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ORIGINAL RESEARCH ARTICLE

An analysis of birth defects of different nationalities in Guangxi

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ABSTRACT

This study aims to provide a theoretical basis for the development of maternal and child health interventions newborns born in 2016 in Liuzhou of south China's Guangxi Zhuang Autonomous Region. The condition and the different national basic data of birth defects were analyzed. A total of 49873 cases of different ethnical newborns in 2016 in Liuzhou were analyzed. The total of hospital newborn babies were 49873 in 2016, and the birth rate was 41.2% (20562/49873) in the Han nationality, 37.4% (18651/49873) in the Zhuang nationality, 8.1% (4025/49873) in the Miao nationality, 8.1% (4034/49873) in Dong nationality, and 5.2% (2601/49873) in other minority nationalities. The rate of preterm birth was 7.7% (3842/49873) and the rate of birth defect was 1.48% (736/49873). The hearing screening rate was 93%. The early screening positive population for G6PD deficiency was 758 for G6PD deficiency in Liuzhou and the early screening positive rate for G6PD deficiency was 1.52% (758/49873). A total of 818 cases were detected with thyroid hypofunction with positive rate of 1.64% (818/49873) in Liuzhou. The phenylketonuria (PKU) screening positive assessment confirmed for the screening rate of 0.25% (125/49873). In conclusion, the propagation of relative knowledge about the pregnant period health should be enhanced. The nutrition guidance should be provided to pregnant women in order to promote fetal development and reduce the incidence of premature birth, low birth weight infants and birth defects.

Keywords*: newborn; ethnic; birth defect*

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Introduction

Birth information is the foundation of health-related evaluation data. The rate of preterm low birth weight and cesarean section rate, rate of multiple pregnancy, birth defects, pregnant women, and perinatal and neonatal mortality were investigated in developed countries every year[1]. However, a variety of demographic signs of epidemiological investigation and study are lacked in China. Therefore, the development of neonatal medicine have restricted in China. This study obtained information based on newborn babies and described the basic birth information of Liuzhou through survey in order to enrich the newborn medical epidemiology data and master the various basic demographic data.

Liuzhou is a city located in the north-central part of the Guangxi Zhuang Autonomous Region. Liuzhou city has six counties with a total area of 18618 km^2, including urban area of 1214.3 km^2. Liuzhou city has 3.7587 million people (sixth census in 2010) and the city has about 1.7 million inhabitants. Among the permanent residents, there are 1.8386 million people accounting for 48.92% of the Han nationality and 1.9201 million people accounting for 51.08% of the minority nationality. The Han nationality and Zhuang nationality are in all the parts of the city, Miao nationality is mainly in Rongshui Miao Nationality Autonomous County, while Dong nationality is mainly in Sanjiang Dong Nationality Autonomous County[2].

During the survey period of one year, all newborns in the hospital were included to investigate neonatal birth information second level of above hospital of Liuzhou city. All the population epidemiological investigation on newborns in the Midwest cities in China was firstly investigated. Low birth weight, premature birth rate, rate of hearing screening, the incidence of

neonatal disease screening, the incidence of birth defects, neonatal mortality and other information were acquired and analyzed in order to looking for the ways to reduce mortality, optimize configuration of medical resources, and provides the basis for policy for women and children perinatal care measures.

Materials and Methods

Source birth population of 37 delivery hospitals in Liuzhou municipalities and six counties in 2016 was registered and analyzed using maternal and child health information system database. Population and birth mother ethnic composition, preterm birth rates, birthdefect, newborn screening and hearing screening data were all extracted from the database.

Differences between groups were determined using the Chi-squared test with the Least Significant Difference (LSD) multiple-comparison test when appropriate. Values were considered significant when $p < 0.05$.

Results

Population and birth mother ethnic composition

The total of hospital newborn babies were 49873 in 2016, and the birth rate was 41.2% (20562/49873) in the Han nationality, 37.4% (18651/49873) in the Zhuang nationality, 8.1% (4025/49873) in the Miao nationality, 8.1% (4034/49873) in Dong nationality, and 5.2% (2601/49873) in other minority nationalities.

Complications of pregnancy: 784 people are suffered from pregnancy anemia (including 322 are thalassemia), 157 are suffered from pregnancy-induced hypertension and hypertension, 105 with diabetes, 48 are suffered from thyroid function, 34 with active viral hepatitis, and 15 are suffered from heart disease.

Preterm birth rates

The rates of preterm birth were 7.7% (3842/49873), rates of full-term children were 91.8% (45764/49873), and others were 1.5% (267/49873), Table 1. Preterm birth rates in various nationalities were 8.1% in the Han nationality (1661/20562), 8.0% in the Zhuang nationality (1491/18651), 6.4% in the Miao nationality (259/4025), 6.5% in the Dong nationality (261/4034), and 6.3% in other nationalities (165/2601). There are statistically significance in differences of preterm birth rate among various nationalities ($\chi^2 = 27.83$, $p < 0.001$). The Han nationality has significantly higher incidence of preterm infants ($p < 0.001$) when compared with Miao nationality. The Han nationality has significantly higher incidence of premature infants ($p < 0.001$) when compared with the Dong nationality. The Zhuang nationality has significantly higher incidence of preterm infants ($p = 0.002$) when compared with the Miao nationality. Moreover, the Zhuang nationality has significantly higher incidence of preterm infants ($p = 0.004$) when compared with the Dong nationality.

