EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 4
Issue: 12
109-115
Year: 2017

EPIDEMIOLOGICAL STUDY OF CONGENITAL CLEFT LIP AND PALATE IN SOHAG GOVERNORATE

***Magda Mohamed Ali and Samia Saied**

Department of Community Medicine, Department of Plastic Surgery, Sohag Faculty of Medicine, Sohag University, Sohag, Egypt.

***Corresponding Author: Magda Mohamed Ali**
Department of Community Medicine, Department of Plastic Surgery, Sohag Faculty of Medicine, Sohag University, Sohag, Egypt.

Article Received on 11/10/2017 **Article Revised on 31/10/2017** **Article Accepted on 21/11/2017**

ABSTRACT

Introduction: Cleft of the lip and palate represent a major public health problem due to the possible associated life-long morbidity, Complex aetiology and the extensive multidisciplinary commitment required for intervention. Cleft are generally divided into two groups, isolated cleft palate and cleft lip or syndromatic disorders. These defects arise in about 1·7 per 1000 live born babies, with ethnic and geographic variation. Effects on speech, hearing, appearance and psychology can lead to long lasting adverse outcomes for health and social integration. Typically, children with these disorders need multidisciplinary care from birth to adulthood and have higher morbidity and mortality throughout life than do unaffected individuals (1). Epidemiologically, a known environmental and genetic risk factors and their interaction play a role in incidence of clefts. Although access to care these patients, have increased in recent years, especially in developing countries, quality of care still varies substantially. Prevention is the ultimate objective for clefts of the lip and palate, and a prerequisite of this aim is to elucidate causes of the disorders. Technological advances and international collaborations have yielded some successes (2). **Objective:** To study the epidemiology, evaluate prevention protocols of Cleft lip and palate. **Methods**: A cross sectional study was conducted for infants from Sohag University hospitals from September 2015 to December 2016. All recruited infants after clinical evaluation and investigation to ensure the diagnosis, were interviewed assessing socio-demographic conditions, risk factors then data are statistically analysed. **Results:** In our study including 750 cleft lip and palate infants and 750 non cleft lip and palate, the estimated incidence of cleft lip and palate was 6.76/1000 living births. Significant risk factors were identified: age of the mother 15:50 years at conception 0.001, smoking (13.5%), fever (1.3%), exposure to pollutants, irradiation (1.3%) and (13.3%) respectively. Consanguinity was present in 36.4%, family history was detected in 10.4%, drugs intake in 23.7% (Table 1). The incidence of neonatal jaundice (13.9%), only (51.7%) of patients not need antenatal care, normal development (91.2%), delayed (8.8%) breast feeding (26.9%), bottle feeding (41.9%) (Table 2). Surgical interventions were the keystone in management of all cases of cleft with other multidisciplinary team as speech therapy, auditory and dental care and psychological support. **Conclusions*:*** Important risk factors have been identified, strongly associated with the incidence of congenital cleft lip and palate in infants. Improvement antenatal care, socio-demographic conditions and adopted fortification of the staple food are needed to our locality.

KEYWORDS: Epidemiology, Risk Factors, Cleft Lip and Palate.

INTRODUCTION

Cleft lip and cleft palate, also known as, orofacial cleft. Cleft lip and palate, is a group of conditions that includes cleft lip (CL), cleft palate (CP) and both together (CLP).[1] These disorders can result in feeding problems, speech problems, hearing problems and frequent ear infections. Less than half the time the condition is associated with other disorders.[1]

Cleft lip and palate is due to defect of fusion mesenchymal structure of facial process intrauterine. The cause in most cases is unknown, risk factors include smoking during pregnancy, diabetes, an older or very young mother, obesity and certain medications such as some used to treat seizures. They can often be diagnosed during pregnancy by using ultrasound.[2]

A cleft lip or palate can be successfully treated with surgery. This is often done in the first few months of life for cleft lip and before eighteen months for cleft palate. Speech therapy and dental care may also be needed. With appropriate treatment outcomes are good.[3]

Cleft lip and palate occurs in about 1 to 2 per 1000 births in the developed world. CL is about twice as common in males as females, while CP without CL is more common in females. In 2013 it resulted in about 3,300 deaths globally down from 7,600 deaths in 1990.[4]

