Epidemiology of facial clefts

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SUMMARY Data from the Glasgow Register of Congenital Malformations were used to investigate the epidemiology of congenital facial clefts over the period 1974–85. Facial clefts were registered in 247 infants representing a prevalence of 1.56 per 1000 total births. Cleft palate was more common than cleft lip, with cleft lip and palate occupying an intermediate position. More than half of the infants with facial clefts had associated defects. Males predominated for cleft lip; females for cleft palate. Cleft lip (alone) was more common in babies born to women aged 35 years and over. Sudden declines in registered prevalence were observed in 1978 and 1985. Clefts were more common in socioeconomically deprived areas of the city.

In comparison with data from elsewhere, Glasgow seems to have a low rate of cleft lip, a high rate of cleft palate, and a high rate of associated defects. Many of the findings of cleft palate in Glasgow could be explained by the interaction of an unidentified environmental teratogen with a susceptible population.

In the continued absence of an understanding of their aetiology, the epidemiological investigation and monitoring of facial clefts remain important both from a research and public health point of view. A recent report from European Registration of Congenital Anomalies and Twins (EUROCAT) suggests that Glasgow has experienced a higher prevalence of cleft palate than any of the other participating centres over the period 1980–83.¹ The purpose of the present study was to attempt to identify possible reasons for this by means of a more detailed investigation of the descriptive epidemiology of facial clefting in Glasgow.

Methods

All congenital anomalies either identified in a child born (alive or stillborn) to a Glasgow resident or diagnosed in a therapeutically terminated pregnancy of a Glasgow resident, are notified to the Glasgow Register of Congenital Malformations of the Greater Glasgow Health Board. Multiple sources of ascertainment are used, including paediatric discharge letters, hospital (including dental hospital) records, health visitors, perinatal conferences, and death registrations. There is no formal time limit to the period after birth within which notifications are accepted.

Data on facial clefts were abstracted from the Register for the birth years 1974–85. Information

was obtained on the category of facial cleft, any associated defects or syndromes, birthweight, sex, maternal age and postcode sector of maternal residence. The classic epidemiological triad of person, time, and place was analysed for each case.

Results

Personal characteristics of infants and mothers.

Over the 12 years 1974–85 there were 158 668 births in the Greater Glasgow Health Board area. Facial clefts were registered in 247 infants (including seven terminations of pregnancy), representing a prevalence of 1.56 per 1000 total births. Of these, more than half (138) were associated with other malformations. Cleft palate (alone) occurred almost twice as often as cleft lip (alone), with cleft lip and palate occupying an intermediate position (Table 1). The prevalence of other associated defects varied according to the category of facial cleft: almost two thirds of children with cleft palate had other defects, compared with less than one third of children with cleft lip. Children with cleft lip and palate again occupied an intermediate position, being fairly evenly divided between those who did and did not have other defects. Table 2 shows that the most common association was with the Pierre-Robin sequence in 38 children, all but one of whom had cleft palate. The severity of the associated defects is shown by the fact that only 57% of the infants with

Table 1 *Infants with facial clefts notified to the Glasgow Register 1974-1985 (total births = 158 668)*

Category of facial cleft	Facial clefts alone		Facial clefts associated with other defects		Total facial clefts	
	No	Rate/1000	No	Rate/1000	No	Rate/1000
Cleft lip	24	0.15	9	0.06	33	0.21
Cleft lip and palate	41	0.26	44	0.28	85	0.54
Cleft palate	44	0.28	85	0.54	129	0.81
All categories	109	0.69	138	0.87	247	1.56

Table 2 *Congenital malformations associated with facial clefts*

Associated malformations	No	%
Pierre-Robin sequence	38	(28)
Musculoskeletal defects	25	(18)
Neural tube defect	21	(15)
Chromosomal defects	14	(10)
Cardiovascular defects	10	(7)
Others (including syndromes)	30	(22)
Total	138	(100)

Table 3 *Sex ratio of registered cases of facial clefts, 1974-1985*

Category of cleft	No		Sex (M/F) ratio
	M	F	
Cleft lip only	18	6	3:1
Cleft lip and palate only	34	7	4.9:1
Cleft palate only	17	27	1:1.6
Cleft lip with other defects	7	2	3.5:1
Cleft palate with other defects	33	52	1:1.6
Cleft lip and palate with other defects	26	18	1.4:1

them were alive at aged 1 year, compared with 84% of those with facial clefts alone.

There was a pronounced male predominance for cleft lip and for cleft lip and palate, but a female predominance for cleft palate (Table 3).

