

*Full Length Research Paper*

## Prevalence of common childhood illnesses and immunization status in infants and young children in two districts of Zambia

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**Scaling-up the Integrated Management of Childhood Illnesses (IMCI) strategy, Expanded Programme of Immunization (EPI) and improved infant feeding practices have contributed to a decline in child mortality in Zambia. Despite this progress, documentation on EPI and common childhood illnesses that are addressed in IMCI in the two districts where the study was conducted are scanty. The report below highlights findings on immunization and health status of children aged from birth-23 in two districts of Zambia, Kafue and Mazabuka. A cross-sectional study was conducted among 634 caretakers of children. Proportions were compared using the Chi-squared test at the 5% significance level. A total of 634 caretakers of children less than 2 years (from birth 23 months) were interviewed: 270 from Mazabuka and 364 from Kafue. The commonest symptoms reported in Mazabuka and Kafue were diarrhoea (50.6 vs. 37.7%), fever (48.2 vs. 33.1%), and cough (45.0 vs. 48.2%), respectively. Majority (95.4% in Mazabuka and 91.0% in Kafue) were reported sleeping with the children under the ITNs. From the cards, 70.9% of the children had received all the vaccines. Majority of children were not malnourished. Thirty percent were exclusively breastfed up to six months. This study showed a high prevalence of diarrhoea, fever and pneumonia. These common causes of illnesses in children in the two districts are those addressed in the IMCI strategy. Access to at least one vaccine was found to be optimal, but continuous utilisation for the national immunization schedule fell below the national targets and this gap needs to be addressed.**

**Key words:** Diarrhoea, pneumonia, malaria, Integrated Management of Childhood Illnesses (IMCI) strategy, immunization.

### INTRODUCTION

#### Common childhood illnesses

1. Diarrhoea, pneumonia and malaria, are the most

common childhood illnesses in Zambia. They are the leading causes of morbidity and mortality in children less than 5 years of age in the country including Kafue district

(Lusaka Province) and Mazabuka district (Southern Province) where the study was undertaken (Central Statistics Office 2003; CSO 2009). In general, prevalence of diarrhoea in Zambia is higher in urban areas than in rural areas, and conversely, higher in areas with improved water (18%) than those with unimproved water source (14%) (Central Statistics Office 2003). Both districts are predominantly rural. Among the under-five years, the rate of diarrhoea in Lusaka and Southern Provinces was 25 and 24%, respectively (Central Statistics Office 2003). Fever prevalence was 35 and 41.2% in Lusaka and Southern Provinces, respectively. Acute respiratory tract infection accounted for 15.8 and 14.6% in Lusaka and Southern Provinces, respectively. Effective and integrated case management of childhood illnesses (diarrhoea, dysentery, pneumonia, malaria, and neonatal sepsis) saves 3.2 million children each year (33% of total deaths) (Jones et al., 2003). Case management is part of the Integrated Management of Childhood Illness (IMCI) strategy and includes preventive interventions such as breastfeeding promotion and immunizations. The IMCI strategy was adopted in 1995 in Zambia, and has contributed towards the reduction of morbidity and mortality of children under-five years of age. The three components of the IMCI strategy should be implemented simultaneously, for the most effective result. The most promising interventions may be delivered at household level, with limited need for external material inputs. These include promotion of breastfeeding, oral rehydration therapy, education on complementary feeding, use of insecticide-treated nets (ITNs), growth monitoring and promotion with other added services like improved hygiene and family planning. They have shown a positive effect on some health indicators in the intervention areas as compared to the non-intervention areas (JICA 2007).

It is worth noting that in some societies there is emphasis on feeding a child who has diarrhoea and special efforts are made to feed a child with diarrhoea even at community level (Almroth et al., 1997).