The increase did not continue in the following years, probably due to the improved prenatal and prenatal care of these high-risk infants. Care can be lifelong. Treatment procedures can vary between craniofacial teams. For example, some teams wait on jaw correction until the child is aged 10 to 12 (argument: growth is less influential as deciduous teeth are replaced by permanent teeth, thus saving the child from repeated corrective surgeries), while other teams correct the jaw earlier (argument: less speech therapy is needed than at a later age when speech therapy becomes harder). Within teams, treatment can differ between individual cases depending on the type and severity of the cleft.[5]

Clefts can also affect other parts of the face, such as the eyes, ears, nose, cheeks and forehead. In 1976, Paul Tessier described fifteen lines of cleft. Most of these craniofacial clefts are even rarer and are frequently described as Tessier clefts using the numerical locator devised by Tessier.[6]

Aim of the work

To study the epidemiology, evaluate post natal management and prevention of Congenital Cleft lip and palate.

Subjects and Methods

Type of the study

A cross sectional study was conducted for infants in outpatient clinics and inpatients from Sohag University and as hospital received almost all cases from Sohag Governorate. The field work and data collection lasted from from September 2015 to December 2016.

Sample size justification

Number of cleft lip and palate infants and control ones were calculated using computerized method (open Epi, version 3 open source calculator proportion)

N= the desired sample size when population is more than 10.000.

P = Prevalence of cleft lip and palate (2 in developing countries per 1000.

So the calculated sample size was 750 infants with cleft lip and palate and 750 control infants.

Target Patient

The study population comprised 750 infants with cleft lip and palate from department of plastic surgery, Sohag faculty of medicine, Sohag University received near all cases from Sohag governorate. For the purpose of comparison we aimed at recruiting cleft lip and palate and non cleft lip and palate infants attending the outpatient clinics and inpatients of these hospitals during the same period.

Inclusion criteria for patients were: Infants of cleft lip and palate.

Exclusion criteria for patients were: Infants without cleft lip and palate and cleft lip and palate infants with complications.

Tools of the study

All recruited infants were interviewed, assessing history of socio-demographic conditions as maternal and paternal ages, father occupation, consanguinity, economic status, onset of prenatal care, geographic location of pregnancy. The questionnaire included history of co morbid conditions as maternal diabetes. Chronic hypertension, pregnancy induced hypertension, pre-eclampsia, eclampsia, single or multiparous gestation, maternal alcohol, tobacco, drug use, infection.

Trauma during gestation, trauma or sexually transmitted disease at parturition were also assisted. Duration of before repair of cleft lip and palate, type of treatment, patient compliance to treatment, regular check up with physicians, personal home care as home follow up of medical treatment, complications and other family members with cleft lip and palate.

Investigations

Infants group with cleft lip and palate underwent the following investigations: X ray, CT (computerized topography). Normal infants were examined to exclude cleft lip and palate.

Data collection

Data entry was done using Excel program then transferred to SPSS version 20 program, office 2016.

Statistical analysis

The data was collected, coded and entered on Microsoft Excel Worksheet. Data was then transferred to SPSS format for data checking, cleaning and lastly analysis of data. The Program used for data analysis is SPSS version 20 for windows.

Descriptive statistics was done for demographic data. The statistical tests used in this study were student t test; Chi-Square test was used as a significant test. P value was considered significant when < 0.05 and regression analysis to calculate odds ratio was. A logistic regression was built to find the risk factors that affect the epidemiology of cleft lip and palate.

Ethical consideration

The study was approved by the Ethical committee of the Faculty of Medicine, Sohag Universit. An informed verbal, written consent was taken from all participants in the study. All participants were reassured of data confidentiality.

RESULTS

The studied infants 750 live-born infants with surgically treated infantile cleft lip and palate from September 2015 to December 2016 in Sohag University and Insurance hospitals.

Incidence of cleft lip and palate calculated of all new cases of cleft lip and palate 750 live-born infants with surgically treated infantile cleft lip and palate divided by all live births registries in Sohag Governorate (35.500) live births, Incidence was 2/1000 live births.

