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Traditional medicine used in childbirth and for childhood diarrhoea in Nigeria's Cross River State: interviews with traditional practitioners and a statewide cross-sectional study

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ABSTRACT

Objectives: Examine factors associated with use of traditional medicine during childbirth and in management of childhood diarrhoea.

Design: Cross-sectional cluster survey, household interviews in a stratified last stage random sample of 90 census enumeration areas; unstructured interviews with traditional doctors.

Setting: Oil-rich Cross River State in south-eastern Nigeria has 3.5 million residents, most of whom depend on a subsistence agriculture economy.

Participants: 8089 women aged 15–49 years in 7685 households reported on the health of 11 305 children aged 0–36 months in July–August 2011.

Primary and secondary outcome measures: Traditional medicine used at childbirth and for management of childhood diarrhoea; covariates included access to Western medicine and education, economic conditions, engagement with the modern state and family relations. Cluster-adjusted analysis relied on the Mantel-Haenszel procedure and Mantel extension.

Results: 24.1% (1371/5686) of women reported using traditional medicine at childbirth; these women had less education, accessed antenatal care less, experienced more family violence and were less likely to have birth certificates for their children. 11.3% (615/5425) of young children with diarrhoea were taken to traditional medical practitioners; these children were less likely to receive BCG, to have birth certificates, to live in households with a more educated head, or to use fuel other than charcoal for cooking. Education showed a gradient with decreasing use of traditional medicine for childbirth (χ^2 135.2) and for childhood diarrhoea (χ^2 77.2).

Conclusions: Use of traditional medicine is associated with several factors related to cultural transition and to health status, with formal education playing a prominent role. Any assessment of the effectiveness of traditional medicine should anticipate confounding by these factors, which are widely recognised to affect health in their own right.

Strengths and limitations of this study

- Locally recruited and trained interviewers conducted all interviews in the local language.
- Secondary analysis of data from a large study of health service coverage in a statewide representative sample provided interpretable data on use of traditional medicine.
- Interviews with traditional medical practitioners oriented the analysis and enriched interpretation of results.
- The original study was not focused on the use of traditional medicine, so only a few questions about this were included in the survey.

INTRODUCTION

The WHO supports integration of traditional medicine into national health systems.[1] Reactions to the idea of bringing traditional medicine into the mainstream of health systems range from 'a noncritical enthusiasm to an uninformed scepticism'.[2] Important obstacles to integration of traditional medicine include lack of evidence about the effectiveness of traditional medicine, and a narrowly quantitative approach is not well suited to investigate the impact of traditional medicine.[3]

A central concern of modern epidemiology is to explore causality and investigate confounding in associations. Poverty, lack of education and low coverage of Western medical services are recognised covariates of the use of traditional medicine, but these factors are also determinants of health status in their own right, making it difficult to untangle the impact of traditional medicine on health status.[4]

Nigeria has a notoriously poor coverage with Western health services,[5] high rates of

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preventable morbidity and mortality,[6] and a high level of unsatisfied basic health needs.[7]

In recent years, there has been growing scientific interest in traditional medicine in African countries and recognition of its role in meeting healthcare needs.[8 9] Traditional medicine is known to be widely used in Nigeria, but there is only weak evidence on how many people use it or who they are.[10–12]

The Nigerian Evidence-based Health System Initiative (NEHSI)[13] was a collaboration between the Government of Nigeria, the International Development Research Centre and the Department of Foreign Affairs, Trade and Development of Canada. As part of this initiative in Cross River State, a series of statewide cross-sectional household surveys (2009, 2011 and 2013) complemented routine information with information on health conditions, their management and associated factors in women and children.

The present secondary analysis of data from the 2011 survey examined the use of traditional medicine in the context of available Western health services, education levels, economic status, family relations and engagement with the modern state in Nigerian communities. The study sought to determine the level of use of traditional medicine by households in Cross River State and to examine the factors associated with the use of traditional medicine, including the availability of Western health services.

