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AN EVALUATION OF VITAL REGISTERS AS SOURCES OF DATA FOR INFANT MORTALITY RATES IN CAMEROON

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FOREWORD

Improvement of infant health has been a key objective of public health and population programs in both developing and developed countries. Monitoring of such programs through the measurement of infant mortality has occupied the attention of health statisticians and demographers in many countries. As this paper demonstrates, measuring changes in this important indicator is not an easy task because of the problems encountered in the accurate counting of both births and of infant deaths. Although it is difficult to verify the responses in this household survey because of the anonymity provided to respondents, the results and discussion provide some very useful suggestions for improving the registration of births and infant deaths in Cameroon and by extension in other developing countries. Their most important conclusion perhaps is that "a mechanism of registration that uses medical institutions may substantially improve coverage and timeliness of registration."

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An Evaluation of Vital Registers as Sources of Data for Infant Mortality Rates in Cameroon

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Ndong I (Department of Health Services, School of Public Health and Community Medicine, University of Washington, Seattle, USA), Gloyd S and Gale J. An evaluation of vital registers as sources of data for infant mortality rates in Cameroon. *International Journal of Epidemiology* 1994; **23:** 536-539.

Background. Infant mortality rates have been widely used as indicators of health status and the availability, utilization and effectiveness of health services. Two principal sources of data for infant mortality rates are vital registers and censuses. This study was designed to evaluate the accuracy of vital registers as sources of data for infant mortality rates in Cameroon.

Methods. A household census of births and infant deaths that occurred in Buea Subdivision between 1 November 1991 and 31 October 1992 was conducted to determine the proportion that were registered and the reasons why the remainder were not registered.

Results. The registration coverage was found to be 62% for births and 4% for infant deaths. The most frequently reported reasons for not registering births were lack of money, lack of time and a complicated registration procedure. For infant deaths the reasons were lack of knowledge and no perceived benefits.

Conclusions. Vital registers of birth and death are not an accurate source of data for infant mortality rates in Cameroon. Motivation for birth and death registration appear to be dependent on the perceived benefits. A mechanism of registration that uses medical institutions may substantially increase registration coverage for births and infant deaths.

Infant mortality rates have been widely accepted as indicators of the health status of a population and the availability, utilization and effectiveness of health services.[1-3] These indicators have been consistently used by national and international organizations to set targets, monitor, and evaluate the outcome of their programmes.[4-6]

Two principal sources of data for infant mortality rates are vital events registers and household censuses.[6] In most developing countries census results are often out of date by the time they are released.[7] Large sample surveys are required to update infant mortality data between censuses. Vital registers of births and deaths can be inexpensive and up-to-date sources of data for infant mortality rates if these events are registered promptly and completely.[8-10] Unfortunately, this is not the case in most developing countries[2,11] where there has been a proliferation of demographic surveys and indirect methods for estimating birth and death rates.[3,12,13] The difficulties and costs associated with censuses and special surveys provide justification for reassessing the feasibility of routine collection of vital data.

This study was designed to evaluate the accuracy of vital registers as sources of data for infant mortality rates in Cameroon and to better understand the obstacles to birth and infant death registrations.

BIRTH AND DEATH REGISTRATION IN CAMEROON

Cameroon has legislation for compulsory registration of births and deaths but it has not been adequately enforced. Registration takes place in the local councils and is the responsibility of the parents.[14] A notification of birth or death from a medical institution or a declaration of their occurrence to the district attorney and 600 francs CFA (US $2.40) in stamps are prerequisites for registration.

Birth certificates are required for family allowances claims by employees, tax deductions, school attendance, applications for employment, acquisition of national identity cards, and as proof of family relationship. Death certificates are required for insurance claims, to stop family allowances, for transportation of corpses, and inheritance. Death certificates are not required for burial.

