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# Does the Clinical Exposome Affect Children with Cerebral Palsy?: A feasibility study

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## Introduction

- Cerebral palsy (CP) is the most common pediatric motor disability in the United States of America today and has been associated with many etiologies.
- Literature on Cerebral Palsy and Social Determinants of Health (SDoH) is lacking, even though it is a crucial component of medicine.
- There is little evidence analyzing that the effect of socioeconomic status (SES) based on area-based analysis and the prevalence and severity of CP.
- The relationship between zip code tabulation areas and CP prevalence or severity is unknown.

## Design/Sample

- Aims: Examine the existing literature on the association between SES and cerebral palsy outcomes.
- A search was performed to identify published literature on social determinants of health (SDoH), CP, CP disparities, CP prevalence, race, ethnicity, socioeconomic status, and zip code-based tabulation areas following Prisma guidelines. The search was performed using the following databases:
  - Ovid Medline
  - Embase
  - Scopus
  - Cinahl
- Articles were selected based on inclusion criteria including: papers written between the dates of 1990-2022, participants diagnosed with cerebral palsy (up to 18 years old) using the Gross Motor Function Classification System, peer-reviewed papers, and original studies. Relevant articles were then selected and reviewed in detail.

## Results

**Figure 1:** Prisma Figure



**Figure 1:** PRISMA flow diagram for the systematic review detailing the number of abstracts screened, the amount of duplicates removed, and the amount of full texts assessed and selected

## Analysis

Seven articles were included in the systematic review. Of these, four found low SES to be a risk factor for increased CP prevalence. Three studies found low SES to be associated with increased CP severity. Four studies found ethnicity to be associated to CP. Two of these papers that explored ethnicity found an association with increased CP prevalence in those of minority ethnicities. Additionally, two studies found increased CP severity in those who identify with minority ethnicities. Two studies found statically significant associations with SES and CP after controlling for pregnancy factors including gestational age, and/or birthweight. Lastly, three of the studies were area-based deprivation studies and found a relationship between the lowest SES ranking and having increased CP prevalence and/or severity.

## Summary

In our study, we identified literature proving that a socio-economic gradient exists in both CP prevalence, and CP severity. Additionally, we have seen that the gradient exists in both individual measures of SES, and area/neighborhood measures of SES. These factors have been found to be associated with increased CP severity/prevalence outside of pregnancy risk factors. However, to our knowledge, there has not been a study identifying a correlation between specific zip code tabulation areas and CP severity.

## Conclusions

- Evidence suggests that there is an association between SES and CP outside of pregnancy risk factors that may cause CP including birth weight, maternal gestational age, etc.
- An individuals’ zip code and environment can have an effect their health and on a child's health both pre-natal and post-natal. It is imperative to study these factors in the cases of pediatric disorders such as cerebral palsy.
- Further studies are needed to examine the role between zip code tabulation areas with an associated risk of development and severity of cerebral palsy.

## Further Study

A pilot project of a 9-digit zip-code based analysis on a subset of n=150 patients with CP at Shriners Children’s Hospital will be performed. By analyzing zip codes, key information can be extrapolated by comparing different factors that may be present in an individual’s environment. A variety of environmental factors have been linked to health outcomes. This pilot project will be investigating if there is an association between CP prevalence and severity and varying environmental factors.

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