In this study of 750 cases of infantile cleft lip and palate, Maternal age mean/SD= 29 ± 9 years, infant age mean 33 /SD= ± 31 days and period of gestation mean /SD= 8.5 ± 1 month. There was sex predominance as the female: male ratio was 2:1.

In our cross sectional study, several significant risk factors were identified among 750 well defined cases of congenital cleft lip and palate. The percentages of risk factors in our study were as follow: In our study including 750 cleft lip and palate infants and 750 non cleft lip and palate, the estimated incidence of cleft lip and palate was 6.76/1000 living births. Significant risk factors were identified: age of the mother 15:50 years at conception 0.001, smoking (13.5%), fever (1.3%), exposure to pollutants, irradiation (1.3%) and (13.3%) respectively. Consanguinity was present in 36.4% , family history was detected in 10.4%, drugs intake in 23.7%, neonatal jaundice(13.9%), no antenatal care (51.7%), normal development (91.2%), delayed(8.8%) breast feeding(26.9%), bottle feeding (41.9%).

Variable		Number of cases	Percent
Total number of cases		750	100%
Sex	Male	307	40.9%
	Female	418	55.7%
	Not mentioned	25	3.3%
Prenatal history	Drugs (vitamins)	178	23.7%
	Exposure to radiation	10	1.3%
	Smoking	101	13.5%
	Alcohol	5	0.7%
	Fever	10	1.3%
	Bleeding	41	5.5%
	Hypertension	6	0.9%
	Trauma	0	0%
Perinatal history	Pregnancy in months Mean SD Range	 8.47 0.65 7-9	
	Toxoplasmosis during pregnancy	7	0.9%
	Other complications during pregnancy	30	4%
	Caesarean section	62	8.3%
	Complications during birth	35	4.7%
	Twins	0	0%
Maternal age	Mean	28.28	
	SD	6.057	
	Range	15-50	
Neonatal history	Jaundice	104	13.9%
	Incubation	94	12.5%
	Cyanosis	19	2.5%
	Convulsion	6	0.8%
Development	Normal	684	91.2%
	Delayed	66	8.8%
Nutrition	Breast feeding	202	26.9%
	Bottle feeding	314	41.9%
	Mixed feeding	234	31.2%
Family history	Of similar conditions	78	10.4%
	Consanguinity	273	36.4%

Variable		Cases	Controls	P value
Prenatal history	Drugs (vitamins)	178(23.7%)	161(21.5%)	0.294
	Exposure to radiation	10(1.3%)	10(1.3%)	0.999
	Smoking	101(13.5%)	88(11.7%)	0.312
	Alcohol	5(0.7%)	2(0.3%)	0.256
	Fever	10(1.3%)	8(1.1%)	0.635
	Bleeding	41(5.5%)	37(4.9%)	0.642
	Hypertension	6(0.8%)	6(0.8%)	0.999
	Trauma	-	-	-
Perinatal history	Pregnancy in months Mean SD Range	 8.468 0.651 7-9	 8.310 0.769 7.5-9	0.096
	Toxoplasmosis during pregnancy	7(0.9%)	5(0.7%)	0.845
	Other complications during pregnancy	30(4%)	28(3.9%)	0.999
	Caesarean section	62(8.3%)	57(7.6%)	0.892
	Complications during birth	35(4.7%)	25(3.3%)	0.187
	Twins	-	-	-
Maternal age	Mean	28.28	26.44	<0.001
	SD	6.057	3.690	
	Range	15-50	17-35	

