

ORIGINAL
ARTICLE

Incidence Rate and Risk Factors for Cleft Lip and Palate at Hospital Centers of Hamadan Province, Iran in 2007

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Background and aim: Cleft lip and palate is a common craniofacial congenital malformation. Treatment of this deformity has always been a matter of great concern for physicians and specialists. Data on the incidence and prevalence rate of this condition can help medical authorities plan for the healthcare of these patients. Present study aimed to determine the incidence rate and related risk factors of cleft lip and palate in Hamadan province in 2007

Materials and methods: In this study, 29,822 newborns were evaluated in Hamadan Province hospitals, Iran. Variables such as neonatal gender, parents' occupations, place of residence, family background, parental consanguinity, and neonatal co-occurring disorders, as well as maternal factors such as age at pregnancy, diseases during pregnancy, medications, drug abuse, smoking, alcohol consumption, radiography, and radiotherapy during pregnancy were recorded. Finally, the data were analyzed using SPSS version 13.

Results: 25 neonates (14 male and 11 female subjects) were born with various forms of cleft lip and cleft palate. The incidence rate was 0.83 per 1000 live births. Cleft lip and palate (bi or unilateral) and isolated cleft palate were the most and least frequently reported cases, respectively. In total, 28% of the newborns presented with other co-occurring disorders. Consanguineous marriage was reported in approximately 28% of the neonates' parents and 12% of the mothers used medications such as phenytoin, imipramine, and trifluoperazine during pregnancy.

Conclusion: The incidence rate of cleft lip and palate was close to the average global rate and reports in European and East Asian countries. The incidence rate of clefts was higher in males, compared to females. According to the results, parental consanguinity and mother's medication, especially at the beginning of pregnancy, are regarded as risk factors for cleft lip and palate

Keywords: Cleft lip and palate, cleft lip, disorder

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Introduction

Cleft lip and/or palate occur when tissues in the upper lip and/or palate and the maxillary alveolar arch fail to merge during embryonic development. The incidence rate of this abnormality varies among different racial groups. The incidence rates of oral cleft have been reported from 1 per 500 in Japanese or Navajo neonates to 1 per 2000 in black neonates (1,2). Also different rates were reported from different parts of Iran (3).

Although the etiology of cleft lip and palate is unknown in most cases, the following factors can be pointed out (2,4):

- 1) Environmental factors: Mother's medications such as NSAIDs, salicylates, and phenytoin during pregnancy, amniotic fluid changes, malnutrition, some viral infections, alcohol consumption along with smoking, hypoxia, stress, deficiency or abundance of some vitamins, and radiation during pregnancy can cause clefts in the fetus.
- 2) Inheritance: Approximately 20% to 30% of these abnormalities are associated with genetic factors.

Individuals with different forms of oral clefts will face various problems such as dental malocclusions, nasal deformities, difficulties in eating and speaking and hearing difficulties.

Data of the incidence rate, prevalence and related factors can help healthcare managers to organized qualified team work and plan treatment procedures which can improve the quality of life of these patients.

Material & Methods

In this study, all neonates, born in Hamadan province hospital centers, were evaluated in 2007. The subjects with oral clefts were evaluated in terms of the type of cleft lip and palate, other co-occurring disorders, neonatal gender, previous family history of cleft lip and palate, parental consanguinity, parents' occupations, child rank in the family, place of residence, and ethnicity; maternal factors such as age, diseases during pregnancy, medication use during pregnancy, drug

addiction, and radiographic examination during pregnancy were also recorded.

In order to collect data, the researcher visited 11 hospitals in Hamadan province and searched for cases according to the medical records of hospitals. It should be noted that the type of cleft lip and palate was determined by pediatricians, named in the records, as well as the researcher's examination. The collected data were analyzed using SPSS version 13.

Results

In present study 29,822 neonates, born in year 2007, in all hospitals of Hamadan province were evaluated. The study population consisted of 15,070 male and 14,752 female neonates. A total of 25 neonates (14 boys and 11 girls) borne with cleft lip and palate. The incidence rate of this malformation was calculated as 0.83 per 1000 births (table 1). Gender difference was not statistically significant which was 0.92 per 1000 boys and 0.74 per 1000 girls ($P>0.5$).