## Immunization

Zambia was certified Polio-free in 2004. The country received the 2003 Task Force on Immunization (TFI) award for the nation-wide under 15 measles campaign, and has maintained high immunization coverage. Despite all this achievement, there are pockets of unreached children in both the urban and rural areas. The fully immunized coverage for Lusaka and Southern Provinces were 78.3 and 77.4%, respectively when compared with

the national figure of 70% (Central Statistics Office 2003). Immunization coverage increased with the mother's level of education from 58% among children whose mothers' had no education to 76% for mothers with secondary education (Central Statistics Office 2003). Shortage of staff and heavy workload at health centres constrains delivery of health services, including immunization (Ministry of Health Zambia Annual Report 2012; Annual Report 2013). In addition to limited funding, seasonal, and geographical barriers have resulted in a decrease in the outreach activities (Annual Report 2013; Alleviating System Wide Barriers to Immunization 2004). Other problems identified mainly surrounded introduction of new technology such as the use of auto-disabled syringes, open vial policy and the change from a "supermarket" approach to scheduled vaccination days and outreach services (Annual Report 2013).

To further understand the problems highlighted earlier, the baseline study was conducted in the two districts of Zambia to primarily collect information on the feeding practices, nutritional status and in addition, evaluate the health and immunization status of children from birth, 23 months. This paper focused its discussions on the prevalence of common childhood illnesses and the immunization status of the children included in the study.

## METHODOLOGY

### Study design

The study was conducted between January and March, 2006 in Kafue and Mazabuka districts which are predominantly rural. It was a cross-section study. A questionnaire was administered to the mothers and closest caregivers of children aged from birth 23 months by 22 trained and locally recruited research assistants who were supervised by 11 health workers experienced in the IMCI and EPI programmes. The questionnaire was pre-tested a week prior to the study. It collected information on the general characteristics of the participants and their children, knowledge, attitude and practices on early initiation of breastfeeding, colostrum, exclusive breastfeeding for up to 6 months, introduction of complementary foods and types of complementary feeds, breastfeeding problems and how they are addressed and support for breastfeeding.

### Inclusion criteria

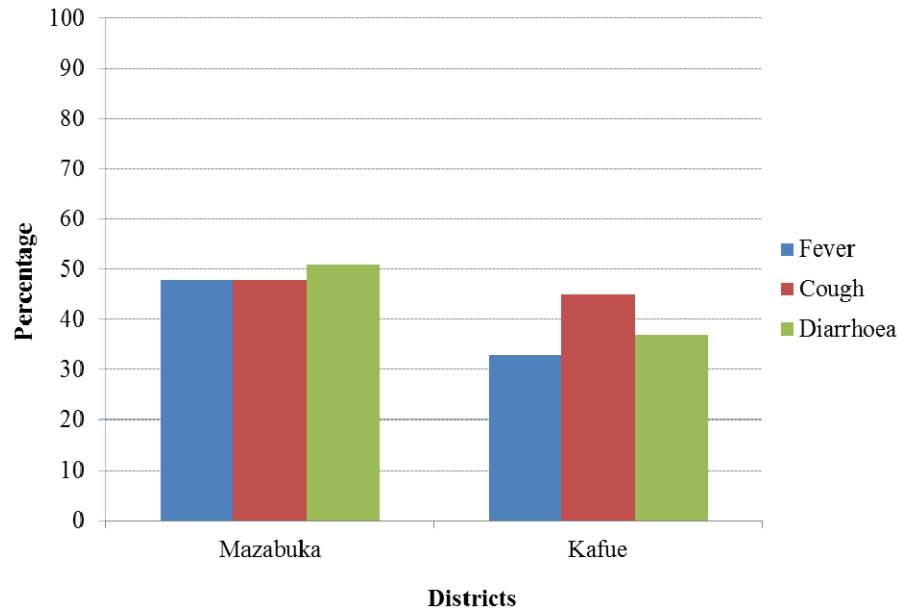
For this study, all sampled households with a child less than 2 years were present at the time of the study.

### Exclusion criteria

Sampled households with a child more than 2 years or households with no child were present at the time of visit by research assistants.