The prevalence of low birthweight (less than 2500 g) in infants with facial clefts was 13%, almost double the figure (7%) for all Glasgow births during the period 1975-84 (Forbes JF, personal communication), and was particularly high (26%) in infants with both cleft lip and cleft palate.

The only association with maternal age was found in babies born to women aged 35 years and over in whom the prevalence of both cleft lip (alone) and cleft palate (alone) seemed to be higher than in the younger age groups. The difference was, however, significant (at the 5% level) only for cleft lip.

Time trends. During the period studied there were two sharp dips in prevalence. The first, in 1978, was entirely confined to cleft palate (with or without cleft lip), while the second, in 1985, concerned all three categories (Table 4). The decline in 1978 is likely to have been real as the number of infants attending the Glasgow Dental Hospital with facial clefts was also unusually low at that time. (1985 dental data were not yet available at the time of writing). There was one other notable trend: the incidence of clefts associated with other malformations rose over the study period, particularly after 1979, while the prevalence of clefts unassociated with other malformations declined (Table 5).

Table 4 *Annual prevalence (per 1000 total births) of facial clefts (with or without associated malformations) in Glasgow, 1974-1985**

Year	Cleft lip		Cleft lip and palate		Cleft palate		All clefts	
	No	Rate	No	Rate	No	Rate	No	Rate
1974	7	0.5	10	0.7	10	0.7	27	1.8
1975	3	0.2	8	0.6	11	0.8	22	1.5
1976	1	0.1	10	0.8	10	0.8	21	1.6
1977	1	0.1	8	0.6	10	0.8	19	1.5
1978	2	0.2	3	0.2	4	0.3	9	0.7
1979	2	0.2	5	0.4	10	0.8	17	1.3
1980	5	0.4	4	0.3	15	1.1	24	1.8
1981	2	0.2	9	0.7	13	1.0	24	1.8
1982	2	0.2	6	0.5	19	1.5	27	2.1
1983	3	0.2	9	0.7	9	0.7	21	1.7
1984	4	0.3	10	0.8	13	1.0	27	2.1
1985*	1	0.1	3	0.3	5	0.5	9	0.9
Total	33	0.2	85	0.5	129	0.8	247	1.6

*Figures for 1985 are provisional.

Table 5 *Annual prevalence (per 1000 total births) of facial clefts (without associated malformations) in Glasgow, 1974-85**

Year	Cleft lip		Cleft lip and palate		Cleft palate		All clefts	
	No	Rate	No	Rate	No	Rate	No	Rate
1974	6	0.4	8	0.5	6	0.4	20	1.3
1975	2	0.1	3	0.2	6	0.4	11	0.8
1976	1	0.1	7	0.5	5	0.4	13	1.0
1977	1	0.1	7	0.6	5	0.4	13	1.0
1978	1	0.1	2	0.2	2	0.2	5	0.4
1979	1	0.1	0	0	0	0	1	0.1
1980	4	0.3	1	0.1	4	0.3	9	0.7
1981	1	0.1	2	0.1	3	0.3	6	0.5
1982	1	0.1	3	0.2	6	0.5	10	0.8
1983	2	0.2	1	0.1	2	0.2	5	0.4
1984	3	0.2	5	0.3	3	0.2	11	0.8
1985*	1	0.1	2	0.2	2	0.2	5	0.4
Total	24	0.2	41	0.3	44	0.3	109	0.7

*Figures for 1985 are provisional.

Analysis of month of birth indicated a low incidence of facial clefts in November. This pattern seemed to have been confined to cleft palate (alone), though significance was not reached. No seasonal trend was observed either for cleft lip or for cleft lip and palate.

Place of maternal residence. Table 6 shows the variation of the prevalence of facial clefts within Greater Glasgow subdivided into eight categories of postcode sectors classified and ranked according to housing and social characteristics. The categories were derived by means of a cluster analysis of variables obtained from the 1981 census. The highest rates were observed in area types 7 and 8 (local authority housing with young families, high unemployment, and a preponderance of unskilled workers). The lowest rates were found in area type 1 (professional and non-manual workers in large owner occupied housing with two or more cars) and type 3 (mainly non-manual and professional workers in older but good quality housing). Most of this

Table 6 *Prevalence (per 1000 total births) of facial clefts (with or without associated malformations) in eight types of area within Glasgow, 1974-1985*

Housing/social type area	Cleft lip with or without cleft palate		Cleft palate		All clefts	
	No	Rate	No	Rate	No	Rate
1	12	0.7	5	0.3	17	1.0
2	12	0.7	15	0.9	27	1.6
3	6	0.4	8	0.6	14	1.0
4	12	0.7	10	0.6	22	1.3
5	25	0.8	23	0.8	48	1.6
6	9	0.8	10	0.9	19	1.8
7	18	0.9	28	1.4	56	2.2
8	24	0.9	30	1.1	54	2.0
Total	118	0.8	129	0.8	247	1.6

