Afr. J. Med. med. Sci. (1990) **19**, 49–56.

Morbidity trends at the children's emergency room, University College Hospital, Ibadan, Nigeria

E. A. BAMGBOYE AND J. B. FAMILUSI*

*Department of Preventive and Social Medicine, and *Department of Paediatrics, University College Hospital, Ibadan*

Summary

The paper describes the pattern of diseases of the 17,033 emergency admissions at the children's emergency room of the University College Hospital, Ibadan. Neonates and infants constitute 60% of admissions into the children's emergency room although the facilities provided are heavily weighted in favour of older children. The study also shows a high prevalence of infectious diseases the commonest of which include measles and meningitis. The implications for hospital management of the low frequency of admissions over the weekends and high frequencies in the months of January to April in terms of staff adjustment and facilities are discussed.

Résumé

L'article décrit les types de maladies rencontrées parmi les 17,033 admissions d'urgence au Service des Urgences pour enfants du Complexe Hospitalier Universitaire d'Ibadan. Les nouveaux-nés et les enfants en bas-âge constituent 60% des admissions dans le Service des Urgences pour enfants, alors que les moyens dans ce service sont plus largement développés pour des enfants plus âgés. On a aussi discuté l'incidence élevée des maladies infectieuses dans un tel cadre à ce niveau des soins de santé tertiaires. On a analysé ici les conséquences, au niveau de l'administration de l'hôpital, en ce qui concerne l'aménagement du personnel et les moyens, du faible nombre d'admissions au cours des week-ends et du nombre élevé de celles-ci entre les mois de janvier et d'avril.

Correspondence: Dr E. A. Bamgboye, Department of Preventive and Social Medicine, University College Hospital, Ibadan, Nigeria.

Introduction

The paramount importance of reliable health statistics for health planning, health service management and for formulating governmental health policies cannot be overemphasized. Nigeria and most other developing countries are at a considerable disadvantage in this regard because these countries lack reliable systems of vital registration, disease notification, and other traditional sources of health statistics [1–6]. Because of the prevailing lack of reliable health statistics, hospital records remain the main source of estimates of the health profiles of most developing countries, including Nigeria [7,8]. Despite the limitations of this source, i.e. its selectiveness of patients and unrepresentativeness of the population, it is nevertheless still the best available source of data for describing disease patterns in Nigeria today [4,9].

Most available information stresses the importance of children and their mothers as constituting the majority and most vulnerable groups of Nigerian population [10,11]. An examination of Nigerian demographic characteristics shows that 48% of the Nigerian population consist of children under the age of 15, while women of child-bearing age (15–44 years) constitute an additional 20% [8,10]. The present study examines the pattern of diseases in children seen at the children's emergency room of the University College Hospital, between January 1978 and December 1986.

Materials and methods

The children's emergency room of the University College Hospital Ibadan is opened for 24 h daily for the care of acutely ill children regardless of social class, ethnic or any other back-

ground factors. Admissions facilities in the children's emergency room consist of 12 large cots, seven serento cots and one incubator, giving a total admission complement of 20, but up to 30 or even 40 patients are sometimes admitted at a time. Thus one finds a variety of paediatric admissions in the unit. The initial aim of the present study was to cover the 10-year period 1977 to 1986, but because some of the admission and discharge registers have been mutilated, it was only possible to retrieve adequate information for 7 years, namely 1978 and 1981–1986.

The information extracted from the registers include age, sex, residence, principal diagnosis and outcome of admission. The diagnoses were coded according to the ninth edition of the International Classification of Diseases, while the residences were classified according to whether the patients were from the centre of Ibadan, the periphery of Ibadan, or from outside Ibadan. The extracted data were later processed, with an IBM PC micro-computer using the statistical software SURVEY MATE, for data entry, frequencies, and cross-tabulations. All data which were either not available or unknown on any item during cross-tabulations, were excluded from the denominator of the rates calculated.

Results

A total of 17,033 emergency admissions were recorded in the children's emergency room over the 7 years (1978, 1981–1986) examined in this study. Information regarding residence was available for 15,803 admissions. 10,208 came from the central core of Ibadan, 5378 from peripheral sections of Ibadan, and 1217 came from outside Ibadan.