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**Figure 1.** Distribution of common symptoms in preceding 2 weeks.

### Sample size and sampling

The sample size was determined using the national prevalence of exclusive breastfeeding rate of 40% (Central Statistics Office 2003), at a confidence level of 95%, and considering a response rate of 90%, the minimum required sample size was 450, but the questionnaire was administered to 634 caretakers (270 from Mazabuka and 364 from Kafue). Participants were conveniently sampled in rural areas and randomly selected in the urban areas. This was because rural areas had scattered households over large hard-to-reach geographical areas.

### Data management and analysis

Microsoft Excel and SPSS were used for data entry and analysis. Quality control audits of all data in the database were made after entering data from each field exercise. The outcomes on prevalence of diarrhoea, cough, fever and immunization status were assessed. Chi-square test was used to compare proportions between districts at the 5% significance level.

### Ethics

The study received clearance from the University of Zambia Research Ethics Committee and the Ministry of Health through the district health management teams in Kafue and Mazabuka. Individual informed consent was obtained from all participants of the study before any instrument was administered to them.

## RESULTS

### Demographic information

Majority of interviewees (634) were the mothers of the children assessed (98.2% in Mazabuka and 98.9% in

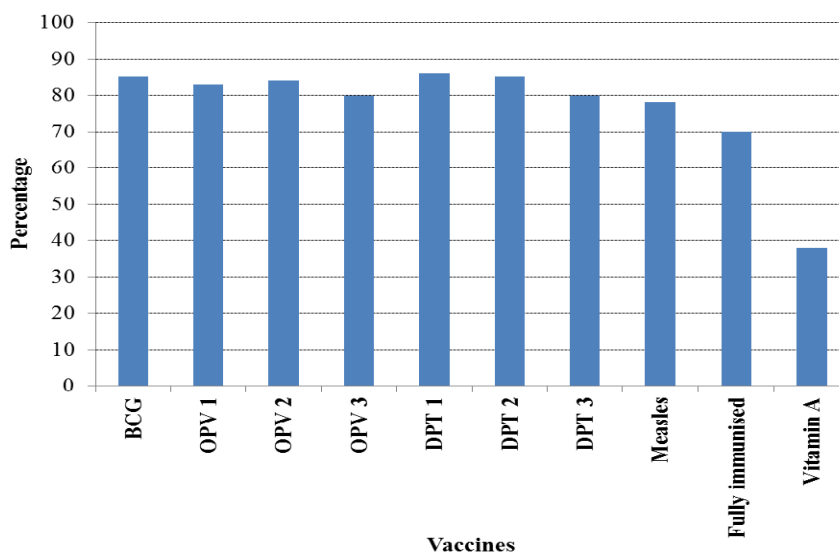
Kafue). Of the respondents, 81.8% in Mazabuka and 86.3% in Kafue were married. In both districts, majority of the caretakers attained primary education level (55.8% in Mazabuka and 77.2% in Kafue). Educational level of the caretaker was significantly higher in Mazabuka than Kafue ( $p < 0.001$ ). About half (54.6%) of the children seen in Mazabuka and 60.9% of the children seen in Kafue were infants. There was a slight male predominance (53.5% in Mazabuka and 51.2% in Kafue) amongst the children in both districts.

### Common childhood illnesses

There were significantly more children with reported illness in the preceding two weeks in Mazabuka as compared with Kafue ( $p = 0.054$ ). Majority (more than 94.5% in both districts) of the respondents with a sick child sought help from health workers. In Mazabuka, the commonest symptom reported was diarrhoea, followed by fever and cough. In Kafue on the other hand, cough was the most common symptom reported followed by diarrhoea and fever (Figure 1).

There were significantly more people in Kafue who had insecticide treated nets (ITNs) for protection against malaria than in Mazabuka ( $p < 0.001$ ). Of those who had ITNs, at least 90% in each of the districts were reported sleeping under them with the children.