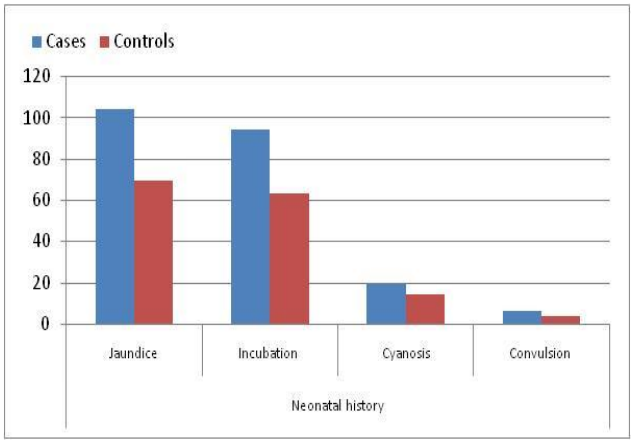
Variable		Cases	Controls	P value
Neonatal history	Jaundice	104(13.9%)	69(9.2%)	0.005
	Incubation	94(12.5%)	63(8.4%)	0.009
	Cyanosis	19(2.5%)	14(1.9%)	0.379
	Convulsion	6(0.8%)	4(0.5%)	0.526
Development	Normal	684(91.2%)	704(93.9%)	0.049
	Delayed	66(8.8%)	46(6.1%)	
Nutrition	Breast feeding	202(26.9%)	236(18.1%)	0.053
	Bottle feeding	314(41.9%)	212(28.3%)	<0.001
	Mixed feeding	234(31.2%)	302(40.3%)	<0.001
Variable		Cases	Controls	P value
Family history	Of similar conditions	78(10.4%)	53(7.1%)	0.022
	Consanguinity	273(36.4%)	187(24.9%)	<0.001

Variable	B	S.E.	Wald	P value	Odd's ratio	95% C.I. for Odd's Lower	Upper
Sex	0.485	0.324	2.238	0.135	1.624	0.860	3.065
Drugs	0.130	0.124	1.101	0.294	1.138	0.894	1.450
Radiation	0.002	0.450	0.006	0.996	1.000	0.414	2.417
Smoking	0.158	0.156	1.022	0.312	1.171	0.862	1.589
Alcohol	0.920	0.838	1.205	0.272	2.510	0.485	12.978
Fever	0.226	0.477	0.224	0.636	1.253	0.492	3.193
Bleeding	0.108	0.233	0.216	0.642	1.114	0.706	1.759
Hypertension	0.005	0.580	0.019	0.921	1.005	0.321	3.115
Trauma	0.002	0.592	0.008	0.985	1.002	0.758	1.258
Perinatal hemorrhage	0.184	0.608	0.091	0.762	1.202	0.365	3.954
Pregnancy in months	0.303	0.194	2.452	0.117	1.354	0.926	1.980
Complicated pregnancy	0.339	0.588	0.333	0.564	0.712	0.225	2.255
Complicated labor	-0.09	0.192	0.229	0.632	0.912	0.627	1.328
Twin pregnancy	0.005	0.489	0.119	0.963	1.006	0.775	1.226
Maternal age	0.075	0.019	15.465	**<0.001**	1.078	1.038	1.119
Neonatal hemorrhage	0.009	0.746	0.071	0.975	1.014	0.996	1.120
Jaundice	0.463	0.165	7.905	**0.005**	1.589	1.151	2.194
Inculation	0.446	0.172	6.775	**0.009**	1.563	1.119	2.188
Cyanosis	0.312	0.356	0.769	0.381	1.366	0.680	2.746
Convulsions	0.408	0.648	0.397	0.529	1.504	0.423	5.351

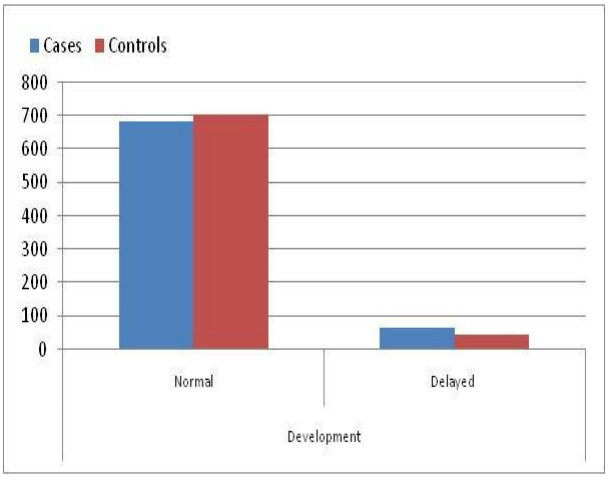
Development	0.390	0.199	3.821	**0.050**	1.477	1.000	2.183
Nutritional	0.408	0.648	0.397	0.529	1.504	0.423	5.351
Breast feeding	0.509	0.126	16.464	**<0.001**	1.664	1.301	2.128
Bottle feeding	0.603	0.110	30.167	**<0.001**	1.828	1.474	2.226
Family history	0.423	0.186	5.168	**0.023**	1.526	1.060	2.198
Consanguinity	0.544	0.114	22.981	**<0.001**	1.723	1.739	2.152

Table (5): Multivariate logistic regression analysis of factors which approved to be significant by univariate logistic regression analysis.

