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Healthcare Practices by Mothers in the Limpopo Province of South Africa: Modeling the Case of the Mopani District

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ABSTRACT Child morbidity is high in some parts of South Africa though there are a lot of interventions available to reduce childhood mortality. Some mothers lack knowledge about these interventions and this increases maternal and childhood mortality. This study seeks to determine the level of knowledge and practice mothers in Mopani have about child healthcare practices, and to model the determinants. A 3-stage sample survey, including stratified random sampling, was conducted covering all the municipalities in the district. About 1820 women in the child-bearing age (that is, 13 to 49 years) were sampled and interviewed using structured questionnaires. Chi-square tests were carried out on categorical variables, and logistic and multiple regression analyses were performed for confirmations. From statistical analyses (catreg, logistic and multiple regressions) the study concludes that the following variables correlate with practices of child healthcare in the district: age, education, employment and the number of children a woman has. For the improvement of child health and survival, the study recommends primary healthcare education, immunization, oral rehydration therapy and prenatal medical check-ups.

INTRODUCTION

Child morbidity and mortality rates are still high in some parts of South Africa. Infectious diseases that ravage newborn babies and very young children can be effectively prevented or treated if proper healthcare practices are put in place. Prenatal medical check-up is a key to protecting the health of the unborn child and the mother. Many child-related abnormalities and diseases that could affect the health of the unborn baby and the mother could be identified during prenatal consultations and thereby treated. This can help keep a baby healthy and prevent problems during and after delivery (The News 2011; UNICEF 2014).

Many childhood diseases are preventable if proper immunization is provided (CDC 2009). Children who are not immunized are at high risk of becoming infected with many preventable diseases (Department of Health (DoH) 2004; Freemster et al. 2009; WHO 2009, 2011). Access to prenatal medical care is critical for reducing maternal and infant morbidity and mortality (UNICEF South Africa 2008).

This study investigates childcare practices in the Mopani district in the Limpopo province. The main aim is to identify types of health practices that women, especially mothers in Mopani know about and practice. In other words, the study seeks to get answers to the following research questions:

- Do mothers in the district breastfeed their babies for a considerable long period, say two years?
- Do they give their children the full immunization coverage needed?
- Do they know and practice oral rehydration therapy (ORT) when needed?
- Do they attend antenatal clinics?
- Do they deliver their babies in clinics or hospitals with professional health workers in attendance?

Positive answers to these questions will demonstrate that the mothers have high or sufficient knowledge about primary healthcare and practice accordingly.

Literature Review

There is a substantial amount of literature on maternal and childhood mortality for the African continent. Garenne and Gakusi (2005) used samples of demographic surveys spanning from 1990 to 2005 from 33 sub-Saharan countries in Africa. They conducted a trend analysis of under-five mortality and concluded that the decline in childhood mortality was merely 1.7 percent per year for that period. Nannan et al. (2012) used vital registration, census and survey data from Statistics South Africa to estimate the trend of childhood mortality rates from1997 to 2007. According to them, the mortality rates declined slightly during the period. They got, approxi-

mately, an infant mortality of 50 per 1000, child mortality of 30 and under-five mortality of 72 per 1000 in 2007. Kyei and Igumbor (2013) used the ten percent sample of 2001 South African census to estimate childhood mortality rates. Their estimates were 68, 36 and 101 per 1000 respectively for infant, child and under-five mortality. For maternal mortality, the rate declined from 189.5 per 100,000 to 132.9 per 100,000 between 2009 and 2013 (Cullinan 2013). Cullinan (2013) further states that only a third of pregnant women had antenatal check-ups by 20 weeks into the pregnancy in some municipalities in Eastern Cape and Johannesburg. Kyei et al. (2014) found out that 58.4 percent of pregnant women in the Vhembe district went for antenatal check-ups when they were 4 to 12 weeks pregnant, 26.8 percent went when there were 13 to 24 weeks, and 14.8 percent went when they were 25 to 36 weeks. They further saw that the teenage girls were the majority that went for check-ups late, during 25 to 36 weeks' period.

METHODOLOGY

Materials and Data

The data used was obtained through a survey conducted in six locations in the Mopani district from September 2011 and August 2012. A 3-stage sampling including stratified random sampling of municipalities and households/ dwelling units were carried out to choose the sample. The first stage was stratification to get all the municipalities in the district represented. Within a given municipality, random sampling was done to get a town or village and once a village or town is selected, systematic sampling was performed to get the households/dwelling units. Childbearing women in the sampled households were interviewed. A total of 1820 women aged between 13 and 50 years were interviewed using a structured questionnaire.