Birth defect

The rate of birth defect was 1.48% (736/49873). The incidence of birth defect was 1.82% in the Han nationality (374/20562), 1.46% in the Zhuang nationality (272/18651), 1.17% in the Miao nationality (47/4025), 1.06% in the Dong nationality (42/4034), and 1.34% in other nationalities (35/2601). Birth defects of all nationalities have no significant difference in statistics ($\chi^2 = 3.81$, $p = 0.558$). The incidence of birth defects in newborn was 29.6% (218/736) with limb deformity, 15.4% (113/736) with congenital heart disease, 12.7% (93/736) with urogenital malformations, 8.3% (61/736) with congenital ear, face or neck abnormalities, 5.5% (41/736) with cleft lip and palate, 4.8% (35/736) with nervous system abnormalities, 2.8% (20/736) with fetal hydrops and thalassemia, 2.5% (18/736) with the digestive system malformation, 0.9% (7/736) with skin anomalies, 0.6% (4/736) with chromosomal abnormalities, and 16.9% (124/736) with other birth defects.

Hearing screening

The hearing screening rate was 93% among the 46382 people screened. The first screening positive rate was 14.2%. Positive hearing diagnosis were performed in 118 people, hearing diagnostic positive

Table 1. The birth rate and birth defect rate in different nationalities

Variables	Han (%)	Zhuang (%)	Miao (%)	Dong (%)	χ^2	p
Birth rate	41.20	37.40	8.10	8.10	27110.25	<0.001
Preterm birth rate	8.10	8.00	6.40	6.50	27.83	<0.001
Birth defect	18.19	14.56	11.83	10.57	3.81	0.558

rate was 3.2%, while 75 people with sensorineural hearing loss, 37 with mixed hearing loss, and 43 with conductive hearing loss.

Newborn screening

The newborn screening rate reached 99.5% (49624/49873) in Liuzhou city in 2016. The early screening positive population for G6PD deficiency was 758 and the early screening positive rate for G6PD deficiency were 1.52% (758/49873). A total of 818 cases were detected with thyroid hypofunction with positive rate of 1.64% (818/49873) in Liuzhou in 2016. The recall review was 718 cases with the re-inspection rate (87.8%), and 21 cases of primary thyroid hypofunction were diagnosed. A total of 103 cases have high blood thyroid-stimulating hormone (TSH > 10 μU/mL but free T4 was normal). The phenylketonuria (PKU) screening positive assessment confirms125 people with positive rate of 0.25% (125/49873).

Discussion

Preterm

The strategies to prevent preterm birth include regular antenatal examination, reducing environmental pollution and smoking during pregnancy, relieve pressure and timely treatment for various complications during pregnancy[3].

Birth defect

The incidence of the birth defect were varied in the world, the data was 3% in USA and Canada, and 12% of hospitalized newborns were because of the birth defects. In England and Wales, the incidence was 2%–3%, where 25% of dead newborns were because of the birth defects[2]. In Taiwan, the incidence of birth defect was 0.73% and the age of the maternal is higher, which is much easier to cause the birth defects[3]. Multiple births have no relationship with the birth defects. In China, it was reported the incidence of birth defect was 0.47%–1.8%[4]. The main reasons of birth defects include the factors of heritage, environments, adverse reproductive history, infection during pregnancy, exposure to the substance of toxic and radioactive. Therefore, it is necessary to supply a comfortable and safe living environment for the pregnant women, reduce environment pollution, away from the work of toxic and hazardous when pre-pregnancy to decrease the incidence of birth defects. Researchers actively explore the related factors of birth defects, look for possible teratogenic reasons, and screen the pathogenic microorganisms, *e.g.* syphilis, herpes simplex virus, rubella virus, cytomegalovirus, and toxoplasmosis[5]. The preventive rubella should be injected before pregnancy and the low-dose folic acid should be given three months before pregnancy to prevent neural tube defects. The tobacco, alcohol and drugs intake should be avoided[6]. The propaganda and eugenics premarital health guidance should be enhanced, and the consanguineous marriage should be prohibited. Prenatal diagnosis and screening tests should be carried out for the pregnant women. The training of birth defects should be enhanced for the obstetric hospital ancillary departments to improve their ability to identify birth defects[7,8].

Hearing defects

Since 1960s, neonatal and infant hearing problems have reached an early consensus, which called “3 Early” –early detection, early diagnosis and early intervention. The early detection, treatment and timely intervention for children of hearing impairments will reduce the developmental neuropsychiatric effects and avoid possibility barriers of speech[9,10].

Conclusion

This study found that the preterm infant incidence of Han was significantly higher than that of Dong, while Zhuang was significantly higher than Miao and Dong nationalities. The preterm infant incidence of Han and Zhuang was significantly higher than Miao and Dong, it is possibly because of the difference of living environment, stressful life, and living habits. However, it still needs further follow-up research. This study also found that the birth defect is the major cause of the newborn deaths. Early diagnosis and effective treatment for the newborns with birth defects can decrease the incidence of disability after birth and improve population quality.

It is very necessary to incorporate the newborn hearing screening into children’s health care, to establish the necessary medical monitoring networks and reporting system for registration of children with disabilities, ensure that the “3 Early”– early detection, early diagnosis and early fitting of hearing aids, early hearing and speech training, and also to enhance newborn hearing screening. Health education, propaganda health care knowledge for horsebean disease, distribution of G6PD mission card, and guidance to prevent hemolysis should be provided to patients with G6PD defects. Thyroid hormone replacement therapy should be given to children with low thyroid function, especially 13 cases of temporary low thyroid function were drug withdrawal and other continued standard treatment.

Patients with PKU positive were given dietary guidance, which is the most effective way for treatment of phenylketonuria. Once diagnosed with PKU, low phenylalanine diet should be provided with strictly protein control, especially animal protein. Patients should be given the moderate of phenylalanine and enough of heat, protein with the supplement of vitamins, trace elements and early intervention.

Conflict of interest

The authors declare no potential conflict of interest with respect to the research, authorship, and/or publication of their article.

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