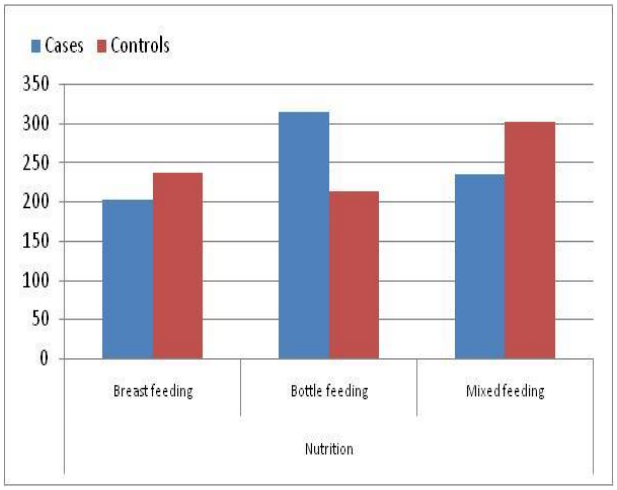
Variable	B	S.E.	Wald	P value	Odd's ratio	95% C.I. for Odd's Lower	Upper
Maternal age	0.074	0.021	12.126	**<0.001**	1.077	1.033	1.122
Jaundice	0.872	0.332	6.910	**0.009**	2.391	1.248	4.580
Incubation	-0.435	0.366	1.412	0.235	0.647	0.316	1.327
Development	-0.193	0.285	0.458	0.498	0.825	0.472	1.441
Breast feeding	-0.358	0.236	2.297	0.130	0.699	0.440	1.111
Bottle feeding	0.467	0.200	5.474	**0.019**	1.596	1.079	2.360
Family history	0.749	0.339	4.894	**0.027**	2.115	1.089	4.109
Consanguinity	0.760	0.217	12.241	**<0.001**	2.139	1.397	3.274



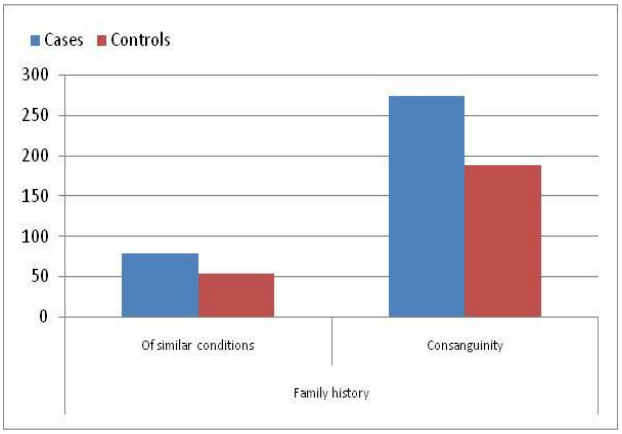
FIGURES(1).



FIGURES(3).



FIGURES(2).



FIGURES(4).

DISCUSSION

1-Incidence

Unusual high incidence (3.7-6.96/1000) was detected in Egypt and this agrees with our results which were 6.96 per 1000 neonates. The incidence is high in some Arabian countries as Algeria 7.5/1000 also among

Palestinians 5.49/1000. Also, Spanish have high incidence attributed to Arabian influences and consanguinity. Low incidence were found in the following countries respectively, Kuwait 1.19/1000, United Arab Emirates 1.14/1000, Bahrain 1.5/1000 and Oman 1.25/1000. Explanation of results recorded from The Gulf Cooperation Council (GCC) countries were mass educational dietetic program emphasized the importance of vegetables and fruit rich in folic acid.[9]

