

## Prevalence of cleft lip and palate in a hospital-based population in the Sudan

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**Summary.** Cleft lip and palate represents one of the most common developmental deformities seen in oral surgery clinics. It is usually associated with problems which include not only cosmetic and dental abnormalities, but also speech, hearing and facial growth difficulties.

**Objectives.** The purpose of the present study was to determine the prevalence of cleft lip and palate in births taking place in hospitals in the Sudan.

**Methods.** The records of 15 890 Sudanese new-borns delivered at three hospitals during the period from 1997 to 2000 were examined.

**Results.** Thirteen cases of cleft lip and palate were found, demonstrating a prevalence of 0.9 per 1000. There were more girls than boys, with a male:female ratio of 3:10. Fifty-four per cent of the cases had cleft lip with cleft palate, 30% had only cleft palate and the remaining 16% had cleft lip alone.

**Conclusions.** The present study was confined to hospital-based births in one city, and the true incidence of cleft lip and/or palate in the Sudan is not yet known. Findings differ from reports from other countries in terms of suggesting a higher incidence in girls.

### Introduction

Cleft lip and palate may present a very varied clinical picture, depending, at least partly, on the severity of the condition. The cause is known to be multifactorial in nature, and to include both environmental and genetic factors [1]. Medication, radiation, smoking and alcohol consumption during pregnancy have all been proposed as factors which may contribute to its aetiology [2–4].

Estimates of prevalence and incidence have varied. There is no single efficient or universally accepted recording system for oral clefts, and inaccuracies in identifying and recording the various types of cleft are very likely to have occurred [5]. The introduction of a system of symbolic representations of cleft lip

and palate anomalies in 1964 was found to be a quick and easy method of recording these disorders, and has been thought to reduce the risk of inaccuracies in recording [6].

Recent literature on the prevalence of cleft lip and palate has revealed wide ethnic and racial variations. In Israel, the prevalence rate of cleft lip and palate has been reported to be 1.6 per 1000 [2]. In the USA, these conditions affect about one in every 700 children, with a slightly lower prevalence rate of 1.3 per 1000 [7]. In the Czech Republic, Sipek *et al.* reported an incidence of cleft lip and/or palate of 1.1 per 1000 [8]. The results of at least one study suggest that the incidence of cleft lip and palate may be lower in Africa, forming a contrast to findings in European and North American population groups [9]. Reporting from Malawi, Msamati *et al.* recorded a prevalence rate of 0.7 per 1000, describing it as the lowest incidence of cleft lip and palate seen among black people [9].

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As well as inconsistency in recording, ascertainment may be more difficult in countries where a high proportion of births may take place in areas remote from structured healthcare systems, meaning that records may be incomplete. This factor may have contributed to lower estimates from some countries. Although estimates do give an indication of rates, they may not be directly comparable with those where full ascertainment may be achieved.

The Sudan is a vast country ( $\approx 2,376,000 \text{ km}^2$ ) lying in the north-east of Africa, much of it relatively sparsely populated. The most recent population census suggested that the Sudan has a population of approximately 33 million people, 5 million of whom live in Khartoum, the capital city. In the Sudan, less than 30% of births take place in hospitals, with the majority of deliveries ( $> 70\%$ ) being home deliveries [10].

The aim of the present study was to investigate the prevalence of cleft lip and/or palate in births taking place during a 4-year period in three hospitals in Khartoum.

## Materials and methods

The present study was carried out in three hospitals which serve the population of Khartoum: (1) Omdurman Maternity Hospital; (2) Al-Rahibat Maternity Hospital; and (3) Khartoum North General Hospital.

The records of 15 890 new-borns delivered in the period from 1997 to 2000 were collected from the three hospitals. The number of births at each hospital during the 4-year period is shown in Table 1. Where data was sufficient, records of all the 15 890 new-borns were studied and analysed with respect to

- presence of cleft lip and palate;
- type of cleft;
- presence of other anomalies; and
- sex of the child.

**Table 1.** Number of hospital births at three maternity hospitals in Khartoum, Sudan.

Year	Hospital		
	Omdurman	Khartoum	Al-Rahibat
1997	8 371	3939	–
1998	9 514	4064	2 924
1999	10 029	4478	2 535
2000	12 137	4337	2 369
Total	40 051	7828	16 818

## Completeness of data

The records for 8236 of the 53 895 births which took place in Omdurman Maternity Hospital were complete, as were those for 297 of the 16 725 births which took place in Khartoum North Maternity Hospital. At Al-Rahibat Maternity Hospital, proper documentation was found for 7357 births out of 7828 recorded for the 4-year study period. Other records were missing or incomplete

## Results

### Presence of cleft lip and palate

Thirteen cases of cleft lip and palate were recorded among the 15 890 new-borns. Ten cases were girls and three were boys.

