Ratios (OR), 95% Confidence Interval (CI) and a P value < 0.05 was considered as significant.

RESULTS

Regression analysis

After successful iterations, mother's occupation, length of exclusive breast-feeding and duration of illness emerged to be the true predictors of disease outcome. The resulting model is tabulated below;

Code definition

Dependent variable: Disease outcome (0 = Emergency, 1 = Priority) independent variables:

- i. Mother occupation (1 = Unemployed, 2 = Informal, 3 = Formal (reference category))
- ii. Length of exclusive breast feeding (0= Less than 4 months, 1= More or equal to 4 months)
- iii. Duration of illness (0 = Less than 2 months, 1= More or equal to 2 months)

Table 1 shows odds ratio for each of the predictors. Exclusive breast-feeding emerged to impact significantly on disease outcome. Children that were not breast-fed exclusively for more than 4 months had a 3-fold risk of

Table 1. Logistic regression predicting mother's occupation, length of exclusive breast feeding and duration of illness by disease outcome of 156 children admitted at Kenyatta National Hospital Pediatric medical wards, 2008.

Independent predictors	P value	Odds ratio	95% C. I. for Odds ratio	
			Lower	Upper
Mother's occupation				
Unemployed	<0.001	10.4	3.9	27.9
Informal	<0.001	7.6	2.4	23.4
Length of exclusive breast feeding (months)	0.006	3.1	1.4	7.1
Duration of illness (days)	0.012	3.09	1.34	7.14

being a priority case. With regard to duration of illness, children who stayed more than 2 month before seeking health care at KNH had a 3- fold risk of becoming priority cases. The same scenario was seen with respect to employment status. Using formal employment as the reference category for mother occupation, the odds of priority outcome for unemployed compared to formal was 10.4 and for informal employment compared to formal was 7.6.

DISCUSSION

Majority of the mothers were aged between 20 to 30 years and sought health care services in other institutions before attending KNH. In Malawi, Kandala et al., (2006) revealed that children born to younger mothers of 20 years were found to have a relatively high risk of morbidity. A large proportion of the mothers were married and belonged to low socio economic class, unemployed 49.4% against 28.6% in the formal employment. A study in Malawi found no relationship between the age of a mother and the risk of diarrhea, cough and fever in young children (Kandala et al., 2006). Mothers and fathers had a mean age of 26 to 28.8 years, respectively, both in emergency and priority disease outcomes. This differs with KDHS results as subjects from this study were from a unique population of sick children.

Majority of mothers had part primary education both in emergency and priority cases. Educated mothers have more income for treatment of illnesses so they waited for the illness to subside (Pillai et al., 2003). Only 16.9% of the mothers completed secondary education and above while 42.7% of the fathers attained the same. Mother's education was a determinant of child survival (KDHS, 2003). Mothers comprised the majority 132 (84.6%) and fathers 13 (8.3%). This probably reflects the fact that unemployment and homemaking were more prevalent in the mothers compared to fathers. As a result more mothers were available to bring their children to hospital.

In this study the mean ages for male children was 14 months while females had 10 months. There was a significant association between length of exclusive breast feeding and disease outcome. After 8 to 10 months of life

when a child had developed immunity, a child's age had little effect on the risk of morbidity (English et al., 2004). The rapid deterioration seen in the health of children in their first 8 months of life was unexpected and probably reflected the common, rapid replacement of breast milk with poor quality food and water and a general lack of immunity to the pathogens causing the morbidity (Kandala et al., 2006). In a Nigerian study, unlike the findings from a related Kenyan survey, children aged 1 to 2 years appeared most vulnerable to diarrhea, cough and fever (Magadi et al., 2000).

This study showed that, childhood immunization was not directly a factor associated with disease outcome. Theoretically childhood vaccines do prevent common childhood diseases. Children's age and feeding practices had a significant impact on outcome of diarrhea and respiratory diseases among children in Kenya (WHO, 2002).

There was a significant association between duration of illness and duration of seeking treatment before visiting KNH ($r = 0.80$, $P < 0.05$).

Majority of caretakers 39.7% attended other hospital/ health centres before attending KNH. Nyamongo (2002) hospital costs determined where caretakers would take their children when sick. Distance from home to the health facility had a significant impact on the use of health care services and the resulting disease outcomes (Nyamongo, 2002). In this study the mean time duration of seeking treatment before attending KNH was 6 and 4 days for emergency and priority disease outcomes respectively.

Conclusion

1. This study revealed the importance of caretakers' socio economic status, mother's breastfeeding practices and health care seeking behavior in predisposing children to illnesses.
2. Findings obtained in the present study showed factors associated with disease outcome as length of exclusive breast feeding, duration of illness and mother's occupation.
3. The mean duration of seeking treatment before

attending KNH was 6 and 4 days in emergency and priority disease outcome respectively.

4. Findings from this study showed some weaknesses in the health seeking behavior of the study population. Although mothers generally recognized the symptoms of childhood illness, a large proportion of them did not seek appropriate and prompt care.

RECOMMENDATION

1. There is need to have an effective and functioning referral system in the health care delivery system to ensure children are attended promptly in health facilities at the onset of any illness.
2. Mass communication and vigorous campaign for the population on seeking treatment early in recognized health care institutions. Health education on exclusive breastfeeding practices among mothers to promote children's health.
3. Socio-economic development of the urban community through income generating can reduce poverty levels hence improve healthcare seeking behavior during the childhood illness.
4. Further studies should be carried out to address access and utilization of health care, water sanitation, hygiene, use of herbal remedies and their implications.
5. Scope for further longitudinal study design to address specific management of childhood illness.

REFERENCES

- Amarasiri de M, Wijekoon A, Hornik R, Martines J (2001). Care seeking in Sri Lanka. One possible explanation for low childhood mortality. *Soc. Sci. Med.*, 53: 1363-1372.
- Beegle K, Frankenberg E, Thomas D (2001). Bargaining power within couples and use of prenatal and delivery care in Indonesia. *Stud. Fam. Planning*, 32: 130-146.
- Caulfield L, Black R (2002). Malnutrition and the global burden of disease. Underweight and cause-specific mortality. Geneva, Switzerland.
- Goldman N, Pebley A, Gragnolati M (2002). Choices about treatment for ARI and diarrhea in rural Guatemala. *Soc. Sci. Med. J.*, 55: 1693-1712.
- Kandala NB, Magadi MA, Madise NJ (2006). An investigation of district spatial variations of childhood diarrhea and fever morbidity in Malawi. *Soc. Sci. Med.*, 62: 1138-1152.
- Kenya Demographic Health Survey (2003). Key findings. Calverton, Maryland, USA.
- Kenyatta National Hospital (2007). Central Medical Records Nairobi, Kenya.
- Magadi M, Diamond I, Nyovani M, Smith P (2004). Pathways of the determinants of unfavorable birth outcomes in Kenya. *J. Biosocial. Sci.*, 36: 153-176.
- Nyamongo I (2002). Health care switching behaviour of malaria patients in a Kenyan rural community. *Soc. Sci. Med.*, 54: 377-386.
- Thind A, Cruz M (2003). Determinants of children's health service utilization in the Philippines. *J. Trop. Pediat.*, 49: 260-273.
- UNAIDS (2006). Report on the global AIDS epidemic in children. New York, USA.
- UNICEF (2004). Community IMCI. A strategy for accelerating child survival and development interventions. Discussion paper. New York, UNICEF.
- World Health Organization (2003). Handbook. Integrated management of childhood illness (IMCI). Geneva, World Health Assembly.