Methods and Analysis

There were four dependent variables considered in this analysis, namely, the time for starting prenatal medical check-up during pregnancy, knowledge of oral rehydration therapy (ORT), the duration of breastfeeding, and hospital visit when the child is sick. [Firstly, a chi-square test was done on the categorical data taking the dependent variable as whether or not a woman/ mother knows about primary healthcare. These four variables were among the factors that had strong relationships with the dependent variable, and that was why they were taken.] There were five independent variables as well, namely, age, the level of education, employment status, the number of children that a woman has, and the marital status of the woman. The two categorical variables, that is, knowledge of ORT and children taken to hospital when ill, were analyzed first by cross tabulation before the Logistic and Multiple regression (ordinary least squares) analyses. The interval data was analyzed by ordinary least squares method of regression.

RESULTS

Table 1 provides information on socio-demographic characteristics of the respondents. Over forty-nine percent of the 1820 women interviewed were older than 36 years, while an insignificant 2.2 percent were teenagers. Since the target was women/mothers with children, teenagers without children were eliminated even when they were in the selected households. The

Table 1: Distribution of some socio-demographic characteristics of women in the Mopani district

Variables	*(%)*
Age	
15 – 19	2.2
20 – 25	15.6
26 – 35	32.9
36+	49.3
Total	100
Mean age	34.54 years
Employment Status	
Not working	51.6
Working for self or family	43.0
Working for somebody else	5.4
Total	100
Educational Level	
Grade R to 7	2.7
Grade 8 to 11	17.7
Grade 12 to 12+	60.9
Tertiary	16.4
No schooling	2.3
Total	100
Marital Status	
Married	58.5
Cohabiting (Living together)	4.0
Widowed	4.2
Divorced	31.5
Lived together previously but no more	1.6
Total	100

elimination of teenagers without children has resulted in their under-representation. Over fifty-one percent of the respondents were unemployed (not working), five percent were working (for somebody else) and forty-three percent were self-employed. The unemployment figure of almost fifty-two percent is higher than the national average of about thirty-six percent. This is a cause for concern because it then shows that women in Mopani are more likely to be poorer than the national average. The distribution of the level of education is as follows: women who had primary education accounted for 2.7 percent, those completed grades 8 to 11 were 17.7 percent, grade 12 and other qualifications accounted for 60.9 percent, those who had tertiary qualifications were 16.4 percent, and 2.3 percent did not attend school at all. These figures show that literacy rate is high in Mopani because only an insignificant figure of 2.3 percent did not attend school. In most African countries, the literacy rate is far below fifty percent, and even in the Vhembe district, the rate is seventy-four percent (Kyei and Igumbor 2013). About 58.5 percent of the women were married, four percent were cohabiting, 1.6 percent separated, and 31.5 percent were divorced.

Table 2 gives information about women whose babies were less than 3 years old and who responded to questions about primary healthcare. Out of 515 mothers who responded to questions concerning healthcare, 87.6 percent remembered some facts about primary healthcare, 82.6 percent knew about oral rehydration therapy; seventy-eight percent reported having given birth to their last child in hospital, 21.6 percent gave birth at the clinic with the attendance of a doctor or a professional nurse, and only 0.4 percent gave birth at home or elsewhere with no professional health attendant assisting. On the average, these mothers first saw a health practitioner (a doctor or a midwife) for antenatal check-up when they were about 3.5 months pregnant and went for a further 4.7 prenatal consultations before the birth of their last child. About 60.3 percent started prenatal medical check-ups when they were 4 to 12 weeks pregnant, 33.4 percent started when they were 13 to 24 weeks pregnant, and 6.3 percent started when they were 25 to 36 weeks pregnant. These figures differ in some cases from what were obtained in the Vhembe district. In Vhembe, 58.4 percent of the pregnant women went for antenatal check-ups when they were 4 to 12 weeks pregnant, 26.8 percent went when there were 13 to 24 weeks and 14.8 percent went when they were 25 to 36 weeks (Kyei et al. 2014). About 20.8 percent of the women were breastfeeding at the time of the interview. For mothers who were no longer breastfeeding, the mean period for breastfeeding was 11.8 months, meaning that mothers do not breastfeed their babies for even a year. This is not good enough, especially for women in low socio-economic income groups who might not be able to deal with diarrhea and other infectious diseases. Breastfeeding boosts the level of immunity of children and prevents infectious diseases and should be encouraged.