METHODS

The 2011 survey covered a stratified (region, urban/rural) last stage random sample of 90 census enumeration areas in all 18 local government areas (LGAs) in Cross River State.[14] Sample size estimation at the design stage suggested that 8012 women aged 15–49 years in 90 clusters would be sufficient to detect a 20% change over 2 years in a maternal outcome (perinatal sepsis) affecting 24% of pregnancies at baseline (80% power, α error 5%, Intraclass Correlation Coefficient (ICC) 0.01), if 50% of the women were pregnant each year.

In July and August of 2011, locally recruited and trained interviewers administered a 35-item household questionnaire (see online supplementary material 1) to one respondent in each household and a team member completed a 44-item community profile (see online supplementary material 2) with the help of a local community leader. Local female interviewers administered an additional 108-item instrument (see online supplementary material 3) in face-to-face interviews with female household members aged 15–49 years. Those who were pregnant during the past 2 years were asked who had assisted them in childbirth and where they delivered. The questionnaire asked the caregivers (nearly always the mothers) of children aged 0–36 months about common illnesses and the primary and secondary management of episodes of these illnesses. The overall questionnaires provided data which have been analysed and published in eight other journal articles.[14–21]

Field supervisors piloted the instruments in similar communities and we made small adjustments to the instruments before the main data collection.

During the fieldwork for the household survey, one of the authors (IS) interviewed traditional medical practitioners in 60 of the 90 clusters. Using an *intercultural dialogue* format,[22] the researcher shared his experience of the subject to establish a two-way exchange of information in which the traditional medical practitioner could feel comfortable. All interviews were anonymous. The dialogue informed categories of analysis and interpretation of the results.

Analysis

Self-reported use of traditional medicine during childbirth included deliveries attended by traditional medical practitioners, traditional birth attendants or religious/spiritual healers.

Mothers reported where they sought treatment for the most recent episode of diarrhoea in children aged 0–36 months, and responses included visiting traditional medicine practitioners of various sorts. The questions allowed reporting of the first choice and second choice for treatment ('Where, if anywhere, did you seek treatment for the child for the diarrhoea?' and 'Where else did you seek treatment?'). We defined access to Western medicine during pregnancy as self-reported attendance for antenatal care at government or private medical services. We used vaccination with BCG as evidence of availability of Western healthcare for childhood illness ('Has this child received BCG injection given at birth into the left arm?').[23]

We examined potential associations between self-reported use of traditional medicine and access to Western medicine, and four other sets of social and economic variables: education, economic status, family relations and engagement with the modern state. We defined five levels for *education* of the woman/mother, of the household head, and of the father of the child: no education, elementary school, junior high school, senior high school, and higher education. Elements of *economic conditions/status* included: housing construction (better construction was cement in walls and zinc roof); self-reported household financial situation (above or below community average); source of drinking water (safer supply was from a tap, borehole or tube well); cooking fuel used (higher economic status was using fuel other than charcoal or wood), whether the household had enough food during the past week; household location (whether living in hard-to-reach communities); and whether the community was urban or rural. *Family relations* included self-reported exposure to physical or verbal abuse, and communication with the partner about pregnancy and delivery. *Engagement with the modern state* included whether the community had electricity, and whether the child had a birth certificate, as reported by the mother.

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We undertook an initial bivariate analysis of all the candidate variables with the outcome of interest. For each set of variables (access to Western healthcare, education, economic conditions, family relations and engagement with the modern state), we then included in the multivariate analysis the variable with the strongest association with the outcome in bivariate analysis, in order to avoid including non-independent variables in the same multivariate model. From an initial multivariate model that included all these candidate variables from the bivariate analysis, we used backward deletion one variable at a time until only significant associations remained, using a conservative threshold (χ^2 Mantel-Haenszel (χ^2MH) >6.65) for significance, to allow for testing multiple variables without prior specification in the study design.