The households visited in Mazabuka had significantly higher ( $p < 0.001$ ) safe water supply as compared to their compatriots in Kafue. Majority (59%) in Mazabuka had protected water source from a tap outside their home and paid for it on a regular basis. In Kafue, a significant



**Figure 2.** Vaccination coverage rates for the different antigens.

proportion (36%) of households used pump or borehole water.

Most (69%) of the household visited in both districts used pit latrines to dispose of their excreta. Most of the toilets were found to be clean: with no visible faeces when visited by the interviewers.

### Immunization status

There was no significant difference between the two districts in terms of the immunization status of the children ( $p=0.793$ ) (Figure 2). About 83% of caretakers in both districts availed their children's under-five cards to the researchers. Only 68% in both districts had birth weights recorded on the under five card. Of the cards seen, 97% had at least one vaccine recorded. Ninety percent of eligible children had Diphtheria Pertussis Tetanus – Haemophilus influenza b 1 (DPT-Hib 1) vaccine while 78.7% had DPT-Hib 3 recorded on the cards. Likewise 76.9% of the eligible children had measles vaccine indicated on the cards. The drop-out rate between DPT-Hib-1 and DPT-Hib-3 was 11.7%. Seventy-one percent of the children had received all the vaccines on the EPI schedule. The cards reviewed did not indicate OPV0.

## DISCUSSION

### Common childhood illnesses

This study demonstrates a high prevalence of diarrhoea, fever and pneumonia. Majority of the caretakers sought

care from a health worker. These findings corroborate with the national health statistics on incidence of common diseases in children less than five years: malaria (1,108 per 1,000 population); respiratory infection non-pneumonia (469 per 1000 population); diarrhoea: non bloody (258 per 1,000 population); and respiratory infection: pneumonia (132 per 1,000 population) (Central Board of Health 2003). The high prevalence of diarrhoea, pneumonia and fever underscores the continued need for expanding the coverage and saturation of the IMCI strategy, which addresses the management of common childhood illnesses (World Health Organization 1997). For improved quality of health care of the sick child it is important to invest in building capacities at community and health facility level to implement the IMCI strategy optimally (WHO 2012; WHO 2010; Bryce et al., 2003).

It has been estimated that the use of ITNs can prevent seven percent of under-five mortality (Gareth et al., 2003). In this study, the ITN utilisation was higher than the national target of 90%. Although the ITN coverage was below the national target of universal coverage (100%), it is encouraging that the reported ownership is close to the national target (National Malaria Strategic Plan 2005-2010 2005; National Malaria Strategic Plan 2011-2015 2011). The efforts by these two districts should be sustained to assure impact on malaria, which afflicts populations particularly in rural areas.

The fact that most respondents had protected water source and toilet facilities within the compounds and clean housing compounds, the high prevalence of diarrhoea and pneumonia points to the need to conduct further studies to gain insight into specific causes of diarrhoea and pneumonia in these communities. The treatment interventions that have sufficient evidence on

the causal relationship with cause-specific mortality among children less than five years are: oral rehydration therapy for treating diarrhoea, antibiotics in the treatment of pneumonia, anti-malarial in the treatment of malaria, and vitamin A as an integral part of managing patients with measles.

The districts studied here are predominantly rural with challenges in accessing health care services. In the Lancet series on childhood survival, it was highlighted that despite the available evidence, knowledge and instruments to deliver these life-saving interventions, children continue to die because these interventions are not reaching them, especially in resource-poor settings (Black et al., 2003). Poor children are far less likely to receive these interventions as compared to their counterparts who live in communities or countries with more resources (Victora et al., 2003; Bellagio Study Group on Child Survival 2003). The finding is not unique to the two districts as it has been previously reported in the country (Central Statistics Office 2003; CSO 2009).