Frequency distribution of admission by age and sex

The frequency distribution by age and sex of the admissions is shown in Table 1. It is to be noted that 405 patients who had incomplete records of either age or sex were excluded from the analysis. More than half (55.9%) of all children seen at the clinic in the period of study were under the age of 1 year, with nearly a quarter (22.9%) being neonates. While 71.7% of the children were under 2 years, only 13.6% were over the age of 5 years. The sex distribution shows a male (58.1%) preponderance over females, almost a 3:2, male to female ratio. The preponderance of male over female is demonstrated in all the years and among all age groups and appears most marked in cases of neonatal jaundice where the male:female ratio is 2:1.

Morbidity pattern

Table 2 presents the 25 most common clinical conditions seen amongst a total of 13,022 children treated or managed at the children's emergency room. They accounted for more than 75% of all cases seen over the 7 years. Eight clinical conditions, namely jaundice

Table 1. The frequency distribution of admission in the children's emergency room, UCH, Ibadan 1978 and 1981–1986 by age and sex

Age (months)	Male	(%)	Female	(%)	Total	(%)
<1	2284	(59.9)	1529	(40.1)	3813	(22.9)
1	360	(61.8)	223	(38.2)	593	(3.5)
2–6	2296	(57.6)	954	(42.4)	2250	(13.5)
7–12	1513	(56.7)	1154	(43.3)	2667	(16.0)
13–24	1488	(56.5)	1147	(43.5)	2635	(15.8)
25–60	1400	(57.3)	1045	(42.7)	2445	(14.7)
61–120	1106	(58.4)	787	(41.6)	1893	(11.4)
121–180	214	(64.7)	117	(35.3)	331	(2.0)
181–500	6	(54.6)	5	(45.4)	11	(0.006)
Total	9667	(58.1)	6961	(41.9)	16,628	(100.0)

Table 2. Commonest clinical diagnoses at the children's emergency room, UCH, Ibadan in 1978 and 1981–1986

Rank	Clinical diagnoses (ICD-9 code)	Frequency	Frequency of total admissions (%)
1	Jaundice (774.0)	1827	10.73
2	Gastroenteritis (009.1)	1606	8.60
3	Bronchopneumonia (485.0)	1231	7.23
4	Measles (055.0)	1078	6.33
5	Anaemia (281.0)	959	5.63
6	Septicaemia (038.0)	866	5.08
7	Meningitis (322.9)	748	4.39
8	Febrile convulsion (780.3)	687	4.03
9	Low birth weight (765.1)	509	2.99
10	Heart failure (428.9)	349	2.05
11	Malaria (084.0)	313	1.84
12	Dehydration (276.5)	305	1.79
13	Marasmus (261.0)	276	1.62
14	Neonatal tetanus (771.3)	261	1.53
15	Kwashiorkor (260.0)	260	1.53
16	Sickle cell disease (282.0)	259	1.52
17	Typhoid (002.0)	233	1.37
18	Pleural effusion (511.9)	220	1.29
19	Obstructed intestine (560.9)	192	1.13
20	Lobar pneumonia (481.0)	169	0.99
21	Tetanus (037.0)	163	0.96
22	Bronchitis (466.0)	150	0.88
23	Kerosene/Drug poison (789.0)	149	0.87
24	Pyrexia (780.6)	114	0.67
25	Cellutis (682.9)	98	0.58
	Total	13,022	76.45

(10.7%), gastroenteritis (8.6%), bronchopneumonia (7.2%), measles (6.3%), anaemia (5.6%), meningitis (4.4%), febrile convulsions (4.0%) and neonatal sepsis (3.3%) were responsible for more than 50% of all admissions during the study period.

The frequency distribution of the 10 leading clinical diagnoses by age showed that 94% of all cases of jaundice were in neonates while gastroenteritis, bronchopneumonia, and meningitis were most frequent in children aged 1–6 months (Table 3). The peak age incidence for measles was 7–12 months, while anaemia and febrile convulsion occurred most commonly among children aged 1–3 years.