Table 7 *Prevalence (per 1000 total births) of facial clefts (without associated malformations) in eight types of area within Glasgow, 1974-85*

Housing/social type area	Cleft lip with or without cleft palate		Cleft palate		All clefts	
	No	Rate	No	Rate	No	Rate
1	5	0.3	1	0.1	6	0.4
2	6	0.4	4	0.2	10	0.6
3	3	0.2	0	0	3	0.2
4	9	0.6	2	0.1	11	0.7
5	14	0.5	6	0.2	20	0.7
6	3	0.3	5	0.5	8	0.8
7	10	0.5	11	0.5	21	1.0
8	15	0.6	15	0.5	30	1.1
Total	65	0.4	44	0.3	109	0.7

gradient is accounted for by cleft palate: cleft lip (with or without palate) varied less. A similar pattern was found when the analysis was repeated for clefts unassociated with other malformations (Table 7).

Discussion

A recent prospective epidemiological study of facial clefting was reported from Liverpool,² a city which is, in many ways, comparable with Glasgow. Both cities have operated registers of congenital anomalies for several years and both are participants in the multicentre EUROCAT project. The Glasgow Register enjoys the advantage of having been subjected to a systematic evaluation of the accuracy and completeness of its data for the earlier years (1972-77) of its operation. At that time the Register successfully ascertained about two thirds of all known infants with oral clefts (Stone DH, Evaluation of A Register (Report for Mastership, Faculty of Community Medicine Part 2), 1979).

The overall prevalence of facial clefts is similar in the two cities and is comparable with the results of other studies.³ The distribution of the types of defects within the total prevalence, however, varies. In Glasgow more than half of the defects are cleft palate and slightly less than half are cleft lip (with or without cleft palate). In Liverpool only about a third of the defects are cleft palate, most being cleft lip (with or without cleft palate). The Liverpool pattern is closer to that reported from other studies in which a predominance of cleft lip (with or without cleft palate) is the norm, suggesting that the Glasgow figure for the prevalence of cleft lip may be an underestimate.

Glasgow is also atypical in another way. The majority of children with facial clefts had associated defects, most of which were serious in terms of the lesions themselves and the survival of the affected infants. Liverpool reported that only 16% of the children with facial clefts were associated with 'more than one other major anomaly,' and while it is possible that the Liverpool rate of associated defects would have been much higher had children with only one associated defect been included, the Glasgow figure does seem to be unusually high.^{1,3}

In both Glasgow and Liverpool there was an excess of males with cleft lip (with or without cleft palate), but this was not the case for cleft palate, which showed either a female predominance (Glasgow) or no predominance (Liverpool), confirming the general trend observed elsewhere.^{3,4} The higher prevalence in babies born to older mothers observed in Glasgow has also been described elsewhere.^{3,4} Seasonality has been inconsistently reported, and

there is little in common between Glasgow and Liverpool in this respect, except for an apparent absence of any seasonal trend in prevalence of cleft lip.

A real decline in the prevalence of facial clefts took place in Glasgow in 1978, but not in Liverpool, where, if anything, an increase in prevalence occurred at that time. Thereafter, the predominance of clefts associated with other malformations in Glasgow may have been due to improved ascertainment in the wake of the findings of the evaluation exercise which was reported in 1979. Alternatively, both the differing secular trends in the two cities and the changing relative incidence of clefts associated and unassociated with other defects in Glasgow may reflect some unidentified environmental teratogen that was waxing and waning at different times in the two locations.

The possibility of an association with epilepsy and anticonvulsant treatment cannot be excluded as neither study collected sufficient data on the subject, but only 3% of the Liverpool cases were associated with a maternal history of epilepsy, which could therefore explain only a small proportion of the prevalence.

Social class distribution was not reported by either study, but the Glasgow finding of an association between cleft palate and areas of socioeconomic deprivation suggests either that a teratogenic factor may be more prevalent in such areas, or that a

deprived environment enhances the susceptibility of the population to a specific teratogen. An interaction between low socioeconomic status or a poor environment with such a teratogen could explain Glasgow's high prevalence of cleft palate, as well as the variable seasonal, secular, and geographical patterns of reported prevalence. The nature of the specific teratogen remains a matter of speculation, but diet, infection, and drugs are all worthy of continued scrutiny.

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Glasgow is one of the British participating Centres in the EUROCAT project.

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