According to the results 64% and 36% of these neonates resided in rural and urban regions, respectively. Among neonates with cleft lip and palate, 44% were the first children of the family. In 36% of cases, maternal age at pregnancy was 31-37 years. Also, the fathers of 32% of the affected neonates were workers. Moreover, the mothers of 80% of these neonates were housewives. The types of oral cleft were demonstrated in table 2.

The results revealed that four subjects with cleft lip and palate passed away. The fathers' of cleft cases were healthy while in one subject, the mother revealed a history of cleft and 7 (28%) of neonates demonstrate history of oral cleft in one of relatives. Parental consanguinity was reported in 28% of neonates with clefts. 12% of the mothers had continuously used certain medications during pregnancy, such as phenytoin, trifluoperazine and Imipramine.

In 7 neonates with cleft lip and palate (28%), other congenital malformations were reported such as Down syndrome, clubfoot, polydactyly.

Pregnancy-related diseases were reported in mothers of 4 neonates with clefts including three cases of severe depression and a case of seizure. In addition, smoking,

drug addiction, and undergoing X-ray examination during pregnancy were each reported in one subject. Finally, no history of radiation-therapy was reported.

Table 1: The incidence rate of cleft lip and palate in Hamadan province

City	Affected cases	Total number of neonates	Incidence rate (per 1000)
Hamadan	6	13917	0.43
Malayer	4	5181	0.77
Kaboudarahang	4	1352	2.9
Nahavand	3	3354	0.89
Asadabad	3	1459	2.05
Bahar	2	635	3.14
Razan	2	2209	0.90
Toyserkan	1	1715	0.58
Total	25	29822	0.83

Table 2: The type of cleft lip/palate in neonates born in Hamadan province

Type of cleft	Number	Percentage	Cumulative percentage
Cleft lip	8	32	32
Bilateral cleft lip / palate	7	28	60
Unilateral cleft lip/palate	4	16	76
Isolated Cleft palate	6	24	100
Total	25	100	-

Discussion

Every year, more than 10,000 children are born with cleft lip and palate worldwide, with the mean incidence rate of 1 in 800 births (5). Considering the costly surgeries and orthodontic treatments and the establishment of a research center for cleft lip and palate in Hamadan, we aimed to perform a comprehensive research on the incidence rate and risk factors for this condition in Hamadan province. This study can serve as a basis for other research and educational planning.

Over all ratio of male to female neonates with clefts was approximately 1.2:1, which was similar to the results of study by Yi et al (6) on singapore cases. Sukwha (7) reported the incidence rate of 1.81 per 1000 births with the male: female ratio of 2.1:1 in the cleft lip group, and 2.5:1 in the cleft lip and palate group. Osuji et al in their

research on cleft lip and palate reported a ratio of 6: 1 for male to female cases (8). As to the results of other studies, prevalence of cleft lip and palate varies between males and females and different ethnic groups (9).

Soltani and colleagues studied 26,537 newborns in Kurdestan Province and found the incidence rate of 1.09 per 1000 live births and 1.8:1 in male to female ratio. They revealed that 38% of the affected population presented with other abnormalities, and 28% of mothers used some sort of medication, except alcohol and cigarette (3). The slightly more incidence rate of cleft cases and also other abnormalities in Kordestan province relative to Hamadan province may be the result of some more exposure to chemical agents during war. As an overall the incidence rate in Iran was reported as 1 per 1000 births (10).

Concerning the etiology of oral clefts, a variety of environmental and genetic factors have been proposed for instance, positive family history of clefts, smoking, use of drugs during pregnancy, and parental age have been suggested as relevant risk factors. Salihu and colleagues in their study on Kosovar newborns revealed that family history is the most relevant risk factor in developing oral cleft; parental age, smoking, and medication use during pregnancy ranked next, respectively (11). These results are consistent with the findings of our study, which showed that 12% of mothers, who gave birth to newborns with oral clefts, consumed some sort of medication during pregnancy.

Furthermore, some diseases during pregnancy can increase the risk of developing oral clefts such asthma particularly accompanied by oral steroid use and fever (12,13). Our cases couldn't remember the history of fever during first months of pregnancy and didn't reveal related disease but 12% of mothers had used various medications such as phenytoin, trifluoperazine, and imipramine during long period of pregnancy.

In the current study, parental consanguinity was reported in 28% of the neonates' parents, which was consistent with the studies by Shariyari in Qazvin, Iran (28.8%) (14) and Golalipour in Babol, Iran (29.7%) (15).