METHODS

This study was carried out in Buea Subdivision, in the South-West Province of Cameroon in November and

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TABLE 1 *Distribution of reported births and deaths by place of occurrence*

Place of occurrence	Births (%)		Deaths (%)	
	Urban (n = 903)	Rural (n = 666)	Urban (n = 37)	Rural (n = 69)
Hospital	74.9	40.7	53.1	47.6
Health centre	23.9	55.4	3.1	3.2
Home	1.2	3.9	43.8	49.2
Total	100	100	100	100

December 1992. The total population of the villages in the study area was estimated at 30 000. Interviews were conducted by a group of 30 high school and university students using a prepared questionnaire. A household census of all births and deaths of children <1 year old which occurred between 1 November 1991 and 31 October 1992 was carried out. No identifying information was collected because of the wish by most respondents to stay anonymous. The following information on births was collected: number of pregnancies in the household in the last 2 years, pregnancy outcomes, place and date of delivery and registration, person who registered the birth. The following information was collected on infant deaths: date of death, age at death, place of death and registration, person who registered the death. Information was collected on the parents' marital status, educational level, employment, and family allowance. When available, birth and death certificates were used to verify the information reported by respondents. Respondents had to be parents of the child or adult members of the household who had been living with the family for at least 6 months. Interviewers returned to all households where appropriate respondents were not found during the first visit. Supervisors assessed the performance of the interviewers by re-interviewing randomly selected households. Information was also collected from the Buea council registers on births and deaths of all ages that were registered between 1 November 1991 and 31 October 1992. This information included date of birth or death, date of registration, and age at death.

TABLE 2 *Distribution of ages (in years) as recorded in the Buea council at the time of registration (n = 1716). (Ages are rounded up to the nearest whole figure)*

Age at time of registration	Number of births registered
1	889
2	36
3	25
4	38
5	23
6	43
7	37
8	29
9	18
10	33
11	44
12	70
13	77
14	33
15	36
16	31
17	41
18	43
19	31
20	34
21	23
22	11
23+	68

RESULTS

A total of 23 villages were surveyed and 6178 households were visited. Respondents refused to participate in only 10 (0.16%) households. In the 1-year interval 1569 births and 106 infant deaths were reported to have occurred. The distribution of births and deaths by place of occurrence is shown in Table 1.

Respondents reported that 1533 (98%) births took place in health institutions. Eleven (1%) of the urban births were reported to have occurred at home, compared to 26 (4%) of the rural births. Respondents reported that 56 (53%) of the infant deaths occurred in health institutions while 50 (47%) occurred at home. Sixteen (44%) of the urban deaths were reported to have occurred at home, compared to 34 (49%) of the rural deaths.

Only 966 (62%) of all reported births were said to have been registered. Completeness of reported birth registration was 69% in the urban area and 52% in the rural area. Of reported birth registrations 80% were done in the first month following birth. It was possible to confirm reported registration in only 315 (33%) of the cases because the certificates were generally kept by fathers, most of whom were absent from home during the interviews.

Respondents reported that 84% of all birth registrations were done by fathers or other male relatives while only 16% were done by mothers or other female relatives. Of the 106 reported infant deaths only 4 (4%) were also reported to have been registered and these were all confirmed with death certificates. Thirty-four (32%) deaths occurred shortly after birth and prior to discharge from the health institution. None of these births or deaths were registered. It was not possible to cross-check reported birth and death registration information with medical and council records because of the anonymity required by respondents.

Buea council registered 1716 births between 1 November

TABLE 3 *Reported reasons for not registering births (n = 702)*

Reported reasons	%
Lack of money	42.7
Lack of time	25.7
Procedure too complicated	11.8
Perceived by mothers as the father's responsibility	4.4
Distance to registration site	2.9
Registration not perceived as useful	2.1
No knowledge of registration	1.0
Other	9.4
Total	100.0

1991 and 31 October 1992. Ages at time of registration ranged from 1 day to 59 years; only 52% were registered at <1 year of age. Moderate increases in birth registration were noticed at ages 4, 10–13 and 17–20 (Table 2).

Buea council registered 59 deaths (all ages) between 1 November 1991 and 31 October 1992. Of these 90% were registered by the end of the fourth month following death. No deaths were registered later than 7 months after their occurrence. Only 7% of registered deaths were infants.