The percentage distribution of yearly admissions of the 10 leading conditions is shown in Table 4, while the frequency of the monthly distribution is shown in Table 5. Except for jaundice, septicaemia and low birthweight, a higher frequency of each clinical condition was recorded in 1978 than in the 6 subsequent years. The highest decline in the frequency of diseases occurred with measles which fell from 306 in 1978 to 58 in 1986. The dramatic fall in the incidence of measles from 138 in 1985 to 58 in 1986 is also noteworthy. With regard to the monthly distribution of the leading diseases, gastroenteritis and meningitis have their peaks in January, while bronchopneumonia had two peaks in August and January. Measles was most frequent between January and April while the highest incidence of febrile convulsion was from April to September. There is, however, no discernible monthly variation in the distribution of the other conditions.

Table 3. Frequency distribution of 10 leading diseases by age

Major diseases	Age (months)								
	0–1	2–6	7–11	12–23	24–59	60–119	>120	Unknown	Total
Jaundice	1717	43	6	9	17	16	1	18	1827
Gastroenteritis + diarrhoea	85	516	488	273	134	66	16	30	1606
Bronchopneumonia	66	412	277	290	134	27	7	18	1231
Measles	0	63	476	361	135	16	5	22	1078
Anaemia	57	102	150	177	268	170	24	11	959
Septicaemia	556	134	49	42	26	43	4	10	866
Meningitis	54	249	142	79	98	104	12	10	748
Febrile convulsions	7	34	89	173	287	81	9	7	687
Nutritional	18	55	161	272	87	23	3	15	634
Low birth weight	450	23	2	6	7	5	0	14	509
Total	3010	1631	1840	1682	1193	551	83	155	10,145

Table 4. Percentage of yearly total admissions of 10 leading diseases at the children's emergency room, UCH, Ibadan

Disease	Year							
	1978	1981	1982	1983	1984	1985	1986	Total
Jaundice	9.1	18.0	14.3	11.2	7.5	5.8	8.1	10.7
Gastroenteritis	12.7	9.2	8.8	6.2	6.5	7.3	6.3	8.6
Bronchopneumonia	9.0	7.3	5.3	5.2	7.1	8.0	7.2	7.2
Measles	8.9	6.0	6.2	6.4	8.3	5.4	2.5	6.3
Anaemia	7.5	4.4	3.4	3.0	5.2	6.1	8.2	5.6
Septicaemia	2.4	4.2	5.7	7.0	5.5	5.7	7.2	5.1
Meningitis	4.7	5.7	4.9	4.4	3.7	3.5	3.2	4.4
Febrile convulsions	5.0	2.5	2.9	3.5	3.8	5.0	5.3	4.0
Low birth weight	1.4	3.0	3.6	4.1	3.9	3.0	3.2	3.0
Heart failure	2.4	1.9	2.7	2.9	1.5	2.1	0.9	2.0
Total	63.0	62.3	57.7	54.0	53.0	51.8	52.2	57.0

Percentage monthly distribution of yearly admissions

Table 6 shows the percentage distribution of the admission pattern by year and month. The highest number of admissions was in 1978 with 3453 (20.3%) of total admissions for the 7 years, while the figure in 1986 was 2329. The number of admissions in 1983 and 1984 were low compared with 1985 and the monthly distributions showed January as having the highest peak, whilst the lowest frequencies were in the months of March, July and August.

Percentage distributions by day of the week

The percentage frequency distribution by each day of the week is presented in Table 7. These generally show a low frequency of admissions at weekends, particularly on Sundays. The flow of patients appears uniform on week days, except

Table 5. Frequency distribution of leading diseases by month

Disease	Month												
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Jaundice	150	171	129	212	185	154	146	130	113	146	155	136	1827
Gastroenteritis	241	117	102	107	157	126	110	130	121	143	122	130	1606
Bronchopneumonia	124	88	91	102	103	117	116	125	100	101	66	98	1231
Measles	136	109	104	142	110	94	54	46	63	63	72	85	1078
Anaemia	101	68	35	79	127	112	85	77	67	73	68	67	959
Septicaemia	90	73	88	95	97	78	64	44	51	72	60	54	866
Meningitis	80	68	44	76	66	65	63	66	55	72	47	46	748
Febrile convulsions	50	33	31	74	68	70	80	57	77	50	57	40	687
Nutritional	62	35	36	47	77	70	70	46	50	58	33	50	634
Low birth weight	48	41	40	55	62	55	42	40	27	38	38	33	509
Total	1082	803	700	989	1052	941	830	761	724	816	708	739	10,145