Given that 64% of the families were residing in rural regions and considering the fathers' occupations (mostly farmers and workers), we can conclude that place of

residence and social and economic conditions could be possible risk factors for cleft lip and palate. As it is evident, rural women are highly exposed to poisons, pesticides, dust, and other microbial contaminants and are unaware of the use of supplements such as folic acid and proper medications during pregnancy. Also, consanguinity rate is high in rural areas, and mothers have less access to physicians and facilities (such as ultrasound facilities) to control their pregnancies; moreover, malnutrition and poverty are reported in these areas.

This difference is quite evident in different city districts with various economic conditions. For instance, in Hamadan Bou Ali Hospital, which is a private hospital with economically privileged patients, in a total of 1,655 neonates, no cases of cleft lip and palate were found. It seems a broad educational programs for parents can significantly decrease the incidence rate of this malformation.

Conclusion

The current study revealed that the incidence rate of cleft lip and palate was similar to the average global rate and the reports in other parts of Iran and other countries. The incidence rate of cleft lip and palate in male neonates was slightly higher than females. Parental consanguinity, anti-depressant drugs, educational and socio-economic factors could play an important role for these conditions.

References

- 1-Vanderas A.P. Incidence of cleft lip, cleft palate and cleft lip and palate among races: a review. *Cleft Palate Journal*, 1987; 24, 216-225.
- 2-Marazita M.L. Genetic etiologies of facial clefting. In: Mooney, M.P., Siegel, M.I., eds. *Understanding craniofacial anomalies: The etiopathogenesis of craniostosis and facial clefting*, 2002; pp147-162. New York: Wiley.
- 3- Soltani M.K., Mohammadi Z., Zakaryai Nasab A., Golfeshan F. The incidence of cleft lip and palate in a Kurd population: a prospective study. *Community Dental Health*, 2014; 31, 50-52
- 4- Ravichandran, K., Shoukri, M., Aljohar, A., Shazia, N.S., Al-Twaijri, Y. and Al Jabra, I. Consanguinity and occurrence of cleft lip/palate: a hospital-based registry study in Riyadh. *American Journal of Medical Genetics*. 2012; 158A, 541-546.
- 5-Mossey P, Castilla E. Global registry and data base on craniofacial anomalies, Report of a WHO registry meeting on craniofacial anomalies. Bauru, Brazil, 4-6 dec 2001.
- 6- Yi NN, Yeow VK, Lee ST. Epidemiology of cleft lip and palate in Singapore – A 10 years hospital –based study. *Ann Acad Med Singapore*. 1999; 28(5):655-659
- 7- 5-Sukwha K, Kim WJ, Kim JC. Cleft lip and palate incidence among the live births in the Republic of Korea. *J Korean Med Sci* 2002; 17:49-52.
- 8- Osuji OO, Ogar DI, Akande OO. Cleft lip and palate as seen in the university college Hospital, Ibadan. *West Afr J Med*. 1994; 13 (4):242-244.
- 9- González BS¹, López ML, Rico MA, Garduño F. Oral clefts: a retrospective study of prevalence and predispositional factors in the State of Mexico. *J Oral Sci*. 2008; 50(2):123-9.
- 10- Khazaei S, Shirani AM, Khazaei M, Najafi F. Incidence of cleft lip and palate in Iran. A meta-analysis. *Saudi Med J*. 2011 Apr; 32(4):390-3.
- 11- Salihu S¹, Krasniqi B, Sejfija O, Heta N, Salihaj N, Geci A, Sejdini M, Arifi H, Isufi R, Ueeck BA. Analysis of potential oral cleft risk factors in the Kosovo population. *Int Surg*. 2014 Mar; 99(2):161-5.
- 12- Murphy VE¹, Schatz M. Asthma in pregnancy: a hit for two. *Eur Respir Rev*. 2014; 23(131):64-8.
- 13- Dreier JW¹, Andersen AM, Berg-Beckhoff G. Systematic review and meta-analyses: fever in pregnancy and health impacts in the offspring. *Pediatrics*. 2014 Mar; 133(3):e674-88.
- 14- Shahryari AA. Prevalence of cleft lip and palate in Qazvin and its etiology in patients referring to dental school. *J Qazvin Univ of Med Sc* 2001; 18:76-80.
- 15- Golalipour MJ. Epidemiologic evaluation of cleft lip and palate in 1376-1382. *J Babol Univ of Med Sc*. 1384; 2:41-47.