2-Risk factors

The maternal risk factors for congenital malformations especially neurological ones, in a study of Ain Shams University, Egypt, were: maternal illness especially diabetes (7.28%), fever and common cold (16.69%), exposure to pollutants (58.57%). Mothers received antenatal care (31.8%); received multivitamins and folic acid during pregnancy were (27.5%). Mothers received some drugs (not exactly known) in first 3 months of pregnancy (36.32%). Mothers of infants with Cleft lip and palate were more significantly affected ($p < 0.05$) than controls with polyhydramnios (10.8%), oligohydramnios (9.81%) and preeclampsia (39.43%). Twin pregnancy was recorded in (2.94%) and breech presentation in (11.32%) in this study. Delivery by caesarean section (CS) was needed by (23.1%) of mothers of patients with Cleft lip and palate. Consanguineous marriage was present in (45.8%) of parents of patients and family history of Cleft lip and palate was detected in (16.69%) of affected families, these results agree with our results in Sohag Governorate.[10]

3. Sociodemographic conditions

Young maternal age carried a higher risk of (CLP) and neural tube defects, as regards father occupation were significantly decreased (15%) in this study compared 40% in the normal group with significant difference. This denotes a higher incidence of cleft lip and palate in lower socio demographic groups.[11]

These are at higher risk due to environmental or life style factors. In addition their wives lack access to prenatal care, proper balanced nutrition and intake of vitamins or folic acid.[12]

4-Antenatal care

Poor antenatal care as mothers in this study did not receive antenatal care (51.7%). This high-lights the importance of measures for health promotion and disease prevention in child bearing-age women with special attention to prenatal care and childbirth which can influence neonatal indicators and prevention of birth defects (13). Multiparty was associated with increased incidence of cleft lip and palate (CLP) in this study (46.7%). The risk of mutations in women with 3rd and higher gravida is higher than in women with primary or secondary gravida.[13] The frequency of cleft lip and palate presenting by breech in this study was (13%). It is well recognized that a foetus presenting by breech is more likely to have the congenital malformations approximately threefold.[14] Good antenatal care in this study (48%) of mothers of patients with cleft lip and palate had a positive history of drug intake (not definitely identified) in the first trimester of pregnancy. About 2–3% of all birth defects result from the use of drugs. The result is under weight, under developed and may be abnormal developed baby.[15]

5-Environmental factors

Mothers in this study were cigarette smokers (76%) compared to (24%) of normal ($p< 0.05$), either actual smokers or passive smokers, i.e., exposed to environmental tobacco smoke. Maternal smoking for one month before conception through the third month of pregnancy (preconception period) was linked with birth defects of the brain, heart, clef lip with or without cleft palate (CLP).[16] Women were exposed to pollutants by working or living near industrial factories, or helping their husbands in cultivating the land where pesticides were aggressively used (76%). In Egypt there is no specific regulations regarding the use of pesticides (type, amount) and there is no considerable awareness about possible related health problems including cleft lip and palate.[17]

6-Importance of vitamins and folic acid

Mothers received folic acid or multivitamin (76%) were which is significantly lower than that in the normal group. Vitamin B12 might also confer health benefits, however such benefits are difficult to ascertain because of the complementary functions of vitamin B12 and folic acid, so foods have to be fortified with vitamin B12 in addition to the current mandatory folic acid fortification of grains.[18]

Conclusions & Recommendations

1-Health education as regards risk factors were: uniparity, young maternal age, exposure to irradiation, contact with infectious agents, smoking, drug intake, twins, maternal diabetes, consanguinity, low socio demographic.

Conditions congenital malformations than a foetus with cephalic presentations, the abnormality is approximately threefold.[19] We found a higher frequency of Cleft lip and palate in the offspring of mothers having pre-eclampsia (8%) compared to normal. The incidence of major congenital anomalies in infants of diabetic mothers was (11%) 5 times higher than and positive family history of cleft lip and palate must be voided.

1-Folic acid supplementation: The recommended daily dose of folic acid for reduction of risk of cleft lip and palate in women with no previous affected pregnancies is 0·4 mg.

2-Surveys of cleft lip and palate must be done in every country and even in different regions of same country to provide prevalence of cleft lip and palate, pattern of

occurrence, nature, identify causes and associated risk factors and ultimately to prevent or reduce the occurrence of cleft lip and palate that responsible for infant mortality rate under 5 years (23.8/1000) and neonatal mortality rate (15.3/1000) in Sohag Governorate.