Statistical analysis relied on CIETmap 2.0 β 9.5, a Windows-like interface with the R programming language.[24] We expressed associations as adjusted ORs (ORa) and 99% CIs using the method of Miettinen, adjusted for clustering with the method of Lamothe (CIca) to avoid overestimation of statistical confidence.[25] Analysis of the non-linear gradient between use of traditional medicine and level of education used Mantel's extension of the Mantel-Haenszel procedure.[26] Analysis excluded records with missing data.

Ethics

The Cross River State Research Ethics Committee approved the methodology and survey instruments in August 2009, with renewals for the 2011 and 2013 surveys. Local government and traditional authorities gave permission for fieldwork in each community. Before each interview, the interviewer obtained verbal informed consent, explained that responses were voluntary and could be stopped at any time, and explained the provisions of confidentiality and anonymity. The interviews with traditional medical practitioners followed ethical principles for medical research in indigenous communities.[27]

RESULTS

Traditional medical practitioners

Interviews with traditional practitioners revealed different forms of traditional medicine, reflecting the diversity of Cross River State. Practitioners described themselves as birth attendants, native doctors, bone setters, religious leaders, medicine sellers and people with knowledge of traditional medicine. They described their interface with government health services as a limited number of specific moments: registration as a traditional medical practitioner; traditional birth attendants receiving Western training; and, in remote communities, government health promoters referring certain types of cases to traditional practitioners.

Traditional practitioners explained that their medical pharmacopoeia is plant based, with prayers and invocations to activate or to potentiate the effect. Plants from the bush or forests are considered more powerful than those that grow close to dwellings, and more appropriate for treatment of advanced or complicated conditions.

The sample

Of 90 clusters in the sample, 60 were rural and 30 urban. Interviewers covered 7685 households (75.5% of the 10 231 households in the enumeration areas), with an average of 85.4 households per cluster (SD 13.4); 58.6% (4503/7685) of households had fewer than five occupants. Some 9.9% of the households (760/7685) were in hard-to-reach communities, most were male-headed (82.8% or 6361/7682), and 57.2% (4354/7613) of the households heads were engaged in low-paying occupations.

Among women who responded to the questionnaire, 90.3% (7306/8089) reported on the health of 11 305 children in the past 2 years; 48.3% (3525/7306) answered for more than 1 child. Women respondents had a mean age of 26.9 years (n 7975, SD 7.7) and an average of three children (n 7321, SD 1.9). Nearly all the women (7423/7938) had some formal education: 63.2% (5017/7938) had primary education and 7.8% (618/7938) had a high school diploma. More than one half (55.5% or 4423/7974) of the women reported a source of income of their own.

Childbirth attended by traditional medical practitioners

Some 71.8% (5735/7985) of women had been pregnant during the past 2 years (1.3% missing data 104/8089), and 24.1% (1371/5686) reported that their last delivery was attended by a traditional medical practitioner. A further 33.4% (1900/5686) delivered at government facilities and 15.1% (858/5686) at private facilities; 21.7% (1232/5686) reported deliveries attended by other non-professional services (pharmacies, churches, a relative or neighbour), and 5.7% (325/5686) reported having delivered their child at home unattended. There were no data on place of delivery for under 1% (49/5686) of respondents.

Some 76.8% (4367/5686) of the women reported attending government antenatal care during their last pregnancy. In bivariate analysis, women who attended government antenatal care were significantly less likely to use a traditional practitioner for childbirth (ORa 0.31 99% CIca 0.22 to 0.41). Table 1 shows the bivariate analysis of all variables examined for association with use of traditional practitioners for childbirth. Table 2 presents the final multivariate model with four variables showing independent statistically significant associations after adjusting for the other three.