The most frequently reported reasons for not registering births were lack of money, lack of time, and a complicated registration procedure. (Table 3) Those for not registering infant deaths were lack of knowledge about registration and the perception that registration is not useful. (Table 4) Some respondents had more than one reason.

Socioeconomic factors associated with birth registration are shown in Table 5. After adjusting for employment and education the greatest association with birth registration was found with family allowance, odds ratio = 5.04, 95% confidence interval: 3.55–7.15.

DISCUSSION

Most people know about birth registration and perceive it as useful so most births are eventually registered. Buea council registers indicate that births are even registered 59 years after they occurred. The 62% reported birth registration coverage for infants in this sample is most likely a substantial underestimate of their expected cumulative registration coverage. The fact that approximately half of the children surveyed had not reached their first birthday also contributed to the underestimate. Requirement for infant death registration is not well known and is not generally perceived as useful. The 4.0% reported registration coverage for infant deaths may be a more reliable estimate because council registers suggest that death registration is unlikely after the first year following a death.

TABLE 4 *Reported reasons for not registering deaths (n = 112)*

Reported reasons	%
No knowledge of registration	54.4
Registration not perceived useful	38.4
Lack of time	3.6
Other	3.6
Total	100.0

The most frequently reported reasons for not registering births are economic and appear to be related to the lack of perceived benefits. Registration is required to be done within 30 days of a birth, just after parents have spent much money on supplies, fees, and birth celebrations. The cost of fiscal stamps and transportation fares to registration centres, long waiting times, and the sometimes unofficial payments required can be a heavy financial burden, especially on poor families. As a result parents generally need to perceive some benefit to register the birth at this time. This is underscored by the modest increases in Buea council birth registrations at ages 4, 10–13 and 17–20, when birth certificates are required for kindergarten, secondary school and university admissions, respectively. Such requirements have commonly been known to result in cases of double registration, with ages being adjusted to meet the requirements.

The association noted between marriage and reported birth registration may be due to the fact that registration is considered the responsibility of men and that the process is more complicated for unmarried parents who want the father's name to appear on the birth certificate. The independent association of education with registration may reflect an increased understanding of the benefits of registration. The stronger association that employment and family allowance have with registration probably stems from eligible parents having a stronger economic motivation.

The very low registration coverage of infant deaths is probably related to the apparent lack of perceived benefits to families. This may also be related to the general lack of knowledge about infant death registration. Cultural factors may contribute to the low registration coverage of births and infant deaths; a common example is not considering children to have been 'born' when death occurs soon after birth. Because family allowance is lost when a child dies, there is less motivation for registering infant deaths. Matters of inheritance are generally decided by families rather than courts thus limiting the use of death certificates for this purpose. The lack of sanctions for not registering births and deaths also undermines the legal requirement.

TABLE 5 *Adjusted socioeconomic factors associated with birth registration*

Characteristic	Odds ratio	Confidence interval
Marriage	2.16	1.70–2.76
Education	2.42	1.84–3.19
Employment	3.19	2.37–4.25
Family allowance	5.04	3.55–7.15

The data in this study are subject to some limitations. Although we relied on the ability of local interviewers to identify all households it is probable that some were missed, especially in the rural areas. We could not confirm all the information on births and deaths with birth or death certificates. Because of the request for anonymity, we could not cross-check birth and death information with medical institutions and registration offices. The small number of reported deaths limited the conclusions that could be drawn from death registration.

It is not clear to what degree the results may be generalized to all of Cameroon. The amount of underregistration of births and deaths may vary from one part of the country to another although the registration procedures and requirements are the same everywhere. We have no reason to believe that similar patterns and reasons for underregistration do not exist throughout the country.

Eliminating registration fees may improve registration coverage. Alternatively, the responsibility for birth and death registration could be transferred from parents and relatives to health units or local councils. The study suggests that a mechanism of registration that uses medical institutions may substantially improve coverage and timeliness of registration. Medical institutions are more widely distributed than registration centres and would reduce the distance travelled by parents for registration. As suggested by many authors village-based community health workers may be able to collect and report births and deaths that occur in their catchment areas.[6,7,8,11,15]

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