3-Prenatal diagnosis and screening programs to prevent these severe, costly, often deadly defects must to be planned in our locality.

4- Further researches are recommended to confirm the actual risk factors which contribute to cleft lip and palate in our locality pattern (of occurrence, nature, identify causes and associated risk factors, prenatal diagnosis and screening programs to prevent these severe, costly, often deadly defects to conclude, cleft lip and palate continues to be an important cause of morbidity and mortality in infants including Egypt.

REFERENCE

1. Boklage, Charles E. (2010). How new humans are made cells and embryos, twins and chimeras, left and right, mind/selfsoul, sex and schizophrenia. Singapore: World Scientific. p. 283. ISBN 9789812835147.
2. GBD 2013 Mortality and Causes of Death, Collaborators (17 December 2014). "Global, regional and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013.". Lancet.doi:10.1016/S0140-6736(14)61682-2. PMID 25530442.
3. Endriga MC, Kapp-Simon KA (1999). "Psychological issues in craniofacial care: state of the art". Cleft Palate Craniofac. J., 36(1): 3–11. doi:10.1597/1545-1569(1999)036<0001:PIICCS>2.3.CO;2.PMID 10067755.
4. JS (2001). "Velopharyngeal insufficiency: An update on diagnostic and surgical techniques". Current Opinion in Otolaryngology & Head and Neck Surgery, 9(6): 365–8. doi:10.1097/00020840-200112000-00005.
5. Endriga MC, et.al (1999). "Psychological issues in craniofacial care: state of the art". Cleft Palate Craniofac. J., 36(1): 3-11.
6. Leonard BJ, Brust JD (1991). "Self-concept of children and adolescents with cleft lip and/or palate". Cleft Palate Craniofac. J., 28(4): 347–353. doi:10.1597/1545-1569(1991)028<0347:SCOCAA>2.3.CO;2.PMID 1742302.
7. Kaplan EN (1975). "The Occult and Submucous Cleft Palate". Cleft Palate Journal, 12: 356–68.
8. Tosun Z, Hoşnuter M, Sentürk S, Savaci N (2003). "Reconstruction of microform cleft lip". Scand J Plast Reconstr Surg Hand Surg, 37(4).
9. Tollefson TT, Humphrey CD, Larrabee WF, Adelson RT, Karimi K, Kriet JD (2011). "The spectrum of isolated congenital nasal deformities resembling the cleft lip nasal morphology". Arch Facial Plast Surg, 13(3): 152–60. doi:10.1001/archfacial.2011.26. PMID 21576661.
10. "Statistics by country for cleft palate".WrongDiagnosis.com. Retrieved 2007-04-24.
11. Sloan GM (2000). "Posterior pharyngeal flap and sphincter pharyngoplasty: the state of the art". Cleft Palate Craniofac. J., 37(2): 112–22. doi:10.1597/1545-1569(2000)037<0112:PPFASP>2.3.CO;2.PMID 10749049.
12. Tobiasen JM (July 1984). "Pychosocial correlates of congenital facial clefts: a conceptualization and model". Cleft Palate J, 21(3): 131–9. PMID 6592056.
13. Pope AW, Ward J (1997). "Self-perceived facial appearance and psychosocial adjustment in preadolescents with craniofacial anomalies". Cleft Palate Craniofac. J., 34(5): 396–401. doi:10.1597/1545-1569(1997)034<0396:SPFAAP>2.3.CO;2.PMID 9345606.
14. Snyder HT, Bilboul MJ, Pope AW (2005). "Psychosocial adjustment in adolescents with craniofacial anomalies: a comparison of parent and self-reports". Cleft Palate Craniofac. J., 42(5): 548–55. doi:10.1597/04-078R.1.PMID 16149838.
15. Pope AW, Snyder HT (July 2005). "Psychosocial adjustment in children and adolescents with a craniofacial anomaly: age and sex patterns". Cleft Palate Craniofac. J., 42(4): 349–54. doi:10.1597/04-043R.1.PMID 16001914.
16. Yuzuriha S, Mulliken JB (November 2008). "Minor-form, microform and mini-microform cleft lip: anatomical features, operative techniques and revisions". Plast. Reconstr. Surg. 122(5): 1485–93. PMID 18971733.