Children with diarrhoea seen by traditional medical practitioners

Mothers or caregivers answered questions about treatment of the last episode of diarrhoea in 5416 children

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Table 1 Bivariate analysis of associations with having childbirth attended by a traditional practitioner, among women aged 15–49 years who gave birth in the past 2 years

Characteristic	Exposed	Non-exposed	OR	99% CIca*	Missing data (%)
Availability of Western healthcare					
Antenatal care in a government facility*	808/4349	560/1300	0.31	0.22 to 0.41	0.7
Education					
Woman with postsecondary or higher education*	31/451	1330/5201	0.25	0.13 to 0.37	0.6
Woman with junior high education or higher	729/3629	632/2023	0.57	0.43 to 0.72	0.6
Woman with any formal education	1293/5349	68/303	1.21	0.71 to 1.71	0.6
Household head with postsecondary or higher	91/832	1249/4716	0.36	0.24 to 0.48	2.4
Household head with junior high or higher	730/3596	610/1952	0.58	0.44 to 0.72	2.4
Household head with any formal education	1237/5143	103/405	0.99	0.65 to 1.33	2.4
Economic condition					
Household of good construction*	796/3729	566/1922	0.68	0.47 to 0.90	0.6
Self-rated economic condition above community average	805/3673	558/1979	0.73	0.58 to 0.89	0.6
Enough food last week	1081/4616	290/1065	0.85	0.63 to 1.06	0.1
Household with safer water source	538/2340	824/3306	0.97	0.60 to 1.35	0.7
Not living in a hard-to-reach community	1203/5108	168/578	1.02	0.33 to 1.71	0.0
Household using fuel other than charcoal or wood	365/1486	994/4161	1.10	0.73 to 1.48	0.7
Living in an urban community	457/1916	914/3770	1.17	0.53 to 1.81	0.0
Family relations					
Not verbally abused by partner in past 12 months*	344/1728	856/3267	0.72	0.57 to 0.86	12.2
Does not report that neighbours were verbally abused	143/731	1064/4285	0.76	0.57 to 0.95	11.8
Not beaten by partner during past pregnancy	855/3760	347/1236	0.77	0.62 to 0.92	12.1
Not beaten by partner in past 12 months	616/2807	588/2192	0.78	0.63 to 0.93	12.1
Talked frequently with partner about pregnancy and delivery	847/3738	515/1904	0.80	0.65 to 0.96	0.8
Engagement with the modern state					
Mother of a child with birth certificate*	465/2558	872/2967	0.55	0.42 to 0.69	2.8
From a community with electricity service	889/3920	401/1514	1.06	0.38 to 1.74	4.4

*Variables included in the initial multivariate model.
CIca, CIs using the method of Miettinen, adjusted for clustering with the method of Lamothe.

who had consulted for their last episode of diarrhoea. In response to the question about where the child was taken first, the local pharmacy was the most common reported source of treatment: 41.8% (2266/5416) of cases. Traditional medicine was reported to be the first source of treatment in 1.6% (85/5416) of cases of diarrhoea. Among the 33.6% (1871/5416) of mothers who reported another source of treatment for the same episode, 29.3% (549/1871) said that they used traditional medicine. Combining first and second sources of treatment, 11.3% (615/5416) of mothers reported that they used traditional medicine for childhood diarrhoea.

Children of mothers whose last delivery was attended by a traditional medical practitioner were significantly more likely to be taken to a traditional medicine practitioner for common childhood illnesses (ORa 1.86, 99% CIca 1.24 to 2.48 χ^2MH 28.9). Bivariate analysis (table 3) showed that children who had received BCG vaccination (as an indicator of access to Western medicine) were significantly less likely to be treated by a traditional medicine practitioner for diarrhoea (ORa 0.37 99% CIca 0.26 to 0.49).