Table 6. Percentage monthly distribution of yearly admissions at the children's emergency room, UCH, Ibadan in 1978 and 1981–1986

	Year							
Month	1978	1981	1982	1983	1984	1985	1986	Total
Jan.	15.3	11.9	8.2	0.3	11.4	9.6	10.7	10.5
Feb.	6.3	10.4	10.2	7.4	11.5	2.2	7.8	7.8
March	7.6	1.2	7.5	14.0	10.2	5.3	6.4	6.9
April	9.1	9.4	9.0	15.8	12.5	7.3	9.3	9.7
May	8.3	8.6	10.0	14.2	12.8	10.3	9.0	10.0
June	7.8	7.4	8.6	14.7	13.4	10.1	8.0	9.4
July	7.6	8.1	7.6	5.1	11.1	10.2	8.8	8.4
Aug.	8.6	9.0	9.8	0.6	2.6	8.4	9.0	9.5
Sept.	6.0	9.5	2.8	15.6	0.0	10.0	7.0	6.7
Oct.	7.6	8.6	9.4	12.2	0.0	10.3	7.7	8.0
Nov.	7.8	8.8	9.1	0.1	4.4	7.6	7.3	7.6
Dec.	7.9	7.0	7.8	0.0	10.0	8.8	9.0	7.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
(*n*)	(3453)	(2779)	(2629)	(1410)	(1882)	(2551)	(2329)	(17,033)

Table 7. Percentage distribution of admissions by day of the week in the children's emergency room, UCH, Ibadan in 1978 and 1981–1986

	Year							
Day	1978	1981	1982	1983	1984	1985	1986	Overall
Monday	15.3	17.1	16.7	15.0	15.2	15.3	14.9	15.7
Tuesday	14.6	16.1	16.2	16.7	14.9	16.2	15.6	15.7
Wednesday	15.3	14.2	15.8	15.6	15.1	14.1	14.6	14.9
Thursday	14.9	15.8	13.9	14.3	15.9	14.5	14.3	14.8
Friday	15.3	13.6	15.2	15.1	14.9	15.9	14.7	14.9
Saturday	13.4	13.5	12.6	11.9	11.3	12.2	14.8	12.9
Sunday	12.3	9.7	9.7	11.3	12.9	11.7	11.1	11.0
Total	20.3	16.3	15.4	8.3	11.0	15.0	13.7	100.0

for slightly higher frequencies on Mondays and Tuesdays.

Discussion

The present study has revealed that the admission facilities provided in the emergency room require modification. As already noted, up to 40 patients are sometimes admitted into the 20 available spaces; there is therefore a need to provide more admission facilities in the children's emergency room. Furthermore, the facilities presently available are heavily weighted in favour of older children, with 12 large cots compared with seven serento cots and only one incubator for neonates and infants. Neonates and infants constitute about 60% of admission into the children's emergency room, and this fact should be reflected in the proportion of admission facilities available for neonates and infants in the ward. A high preponderance of

males over females has been constantly evident in all previous reports of neonatal jaundice from Ibadan and no doubt reflects the importance of G6PD (glucose-6-phosphate dehydrogenase) deficiency, a sex-linked recessive disorder, as a principal cause of neonatal jaundice in the environment [12,13].

The high prevalence of infectious diseases in our Teaching Hospital, a tertiary-level facility, emphasizes the fact that the health problems of our children continue to be mainly preventable infectious diseases. Therefore the current health policy of government with maximum emphasis on primary health care and an expanded programme of immunization is justified [14].