Table 2: Distribution of some health indicators practised by women in Mopani

Health indicators	*(%)*
Indicators Starting Time for Pre-natal Medical Check-up During Pregnancy	
1 – 3 months	60.3
4 – 6 months	33.4
7 – 9 months	6.3
Total	100
Place of Birth of the Last Child (Aged Less Than 5 Years)	
Hospital	78.0
Clinic	21.6
Home	0.2
Other	0.2
Total	100
Breastfeeding	
Yes	20.8
No	79.2
Total	100
Mean duration of breastfeeding	11.8 months

Table 3 gives some common childhood diseases and their treatments. About 11.6 percent of the mothers reported that their little children had had diarrhea two weeks before the survey and 8.5 percent of these children had suffered severe cough four weeks prior to the interview. Out of those mothers whose children had suffered severe cough, 85.7 percent took their children to the healthcare centre for treatment while 14.3 percent did not. For children who had had measles, only 0.5 percent of the mothers reported that their children suffered from it three months prior to the interview. For women whose children had had measles, only 22.2 percent took their children to a healthcare centre for treatment.

Table 3: Some common childhood diseases and their treatment

Variables	*(%)*
Has Your Child Had Diarrhoea in the Last 3 Weeks?	
Yes	11.6
No	88.4
Total	100
Was the Child Given ORS?	
Yes	35.3
No	64.7
Total	100
Was the Child Taken to Health Care Centre?	
Yes	49
No	51
Total	100
Has Your Child Suffered From Severe Cough or Difficult Breathing in the Last 4 Week?	
Yes	8.5
No	91.5
Total	100
Was the Child Taken to Health Care Centre?	
Yes	85.7
No	14.3
Total	100
Has Your Child had Measles in the Last 3 Weeks?	
Yes	0.5
No	99.5
Total	100
Was the Child Taken to Health Care Centre?	
Yes	22.2
No	77.8
Total	100

Table 4: Relationship between knowledge about ORT for the treatment of child diarrhoea and independent variables

Variables	*% of women who can prepare ORS*
Age (years)	
15-19	58.6
20-25	79.2
26-35	84.9
36+	94.2
All ages	89.5
χ^2=30.096	
p-value=0.002	
Educational Level	
Grade R to 7	50.9
Grade 8 – 11	82.2
Grade 12 and 12+	85.0
Tertiary	92.9
χ^2=66.557	
p-value=0.000	
Employment Status	
Working for somebody	84.6
Working for self	87.7
Not working	94.2
χ^2=32.956	
p-value=0.001	
Marital Status	
Married/cohabit	87.8
Divorced/widowed/separated	84.6
Others	75.4
χ^2=3.463	
p-value=0.063	

The chi-square test in Table 4 shows a strong relationship between knowledge about ORT and all the independent variables. The result was "confirmed" by logistic regression, which showed that knowledge about ORT was indeed related to all the independent variables except marital status (Table 5). On the other hand, the same logistic regression showed that the dependent variable that is, child taken to hospital/clinic when ill, was related to only one variable, that is the number of children the woman has. The other independent variables did not have any relationship with the dependent variable.

After the logistic regression, the data was transformed, to enable multiple regressions and General Linear Modeling (ANOVA) to be done as a further confirmation. The results from chi-square test and logistic regression could now be validated (Hosmer and Lemeshow 2000; Menard 1995). The results from the general linear model and regressions analyses in Table 6 support the results from chi-square in Table 4 and logistic regression in Table 5, concerning the relationship between ORT and the independent variables. Only marital status did not correlate with ORT. The three variables, namely, age, employment and the number of children, have very strong relationships but the relationship between the level of education and ORT is not strong, acceptable only at the ten percent significant level.

Table 6, which presents the results obtained from multiple regression analyses showed that the timing of prenatal medical check-ups (TPMC) was negatively related to age, but positively to marital status and the number of children that the woman had. The married start the medical check-up early and the woman with more than two children do not necessarily start early. Table 6 shows that the duration of breastfeeding was dependent on age and employment. Thus, those employed tend to breastfeed their children for shorter periods while the older women tend to breastfeed theirs for longer periods.

The model is as follows.