Variables in the initial multivariate analysis model included: children who had received BCG vaccine,

Table 2 Final multivariate analysis of variables associated with childbirth attended by a traditional practitioner

n=4820	Crude OR	Adjusted OR	99% CIca	cl adj χ^2MH
Attended government antenatal care	0.28	0.33	0.21 to 0.50	45.75
Postsecondary or higher education	0.23	0.34	0.21 to 0.56	31.12
Mother of a child with birth certificate	0.53	0.69	0.53 to 0.90	13.36
Not verbally abused by partner in past 12 months	0.72	0.80	0.65 to 0.99	7.58

The variable for 'Household of good construction' was also included in the initial multivariate model but it did not remain statistically significant.
CIca, CIs using the method of Miettinen, adjusted for clustering with the method of Lamothe; cl adj χ^2MH, Cluster-adjusted χ^2 of Mantel-Haenszel.

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Table 3 Bivariate analysis of associations with use of traditional medicine for childhood diarrhoea

Characteristic	Exposed	Non-exposed	Adjusted OR	99% CIca	Missing data (%)
Availability of Western healthcare					
Children received BCG vaccine*	532/5091	74/299	0.37	0.26 to 0.49	0.7
Education					
Household head has postsecondary or higher education*	34/765	567/4550	0.37	0.20 to 0.54	2
Household head has junior high education or higher	281/3217	320/2098	0.55	0.42 to 0.68	2
Household head has any formal education	528/4811	73/504	0.77	0.52 to 1.03	2
Mother/caregiver has postsecondary or higher education	13/317	571/4788	0.44	0.14 to 0.73	5.9
Mother/caregiver has junior high education or higher	267/3085	317/2020	0.53	0.37 to 0.70	5.9
Mother/caregiver has any formal education	529/4777	55/328	0.69	0.38 to 0.99	5.9
Father has postsecondary or higher education	39/831	525/4334	0.40	0.22 to 0.59	4.8
Father has junior high education or higher	320/3622	244/1543	0.53	0.40 to 0.66	4.8
Father has any formal education	528/4893	36/272	0.88	0.50 to 1.25	4.8
Economic conditions					
From a household using fuel other than charcoal or wood*	71/1048	539/4345	0.56	0.34 to 0.78	0.6
From a household with a safer water source	186/2095	428/3307	0.69	0.47 to 0.91	0.4
From a household with good quality construction	332/3351	282/2051	0.72	0.51 to 0.93	0.4
Not living in a hard-to-reach community	523/4832	92/593	0.79	0.35 to 1.23	0.0
Living in an urban community	139/1529	476/3896	0.81	0.43 to 1.19	0.0
With enough food last week	452/4091	133/1031	0.88	0.62 to 1.14	5.6
From a household considering their financial situation as above average for the community	370/3394	242/2004	0.92	0.68 to 1.17	0.5
Family relations					
Mother not beaten by partner during past pregnancy*	309/3073	158/1070	0.67	0.48 to 0.87	23.7
Mother not beaten by partner in past 12 months	214/2225	253/1922	0.73	0.53 to 0.93	23.6
Mother not verbally abused by partner in past 12 months	115/1232	351/2911	0.78	0.56 to 1.00	23.6
Mother does not report that neighbours were verbally abused	43/497	426/3659	0.82	0.43 to 1.20	23.4
Mother talked frequently with partner about pregnancy and delivery	342/3053	174/1592	1.06	0.79 to 1.33	14.4
Engagement with the modern state					
Child has a birth certificate*	189/2539	418/2799	0.48	0.34 to 0.61	1.6
From a community with electricity service	328/3700	246/1524	0.55	0.33 to 0.78	3.7

*Variables included in the initial multivariate model.
CIca, CIs using the method of Miettinen, adjusted for clustering with the method of Lamothe.

household head with postsecondary studies or higher, households using fuel for cooking other than charcoal or wood, children of a mother not beaten by her partner during her last pregnancy, and children with a birth certificate.

Table 4 shows the final model of the multivariate analysis of variables associated with children with diarrhoea being taken to a traditional medicine practitioner. Table 5 shows a clear, if non-linear, trend between higher educational levels among women and a lower reliance on traditional medicine for childbirth and diarrhoea.