Finally, the findings stated above no doubt have implications for hospital management in terms of staff adjustment and facilities. Although there were no figures for admissions in 1979 and 1980, the decline of the annual admission from 3453 in 1978 to 2329 in 1986 appears significant. One probable reason for this general decline in the number of acute admissions may be the availability of alternative health facilities for paediatric care in the city. A new children's hospital; 'the Oni memorial hospital for children', was established in 1980 and this has no doubt been caring for some children who hitherto would have come to the University College Hospital. Also, the period under review witnessed a phenomenal rise in the number of private clinics and hospitals in the city. It is to be noted that there were industrial actions during the months of January, August, November and December in 1983 and during the months of August to November in 1984. Lack of admissions during these months of industrial actions were no doubt responsible for the very low total admissions recorded in 1983 and 1984 and the apparent rise in the total admission for 1985 compared with 1983 and 1984 is probably fortuitous.

The low frequency of patients over the weekend is interesting and could be partly attributed to the social life of Nigerians who give priority to merriment and social activities during the weekends. However, it could also be due partly to the fact that while the emergency room is fully operational during the weekends, only skeleton services are available in the laboratories, and some parents may, because of this, prefer to bring their ill children to the hospital after the weekend is over. Such a thinking is certainly in accord with the findings of high frequencies of admissions on Mondays and Tuesdays. The frequency of daily admissions could be used with advantage in allocating staff, with fewer staff at weekends and more staff on Mondays and Tuesdays. Similarly the monthly distributions of admission could be taken into consideration when arranging leave schedules so that fewer staff take their vacation during the peak admission months of January to April. It is to be noted that the commonest fatal conditions like measles and meningitis are most frequent at those periods. In contrast the lowest frequencies of patients come during July to September, and the annual holidays of most members of staff could be planned for this period.

Acknowledgments

The authors are grateful to the Health Service Research Unit of the University College Hospital, Ibadan for providing the financial support for this study. They also thank members of staff of the Department of Paediatrics, particularly those working directly at the children's emergency room. Finally, Mr E. O. Abu is acknowledged for his secretarial assistance.

References

1. Ayeni O. Guidelines for the establishment of a vital statistics registration system in Nigeria. Nig Med J 1975;1:214–19.
2. Ayeni O, Olayinka A. An evaluation of special type vital statistics registration system in a rural area of Nigeria. Int J Epidemiology 1979;8:61–8.
3. Ayeni O. Causes of mortality in an African city. Afr J Med Med Sci 1980;9:139–47.
4. Adetuyibi A, Akinsanya JB, Onadeko BO. Analysis of mortality on the medical wards of the University College Hospital Ibadan, 1960–1973. Nig Med J 1978;8:28–34.
5. Adeyokunnu AA, Taiwo O, Antia AU. Childhood mortality among 22,255 consecutive admissions in the University College Hospital, Ibadan. Nig J Paediatr 1980;1:7–15.
6. Bamgboye EA. An evaluation of hospital records as regular source of periodic data on the health status of children and mothers with particular reference to a national programme monitoring. Paper presented at the UNICEF/NISER Experts Workshop on appropriate in-

dicators, source of data and strategy for monitoring the status of children and mothers in Nigeria Ibadan, Dec 2–5, 1986 (unpublished report).

7. Ashley JSA. Present state of statistics from hospital in-patient data and their uses. Br J Prev Soc Med 1973;26:135–47.
8. Dada BAA. Nigeria Health Profile. Occasional publication of the Federal Ministry of Health, Lagos: Nigeria, 1987.
9. Kaine W, Okolie J. A review of causes of hospitalization as a guide to the pattern of diseases in Eastern Nigeria. Nig Med J 1975;7:205–9.
10. Nigeria. The Effects of Population Factors on Social and Economic Development: The futures group. National Population Bureau, Lagos: Nigeria, 1985.
11. Morah BC. Some determinants of Infant and Childhood Mortality in Nigeria. National Population Bureau Publication Lagos, 1986.
12. Familusi JB, Dawodu AH. Neonatal jaundice in association with household drugs and chemicals: a survey of 450 Nigeria families. Nig Med J 1983;13:43–9
13. Capps FPA, Giles HM, Jolly H, Worlleage SM Glucose-6-phosphate dehydrogenase deficiency in Nigeria. Lancet 1963;2:379–83.
14. Nigeria. The National Health policy and strategy to achieve health for all Nigerians. Occasional publication of the Federal Ministry of Health, Lagos: Nigeria, 1986.

(*Accepted* 9 *February* 1989)