### **Immunization status**

The coverage of fully immunised children in both districts was below the national target of 80% with a significant drop-out rate (12%) which was higher than the recommended less than 10% (Zambia Programme on Immunization Multiyear Plan, 2006-2010 2005). The 'dropout' rate is the difference between number of children who received DPT1 and those that received DPT3 and is a measure of utilisation of health care services. The major contributing factor was the abandonment in 2005 of the "supermarket" approach and adoption of scheduled immunization days to minimize wastage of the more expensive penta-valent vaccines (DPT-Hib-Hep) which came in vials of 10 doses. The high rate of DPT1 (>90%) in the two districts is an indication that access to immunization services is not a challenge. In addition, access to health services in general is not a challenge as attested by the fact that the first antenatal care (ANC) visit is over 90% (Central Statistics Office 2003; CSO 2009). The challenge remains on the timely and continued utilisation of health services including immunization. Some of the barriers identified in this study include the following: sessions are held at a time not convenient for caretakers, lack of accurate information about immunization services, long waiting time, and competing priorities such as seasonal farming. Social, cultural or political barriers especially among migrants or refugees or illegal settlers who try to avoid the public authority also contribute to an increase in the drop-out rate. Knowledge also plays a role in making use of the appropriate health-care services like immunization as demonstrated by a study in India where 30% of the mothers who had not immunized their children did not know that immunization was important for the children

and a further 33%, did not know where to go for the vaccination (Schellenberg et al., 2003). The Reaching Every District (RED) strategy that was adopted by the country in 2003 as an effective approach to reach the un-reached and the missed opportunities. Evidence from ten pilot districts showed that the RED strategy improved coverage and reduced dropout and therefore was scaled-up nationally (Zambia Programme on Immunization Multiyear Plan, 2006-2010 2005).

The majority interviewed, in this study, were able to show their under-five card (UFC) or mother's delivery card or book with details about the child's birth and immunizations received. Of those who did not have a card, majority had their cards kept at the health facilities where they use the UFC. The card provides an opportunity for storage of vital health information. The health facility kept the children's cards until the child had received all vaccines before handing it over to the mother, usually when the child was 9 months. Most of the children whose under five cards were seen (92.4% in Mazabuka and 90.6% in Kafue) had received BCG vaccination and this was above the national average. The high BCG coverage is due to the fact that the vaccine is given to the newborn before the mother and baby are discharged from the maternity facilities. The national policy for administration of OPV0 is at birth up to 13 days of life and is commonly given at birth together with BCG. From this practice one would expect that the coverage for these two antigens would be the same, yet this has not been the case. The national OPV0 coverage is less than the BCG coverage. At the time of the study, OPV0 was not reflected on the children's card and as such we cannot make comparison between BCG and OPV0 coverages.

### **Conclusion**

This study showed a high prevalence of diarrhoea, fever and pneumonia. These common causes of illnesses in children in the two districts are those addressed in the IMCI strategy. Access to at least one vaccine was found to be optimal, but continuous utilisation for the national immunization schedule fell below the national targets and this gap needs to be addressed.

### **LIMITATIONS OF THE STUDY**

Health workers do not always record vaccines given in the under-five card, especially those given during the child health week. For the study purpose, we only included documented vaccinations from the UFC. Some health facilities kept the UFC and as such they were not seen during the survey. The cards were kept at the health centre until the children had received all the immunization. The card is then handed back to the caretaker.

## RECOMMENDATIONS

Investing in scaling up the IMCI strategy will contribute significantly to addressing the common childhood illnesses in the two districts. There is need for further documenting or conducting an operational research to find the reason behind the high drop-out rate and decline in utilisation of immunization services so that appropriate interventions can be implemented.

## COMPETING INTERESTS

The authors have no competing interests.

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## Abbreviations

**ANC**, Antenatal care; **CSO**, central statistics office; **EPI**, expanded programme on immunization; **FGD**, focus group discussion; **IMCI**, integrated management of childhood illnesses; **ITNs**, insecticide-treated nets; **RED**, reaching every district; **TFI**, task force on immunization; **UFC**, under-five card.

## Conflict of Interests

The author(s) have not declared any conflict of interests.

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