DISCUSSION

One in every four women (24.1%, 1371/5686) in Cross River State had her last delivery attended by a traditional practitioner and 1 in every 10 children (11.3%, 615/5425) was taken to a traditional practitioner to treat their last case of diarrhoea. Use of traditional medicine was convincingly associated with non-use of Western medical services, lower levels of education, increased risk of family violence, and lack of engagement with the modern state as reflected in children not having birth certificates. Our findings indicate that any enquiry into the effectiveness of traditional medicine should take careful account of these covariates which could be determinants of health in their own right.

This is one of the few population-based representative studies of the use of traditional medicine and associations with this behaviour. Our data probably underestimate the actual use of traditional medicine as people may hide their preferences for traditional medicine in the face of stigma.[28] Mothers in our study rarely spontaneously mentioned traditional medicine when asked where they took a child with diarrhoea, but more often mentioned it when encouraged to say where else they had taken the child. This may reflect stigma associated with the use of traditional medicine. From a cross-sectional study, one

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Table 4 Final multivariate analysis of variables associated with children being taken to a traditional medical practitioner for treatment of diarrhoea

N=5180	Crude OR	Adjusted OR	99% CIca	cl adj χ^2MH
Household head has postsecondary higher education	0.32	0.39	0.26 to 0.59	34.6
Children with BCG vaccine	0.36	0.46	0.29 to 0.72	20.1
Child with a birth certificate	0.47	0.56	0.42 to 0.75	27.3
From a household using fuel other than charcoal or wood	0.51	0.63	0.43 to 0.92	10.01

The variable 'Mother not beaten by partner during past pregnancy' was also included in the initial multivariate model but it did not remain significant.
CIca, CIs using the method of Miettinen, adjusted for clustering with the method of Lamothe; cl adj χ^2MH, Cluster-adjusted χ^2 Mantel-Haenszel.

cannot draw firm conclusions about causal relations. For example, we cannot say that increased education *caused* decreasing use of traditional medicine. However, the association between lower education and greater use of traditional medicine would make it difficult to measure the full impact of traditional medicine on health, because education itself is such a strong determinant of health status and health reporting.

Pharmacies were the first resource for treating childhood diarrhoea in Cross River State (41.8%). The 2010 malaria indicator survey found a similar result for childhood fever,[29] a pattern of self-medication that is well recognised in Nigeria.[18 30] Our finding that women rarely mentioned visiting traditional practitioners for treatment of children with diarrhoea when first asked, but revealed these visits when asked about any other sources of treatment, is in line with findings from two studies in Ghana.[31 32] This suggests that it is important to allow survey respondents to mention more than one source of care if they are to disclose use of traditional medicine. In this study, we did not establish whether choice of Western medicine preceded or followed traditional medicine, although this could be the focus of further research.

Although other authors have reported an association between urban residence and using formal health facilities for antenatal care and delivery,[33 34] we did not find a significant association between use of traditional medical practitioners for childbirth or treatment of childhood diarrhoea and residence in rural or hard-to-reach communities. This suggests that traditional medicine is commonly used in all types of community in Cross River State. A study in Aba City, Nigeria, interviewed 19 urban women seeking treatment from rural traditional medicine practitioners of different ethnicity and found their reasons for going to these traditional practitioners included failure of urban health services to provide a cure, beliefs about the cause of their condition, the nature of their condition and a wish to maintain secrecy.[35]

Although affordability has been recognised as an important factor associated with traditional medicine, in Nigeria treatment choice involves cultural factors as well as cost of services.[36] In our multivariate analysis of use of traditional medicine in childbirth, socioeconomic variables did not remain as significant associations in the final model. Onwujekwe *et al*[37] found no significant difference between low and high socioeconomic status and the quality of the providers used for malaria treatment in southeast Nigeria.