The numbers of cases recorded at each hospital are shown in Table 2. Eight cases were collected from Al-Rahibat Maternity Hospital and the remaining five cases were collected from Omdurman Maternity Hospital. No case was reported amongst the 7828 births which had taken place at Khartoum North General Hospital.

### Cleft type

The numbers of cases with cleft lip, cleft palate and a combination of cleft lip and palate are shown in Table 3 in relation to gender. Of the 13 new-borns, four cases had cleft palate alone, all of whom were girls. Two cases had cleft lip alone, one of whom was a girl and one a boy. The remaining seven cases (five girls and two boys) had both cleft lip and cleft palate.

**Table 2.** Total number of new-borns with a cleft deformity delivered at three maternity hospitals in Khartoum, Sudan.

Year	Hospital		
	Omdurman	Khartoum	Al-Rahibat
1997	–	–	–
1998	3	–	1
1999	3	–	3
2000	2	–	1
Total	8	–	5

**Table 3.** Classification of cleft types in relation to gender.

Gender	Cleft lip	Cleft lip and palate	Cleft palate	Total
Male	1	2	–	3
Female	1	6	3	10
Total	2	8	3	13

### *Presence of other anomalies*

One case of multiple congenital anomalies was found in the records of Omdurman Maternity Hospital. This new-born had microcephaly in addition to cleft lip and cleft palate.

### **Discussion**

In the Sudan, the crude birth rate has been reported to be 33.7% [10]. Therefore, it is estimated that there are approximately one million births per year in the country as a whole, with an average of 170 thousand births in Khartoum state alone [10]. Omdurman Maternity Hospital is the largest hospital of its kind in the country, and it is where 50% of Khartoum State births are believed to take place (Table 1). A large number of births were also reported from Khartoum North Maternity hospital. These two hospitals are both public and open to all classes of people. In contrast, Al-Rahibat is a private maternity hospital serving the needs of a more highly selected social group.

The lack of proper documentation for a high proportion of births very clearly illustrates the difficulty in carrying out this type of study. Although the records for Al-Rahibat Maternity Hospital, where five cases of cleft lip or palate were reported, may be considered more reliable in statistical terms, the highly select nature of the people using this hospital may make estimates less typical of the population. In these circumstances, estimates drawn from records which were complete at the other two hospitals included in this study may, in reality provide a better indicator.

The present study showed that only 13 cases of cleft lip and palate were found amongst 15 890 infants whose births had been properly documented, providing a prevalence rate of 0.9 per 1000. Compared to figures from Africa [9], this prevalence appeared to be high, but like other African estimates, it is low in comparison to most of the figures reported from Europe [11–16]. However, in Al-Rahibat Maternity Hospital alone, the prevalence of cleft lip and palate is 0.67 per 1000 births, while in Omdurman Maternity Hospital, it is 0.97 per 1000 births. The lower prevalence seen in Al-Rahibat Maternity Hospital, compared to Omdurman Maternity Hospital, may be significant in reflecting the more privileged status of those attending private hospitals and who have better access to healthcare in general.

In the USA, the incidence of cleft lip and/or palate has been demonstrated to show wide racial differences. Among Asian groups, it is 1.7 per 1000 births, while in the African-American population it is approximately one per 2500 births [16]. This latter figure suggests that the prevalence of cleft lip and/or palate among African-Americans is even lower than among African natives [9].

The findings of the present study reveal that, of the 13 new-borns with cleft lip and/or cleft palate, seven (54%) had cleft lip with cleft palate, four (30%) had cleft palate and the remaining two (16%) subjects had cleft lip. In most published studies, the percentage of subjects with cleft lip and palate has been higher compared to that of cleft lip or cleft palate alone; for example, this figure has been reported as 66% in Brazil [17], 64% in Korea [18], 53% in the Republic of Ireland [19], 47% in Kuwait [20] and 39% in Denmark [12]. In the present study, the percentage of cleft lip and palate was 54% and is similar to the aforementioned figures. The prevalence of cleft lip alone in this sample was 16% and lies within the reported range [17–20], but in some countries, such as Iran [20] and Japan [22], the reported incidence of cleft lip is very high (35% and 40%, respectively) compared to the above-mentioned countries, including the Sudan.

Amongst children affected, the present findings showed that the girls made up a higher proportion than boys, with a male to female ratio of 3:10. This ratio is similar to that reported by Msamati *et al.* from Malawi, giving the impression that congenital malformations affect girls more than boys in Africa, in contrast to the reports coming from Europe and the USA [1,14,19,22], where females are less often affected than males. The reasons for this are difficult to establish. Complete ascertainment and more uniform reporting to ensure that the finding is real would seem wise before any further speculation.

