

Research on the influence of different factors on the incidence of cleft lip in children ——Taking Xinjiang as an Example

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Abstract. Cleft lip and palate have always been the focus of children's medical research. This paper focuses on various environmental factors, such as the frequency of pregnant women taking prescription medicine, family medical history, and the financial status of the families. To conduct the study, this study will collect a sample of several hundred children with cleft lips and palates, utilizing existing research papers as a data source. The paper focuses on the effect of environmental factors on the incidence rate of children with cleft lips and palates in Xinjiang through literature reading. As the results show, there is statistical significance between environmental factors and the incidence rate of children with cleft lips and palates in Xinjiang. Specifically, consanguineous marriage, medicine consumption during pregnancy, disadvantageous climatic and geographic factors, and a lack of educational background all contribute to increasing the prevalence of children with CL/P among the Uyghur people.

Keywords: Cleft Lip, Influence Factors, Xinjiang.

1. Introduction

Cleft Lips and Palates (CL/P) are congenital conditions characterized by incomplete fusion of the lip or palate during fetal development. Various factors can contribute to the occurrence and increased incidence rate of CL/P. Environmental factors, such as the use of certain prescription medications during pregnancy, have been identified as potential influencers. Additionally, family medical history, including a genetic predisposition, plays a role in CL/P development. CL/P are common congenital defects, and among them, the non-syndrome cleft lip with or without a cleft palate has the highest incidence rate in China. This study specifically concentrates on the Uyghur people in Xinjiang, a region known for its distinctive financial and environmental conditions, to provide readers with an understanding of the geographic context of the study. Their unique status as a national minority in China, along with their distinct geographic, cultural, and religious characteristics, contributes to their relatively stable environment. This stability, in turn, has allowed them to develop specific inherent genetic traits within their population [1].

This study is trying to figure out whether the frequency of pregnant women taking prescription medicine, family medical history, and the financial status of the families have statistical significance with the incidence rate of children with CL/P in Xinjiang. The aim of this study is to examine the potential statistical significance between the aforementioned environmental factors and the incidence rate of CL/P. By analyzing the results, we can gain valuable insights that can be utilized to prevent the

occurrence of CL/P. Specifically, by targeting and addressing these factors, we can work towards reducing their prevalence among families in Xinjiang.

2. Analysis of the Factors

2.1. Consanguineous Marriage

An interesting phenomenon worth mentioning is the significant intermarriage that occurs among the Uyghur people, which further influences their genetic characteristics. Notably, first-generation offspring of NSCL/P patients have a 40 percent higher chance of developing cleft lips and palates compared to individuals without a family history of these conditions [2]. Additionally, it is noteworthy that even in the patient's later generations, there remains a 3-5 percent higher chance of developing cleft lips and palates compared to individuals without any family history of these conditions [2].

It is essential to be aware that intermarriage between Uyghur people should be approached with caution, as there is a direct correlation between the consanguineous marriage rate and the incidence of NSCL/P (non-syndrome cleft lip with or without cleft palate). Taking this into consideration can help in understanding and addressing the potential risks associated with consanguineous unions within the Uyghur community [3].

2.2. Effect of Medicine during Pregnancy

The likelihood of children developing CL/P can increase when pregnant women take various types of medication. Examples of such situations include females unknowingly taking birth control pills during pregnancy or using painkillers for minor discomforts while pregnant. It appears that women in Xinjiang lack sufficient educational medical background to fully understand the potential effects of these medications on the incidence rate of CL/P in their children [4].

According to a study by Vassiliki M Cartosos, researchers analyzed data from the Food and Drug Administration's Adverse Event Reporting System and found that Efavirenz and Lamivudine are the medications most strongly associated with an increased incidence rate of cleft lips and palates [5]. A study was conducted by Adeljiang Saimaiti in Southern Xinjiang, which included 341 Uyghur children aged under 12. He sent out question surveys to the intended children's mothers to see if they consumed any medicine during pregnancy. As the result shows, the treatment group (mother of children diagnosed of CL/P) which has a 32.84 percent of mothers who consumed medicine during pregnancy, while the control group only had 10.56 percent. As Chi-square test reveals, the two groups have statistical significance with $p=0.0001$, allowing the researchers to conclude that medicine used during pregnancy is correlated with the higher incidence rate of CL/P (OR=4.44) [6].

2.3. Detrimental Environmental Factors

In a comprehensive study analyzing 1668 CL/P patients in Xinjiang, it was evident that the province exhibits a high incidence rate of cleft lips and palates (CL/P). Moreover, the research identified several factors, but mostly environmental factors that contribute to this phenomenon, shedding light on the underlying reasons behind the increased occurrence of CL/P in the region.

The study reveals a hostile environment in Xinjiang, with 80.9% of CL/P patients who underwent surgeries being nomadic individuals living in challenging terrains such as mountains, basins, deserts, and regions experiencing extreme weather conditions [7]. The vast climatic variations between the four seasons, coupled with limitations in their living conditions and sanitation facilities, contribute to nutritional deficiencies in pregnant women, particularly in Vitamin B. Additionally, residing at high altitudes presents a significant issue, as women in these areas experience chronic oxygen deficits, leading to an increased likelihood of giving birth to children with cleft lips and palates [8]. The combination of these factors underscores the complexity of the issue and highlights the urgent need for comprehensive healthcare support and awareness programs to address the higher incidence rate of CL/P in Xinjiang.