We found a significant association between experience of family violence and childbirth attended by traditional medicine practitioners. We cannot conclude this relation is causal or in which direction it might be causal. Other authors have reported a strong influence of family and

Table 5 Trend analysis of use of traditional medicine and education level of the women

Education level and childbirth attended by a traditional medical practitioner					
Woman	**No education**	**Elementary**	**Junior High**	**Senior High**	**Higher education**
Traditional medicine during childbirth	67	564	259	439	31
Other source of care for childbirth	233	1156	607	1873	420
Total	300	1720	866	2312	451
OR		1.85	0.97	0.55	0.25
Mantel-Haenszel χ^2 for trend=135.2 1df					
Education level and diarrhoea attended by a traditional medical practitioner					
Mother or caregiver	**No education**	**Elementary**	**Junior high**	**Senior high**	**Higher education**
Traditional medicine for diarrhoea	55	262	99	155	13
Other treatments for diarrhoea	271	1430	706	1808	304
Total	326	1692	805	1963	317
OR		1.01	0.81	0.53	0.44
Mantel-Haenszel χ^2 for trend=77.2 1df					

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relatives in the decision about where to seek pregnancy and childbirth care.[38] Traditional medicine is relatively low in cost compared with Western healthcare; cost-related decisions could be a plausible explanation for what might be an indirect association with family violence. Families where a woman is subjected to violence might also be unwilling to pay for her to have more expensive Western medical care in pregnancy and childbirth.

In our analysis, children with birth certificates—a marker of engagement with modern state institutions—were more likely to be taken to government health facilities for treatment of diarrhoea. In an analysis based on the same survey, children with birth certificates were also more likely to have educated parents, to have mothers who delivered in a government health facility and to live in less poor households.[15]

Our striking gradient between levels of education and reliance on traditional medicine for both childbirth and childhood diarrhoea agrees with the findings of other studies in Nigeria.[34 38 39] Western education is often accompanied by beliefs and values that neglect and sometimes condemn traditional practices as Western-trained educators strive to 'educate and convince women to dispel myths which limit their use of orthodox care'.[40 41] The negative effects of forced Western education on the health of Indigenous people has been a matter of discussion in North America.[42]

Our findings are compatible with a 'transitional society where both traditional and modern medicine are employed and where the choice between them is determined by belief systems which are themselves in the process of change'.[43 44] We believe that use or abandonment of traditional medicine is part of the transition from traditional to modern, a transition unevenly mediated through education, which influences health status in complex ways.[45] Not least of these influences are the economic opportunities and incomes that come with modern education. It seems plausible that people using traditional medicine face harsher conditions of life (less education, less access to modern state machinery, less use of Western health services and low socioeconomic status) producing, interacting with and possibly multiplying health burdens.[42] These variables should be included as possible covariates in analyses of the efficacy of traditional medicine.

Our study was a secondary analysis of data from a survey not designed to answer the question of who uses traditional medicine. Future studies specifically focusing on the use of traditional medicine should include intercultural dialogue with traditional practitioners as part of the design.[46 47] This dialogue could help to refine the research question and identify factors that influence the use of traditional medicine.

CONCLUSIONS

Availability of Western medicine was a factor in the abandonment of traditional medicine, but education, family relationships and linkages with government institutions also played important roles. The prominence of education suggests complex connections between the use of traditional medicine and cultural transition.

Given its continued importance in countries like Nigeria, formal studies to assess effectiveness of traditional medicine are much needed to optimise healthcare services and to improve health outcomes. Epidemiology applied to this traditional knowledge should be based on intercultural dialogue, better recognition and documentation of the social, economic and cultural factors in health outcomes, and should take into account the role of Western education in acculturation and the uneven loss of traditional medicine practices.

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Contributors IS designed the study and supported fieldwork in Cross River; he also analysed the data and drafted the manuscript. GZ supervised the data analysis and contributed to the manuscript. NA designed the overall study in which this is embedded, and contributed to the data analysis and write-up. IS, GZ and NA had access to the data and all authors had final responsibility for the decision to submit for publication. All authors read and approved the final manuscript.

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