Table 5: Logistics Regression -Variables in the equation

Knowledge about ORT (Dependent Variable)

Variables	*B*	*SE*	*df*	*Wald*	*sig*	*Exp (B)*
No. of children	0.460	0.085	1	29.419	0.000	1.584
Marital status	-0.191	0.141	1	1.838	0.175	0.827
Employment	0.325	0.139	1	5.482	0.019	1.385
Level of education	-0.377	0.202	1	3.504	0.061	0.686
Age	-0.140	0.013	1	122.942	0.000	0.870
Constant	2.95	0.361	1	47.812	0.000	12.118

Went to See a Doctor When Child is Ill (Dependent Variable)

Variables	*B*	*SE*	*df*	*Wald*	*sig*	*Exp (B)*
No. of children	0.994	0.506	1	3.870	0.049	2.702
Marital status	1.146	1.063	1	1.161	0.281	3.146
Employment	0.961	1.236	1	0.604	0.437	2.614
Level of education	-15.851	2358.0	1	0.000	0.995	0.000
Age	-0.142	0.091	1	2.452	0.117	0.868
Constant	-4.317	2.925	1	2.178	0.140	0.013

Table 6: OLS analysis

Starting Time (TPMC) (Dependent Variable)

	Unstandardized coefficient			*Standardized*	
Model	*B*	*SE*	*Beta*	*t*	*Sig*
Constant	5.142	0.412	12.486	0.000	
Age	-0.076	0.015	-0.387	-5.072	0.000
Education	-0.155	0.264	-0.029	-0.586	0.558
Employment	-0.271	0.169	-0.083	-1.600	0.110
No. of children	0.272	0.104	0.190	2.623	0.009
Marital status	0.577	0.171	0.176	3.382	0.001

Knowledge About ORT (Dependent Variable)

Model	*B*	*SE*	*Beta*	*t*	*Sig*
Constant	0.813	0.053	15.485	0.000	
Age	-0.021	0.002	-0.434	-12.470	0.000
Education	0.050	0.030	0.042	1.690	0.091
Employment	-0.064	0.022	-0.074	-2.886	0.004
No. of children	0.062	0.012	0.171	5.141	0.004
Marital status	0.021	0.023	0.022	0.903	0.367

Duration of Breastfeeding (Dependent Variable)

Model	*B*	*SE*	*Beta*	*t*	*Sig*
Constant	7.548	2.064	3.657	0.000	
Age	0.206	0.006	0.243	3.657	0.002
Education	-0.320	1.302	-0.014	-0.245	0.806
Employment	-4.460	0.784	-0.333	-5.687	0.000
No. of children	-0.506	0.510	-0.083	-0.993	0.332
Marital status	0.820	0.828	0.058	0.991	0.323

Timing Prenatal Medical Check-up (TPMC):

TPMC =5.142 —0.076age +0.577marital status + 0.272number of children .....(1)

(Unstandardized)

TPMC = 0.387age +0.176marital status + 0.190 number of children..... (2)

(Standardized)

Breastfeeding= 7.548 +0.206age – 4.460employment status …….....…(3)

(Unstandardized)

Breastfeeding= 0.203age – 0.333employment status.....…….....…(4)

(Standardized)

A change in the marital status, from single to married, increases the TPMC by 17.6 percent, while an increase in age by a year reduces TPMC by 38.7 percent. Similarly, one additional child will increase the TPMC of the check-up by nineteen percent.

Concerning breastfeeding, an increase in age by a year increases the duration of breastfeeding by 20.3 percent, whereas a change from the unemployed to employed status reduces the duration of breastfeeding by 33.3 percent.

Children Taken to Hospital to See a Doctor when Sick

Even though the logistic regression analysis showed that the dependent variable, that is child taken to hospital when sick, correlates with the number of children a woman has (Table 6), on the contrary, the OLS analysis shows no relationship between the dependent variable and the independent variables. [The logistic regression deals with conditional probability (the odd-ratios), thus the aspect of conditionality could be the reason for the different observations.]

ORT

Below are the models from multiple regressions. The results from these analyses as seen in Table 6 confirm that the educational level, the number of children, age and employment status have an impact on the knowledge about oral rehydration therapy.

Knowledge about ORT = 0.813 - 0.021age + 0.050educational level - 0.064employment level + 0.062number of children..... (5)

(Unstandardized)

Knowledge about ORT = - 0.434age + 0.042educational level - 0.074employment level + 0.071number of children.....(6)

(Standardized)

With respect to the knowledge about ORT, a year's increase in age reduces the knowledge by 43.4 percent, a year's increase in the level of education increases the knowledge by 4.2 percent, a change in status from unemployed to employed, reduces the knowledge by 7.4 percent and an additional child born to the mother increases the knowledge about ORT by 7.1 percent.