### **Conclusion**

The present study shows that the prevalence of cleft lip and palate among a group of Sudanese hospital new-borns in Khartoum is 0.9 per 1000 births and the male:female ratio is 3:10. Although the estimate represents a starting point and may be comparable to values reported from some other places, it must be viewed with some caution because of at least three limitations to this study:

- poor hospital records and a lack of documentation in the two publicly funded hospitals;

- the study was hospital-based, and hospital births account for < 30% of births in the Sudanese population as a whole; and
- the study was confined to Khartoum, the capital city, and this urban population may have access to better facilities, better education and enjoy a higher standard of living than the rest of the Sudanese population.

**Résumé.** La fente labiale et/ou palatine représente une des anomalies du développement les plus répandues dans le cadre de la chirurgie buccale. C'est habituellement associé à des problèmes incluant non seulement des anomalies esthétiques et dentaires, mais également troubles du langage, de l'ouïe et de la croissance faciale.

**Objectifs.** Cette étude a eu pour objectif de déterminer la prévalence des fentes labiales et/ou palatines chez les nouveaux-nés des hôpitaux du Soudan.

**Méthodes.** Les dossiers de 15 890 nouveaux-nés soudanais de trois hôpitaux sur la période 1997–2000 ont été examinés.

**Résultats.** Treize cas de fente labiale et/ou fente palatine ont été trouvés, indiquant une prévalence de 0,9/1000. Il y avait plus de filles que de garçons avec un rapport garçons/filles de 3:10. Cinquante quatre pour cent des cas présentaient une fente labiale et une fente palatine, 30% une fente palatine et les 16% restant une fente labiale seule.

**Conclusions.** Cette étude a été confinée aux naissances dans les hôpitaux d'une ville et la véritable incidence des fentes labiales et/ou palatines au Soudan n'est pas encore connue. Les données obtenues diffèrent de celles issues d'autres pays, dans la mesure où elles suggèrent une incidence plus importante chez les filles.

**Zusammenfassung.** Lippen-Kiefer-Gaumenspalten stellen die häufigsten Fehlbildungen dar, welche in Kieferchirurgischen Kliniken vorgestellt werden. Betroffen sind nicht nur zahnbezogene und ästhetische Probleme, sondern auch Schwierigkeiten bei Sprache, Gehör und Gesichtswachstum. **Ziele.** Ziel dieser Studie war es, die Prävalenz von Lippen-Kiefer-Gaumenspalten bei den Geburten in sudanesischen Krankenhäusern zu ermitteln.

Die Dokumentationen von 15 890 sudanesischen Neugeborenen aus drei Krankenhäusern innerhalb des Zeitraumes von 1997 bis 2000 wurden untersucht. **Ergebnisse.** Dreizehn Fälle von Spalten waren dokumentiert, entsprechend einer Häufigkeit von

0,9 auf 1000 Geburten. Die Geschlechtsverteilung weiblich/männlich lag bei 10/3. Sieben Fälle zeigten Lippen-Kiefer-Gaumen Spalten, vier isolierte Gaumenspalten und zwei isolierte Lippenspalten.

**Schlussfolgerungen.** Da die vorliegenden Daten aus nur einer einzelnen Stadt stammen, kann die tatsächliche Inzidenz im Sudan daraus noch nicht ermittelt werden. Im Unterschied zu Daten aus anderen Ländern zeigte sich eine höhere Inzidenz bei Mädchen.

**Resumen.** El labio y paladar fisurados representa una de las malformaciones del desarrollo más comunes, vistas en las clínicas de cirugía oral. Está generalmente asociado con problemas que incluyen no sólo anomalías estéticas y dentales sino también dificultades en el habla, el oído y el crecimiento facial.

**Objetivos.** El propósito de este estudio fue determinar la prevalencia de labio y paladar fisurados en nacidos en hospitales de Sudán.

**Métodos.** Se examinaron los registros de 15 890 recién nacidos sudaneses en tres hospitales durante el período 1997–2000.

**Resultados.** Se encontraron trece casos de labio y paladar fisurados demostrando una prevalencia de 0,9/1000. Hubo más niñas que niños con una ratio varón/mujer de 3/10. El cincuenta y cuatro por ciento de los casos tenía labio y paladar fisurados, el 30% tenía paladar fisurado y el resto, 16%, tenía solamente labio fisurado.

**Conclusiones.** Este estudio estuvo confinado a nacimientos asistidos en hospitales en una ciudad y la verdadera incidencia de labio y/o paladar fisurados en Sudán no se conoce todavía. Los hallazgos difieren de informes en otros países al sugerir una alta incidencia en niñas.

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