The Uyghur people residing in remote areas of Xinjiang face significant challenges, including a modest standard of living, limited economic opportunities, and restricted access to comprehensive education on personal hygiene and sexual reproduction. As a result, pregnant women within this community often lack essential knowledge about pregnancy, particularly during the critical gestational period of 13-14 weeks. The lack of awareness about prenatal care and reproductive health is a prevalent issue among expectant mothers. Addressing this crucial concern requires targeted interventions and educational initiatives to empower Uyghur women with vital knowledge, ensuring healthier pregnancies and improved maternal and fetal well-being [8].

2.4. Lack of Education Background

Indeed, cultural isolation and limited access to education in those regions often result in a lack of awareness regarding the potential consequences of consanguineous marriages [9]. This lack of necessary educational background can lead to a lack of understanding regarding the effects of such unions, including the increased risk of certain genetic conditions like NSCL/P. Raising awareness and providing educational resources in these areas could be crucial in promoting informed decisions and improving the overall health outcomes of the Uyghur community.

However, the government can take initiatives to promote the importance of knowledge related to genetics in a way that is easily understandable to the public. In the 1668 cases of individuals with cleft lips and palates, hereditary factors played a significant role. Among these cases, 4.7 percent of the patients' parents were found to have various types of congenital diseases, such as missing fingers, malformed limbs, scoliosis, and more, accounting for a total of 79 cases [10]. Additionally, among these cases, 193 involved consanguineous marriages, representing approximately 11.3 percent of the entire group. These findings highlight the considerable influence of hereditary factors in the occurrence of cleft lips and palates and emphasize the need for heightened awareness and informed decision-making regarding consanguinity [8].

The health issues of parents can significantly contribute to the incidence rate of cleft lips and palates in their children. Habits like alcohol consumption and daily smoking can play a role in this, as can the use of prescription drugs to manage conditions like diabetes and kidney diseases [11]. These habits and medications have a profound impact on the embryonic development of children. The root cause of these factors lies in the parents' poor living standards, which might have contributed to the development of chronic diseases requiring medication. As a result, the likelihood of their children experiencing CL/P is significantly elevated [8]. Addressing these health concerns and promoting healthier lifestyles among parents can potentially reduce the risk of cleft lips and palates in their offspring.

The vocation of parents is another significant factor influencing the incidence rate of cleft lips and palates in children [12]. This study involving 1668 cases revealed that many of the patients' parents were employed in occupations associated with cosmetics sales, house painting, car repair, waste material salvage, and the radiology departments in hospitals. Being exposed to various chemicals for extended periods in these professions has been linked to an increased likelihood of children developing CL/P [8]. Occupational exposure to chemicals highlights the importance of workplace safety and preventive measures to safeguard the health of both parents and their offspring. Implementing appropriate protective measures in these work environments can potentially contribute to reducing the occurrence of cleft lips and palates in children.

The elevated incidence rate of children with cleft lips and palates in the Xinjiang region can be attributed to various factors. Excessive use of fertilizers on crops and vegetables, over-application of pesticides on fruits, and the presence of an excessive amount of antiseptic substances in drinks and snacks are among the contributors. Additionally, an increase in feed supplements for domestic animals, an abundance of minerals in water sources, and environmental pollution further add to the challenges [12]. The collective impact of these factors underscores the need for sustainable agricultural practices, responsible use of chemicals, and robust environmental conservation efforts to reduce the occurrence of cleft lips and palates in children. Addressing these issues can foster a healthier environment for future generations.

3. Conclusion

Owing to the high occurrence rate of cleft lips and palates among the Uyghur population in Xinjiang, China, the purpose of this research was to delve into this specific phenomenon and address potential risk factors that exhibit correlation or statistical significance with the frequency of CL/P incidents. By delving into pertinent sources and scrutinizing statistical information amassed by prior investigators, this study collected data on over 1000 children and their families who had undergone previous examinations or surveys. Consequently, it was possible to identify various factors contributing to the manifestation of CL/P, including consanguineous unions, maternal medication during pregnancy, adverse environmental conditions, and limited educational access. All the aforementioned aspects were found to be linked to an elevated incidence of CL/P.

Furthermore, the choice of the Uyghur cohort as the exclusive focal point of this inquiry was partly due to their geographically secluded location and distinctive cultural practices. Although these elements ultimately emerged as pivotal connections to the prevalence of CL/P within the Uyghur community, it would have been beneficial to encompass a broader range of participants from diverse backgrounds across China. Consequently, in forthcoming endeavors, the scope of this study is set to broaden, encompassing not only Chinese subjects but also individuals hailing from around the globe, representing varied geographical locations and cultural traditions. This expansion aims to render the conclusions more comprehensive and universally applicable.

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