DISCUSSION

The foregoing results show that in the Mopani district, grown women aged 30 and more years, consult early during pregnancy while the younger women especially those who are less than 21 years, start prenatal consultations late. In some Eastern and Southern African countries (ESAR), not only do pregnant teenagers start attending antenatal clinics late, but also do not take the consultations seriously. According to UNICEF (2014), only about forty percent of teenagers deliver their babies in clinics or hospitals with the assistance of qualified health professionals. This means that about sixty percent of these teenagers do not give birth in hospitals or clinics. Report by *Child Trends Database* (2010) stated that in the United States, the proportion of antenatal medical check-ups among teenagers, drops steadily as women get older, reaching 2.4 percent for women in their early thirties. Thus, the result from this analysis supports the findings in this study. UNICEF (2014) further states that in ESAR, some 80,000 women die during pregnancy or childbirth, and 440,000 infants do not survive their first month. In South Africa, maternal mortality rate ranges from 6 per 100,000 in Cape Town to 292 per 100,000 in Capricorn in the Limpopo province (Cullinan 2013). Early prenatal consultations plus adherence to instructions by health professionals is one of the most effective ways of reducing such deaths.

Women staying with partners (married) consult early because most probably their "spouses" put pressure on them to check the status of their unborn child. "Husbands", especially those begetting their first "child" are eager to know when the baby is due and would therefore encourage their "wives" to consult. Women with more than two children do not necessary start early probably due to the experience that they have had from previous pregnancies, and they are not obsessed with pregnancy again. With respect to the duration of breastfeeding, Table 6 shows that older women breastfeed their children for a longer period, because they have sol-

id knowledge about the importance of long breastfeeding (Kyei 1999). As expected, the employed breastfeed their children for a shorter period compared to the unemployed or self-employed because of time constraint.

The older women consult early because women who are over 35 years are at high risk of getting high blood pressure and diabetes when pregnant so consulting earlier enables them to detect any unforeseen problem to quickly address it. Mothers who receive late or no prenatal medical check-ups are more likely to have babies with health problems. According to *Child Trends Database* (2010), these mothers are three times more likely to give birth to a low weight baby, and their babies are five times more likely to die.

The timing of first prenatal medical check-ups is strongly negatively associated with educational level. In Pakistan, attendance to antenatal clinics is found to be associated with the socio-economic status and literacy, such that the ratio of married women in the higher income bracket, which go for prenatal consultations is twice that of women from the low income bracket, and the proportion of women from more educated families who go for antenatal services is seventy-two percent higher than those from less educated families (Nisar and White 2003). According to Kiely and Kogan (2001), in the United States in 1988, ninety-two percent of mothers with at least college education started their prenatal medical check-ups early compared to fifty-three percent of mothers who had less than a high school education. The probability that a pregnant woman will start her prenatal medical check-ups late or never decreases as her educational level increases, although not statistically significant in this study.

Knowledge about ORT is negatively related to employment status and age of the woman but positively related to educational level and the number of children the woman has (see equation 3). Unemployed women in this study appear to be more knowledgeable about ORT than those who are working for somebody else or for family or for themselves. This observation is somewhat startling because one does not see how unemployed can have better knowledge about ORT than the employed. Is it because they are not "working" they get time to attend free workshops organized by medical practitioners? Probably so! On the other hand, older women are more knowledgeable about childcare than younger women, and women with more than two children are also more knowledgeable than women with fewer children. This study shows that women who are highly educated have more knowledge about ORT than those who are less educated. These results agree with the study done by Anidi et al. (2002).

CONCLUSION

The study has revealed that in Mopani, younger women, especially teenagers, start prenatal medical check-ups late and that have dire consequences, including higher childhood and maternal deaths. The proportion of women aged 36+ years who started their prenatal consultations early is more than twice that of women aged 15 to 19 years who started theirs at the same period of pregnancy.

The majority of the women in Mopani seem to know and understand the use of ORS. Table 4 shows that 92.2 percent of the respondents knew about ORT and have made use of the solution when their children were ill with diarrhea. Women's knowledge about ORT was also found to have a relationship with the level of education (*p-value* =.000) and employment status (*p-value* =.001).

For the place of birth of their last child whose age was less than 5 years, seventy-eight percent gave birth to their last child in hospital, 21.6 percent gave birth at the clinic and only 0.2 percent gave birth at home. Less than one percent (0.2%) of the women gave birth somewhere else.

RECOMMENDATIONS

This study recommends that the Department of Health and relevant government agencies and policy formulators should educate the women through massive awareness campaigns since the level of education has a positive relationship with healthcare practices, including prenatal medical check-ups and knowledge about ORT.

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