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COGNITIVE TRAINING OF CHILDREN WITH CEREBRAL PALSY; AN OVERVIEW

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Abstract
Introduction: There were various stages children available who are going through CP issues and this disorder is mainly attacked the brain development system. The children are not able to do movement of muscles and their walking processes have observed as unstable.
Aim: This study aims to know more about the cognitive training process for those children who are going through cerebral palsy issues.
Literature review: There were different objectives related discussions have done and the training process, symptoms, importance of cognitive training, and many more things were described. The audiences can know more about this training process and the problems that have been faced by children as well as parents.
Methodology: The entire study was done based on the primary quantitative data collection process and the SPSS software tool was helped to analyze the data. There were 13 questions and 75 responses were taken from parents, doctors, and trainers who are involved with this process.
Findings: The main findings were the connection between dependent and independent variables and the hypotheses were totally signified as an outcome.
Discussion: The entire study related a brief description was available in this section.
Conclusion: In the conclusion section, it was observed that the infants and preschool children are mostly faced this problem along with till 8 years age. There were various strategies and training process described.
Keywords: Cerebral palsy, children, cognitive training, behavioral therapy, trainers, muscles movements

Introduction

There are various stages of children available who are mainly facing this issue, especially infants and preschool children. As per the views of García-Galant et al. (2020), emotional imbalances, anxiety, including abnormal anger, and depression all of these symptoms are commonly observed in those children. Cognitive training is one kind of process that mainly helps with neurodevelopment using different patterns of stimulation. The main damage is observed in the rain for the children. It means that those children have to face various difficulties with their brains and are not able to understand what others say or what they are saying. CP-impacted children are mainly doing the improper movement, and they are going through exaggerated reflexes, unusual posture, unsteady walking, and many more difficulties.

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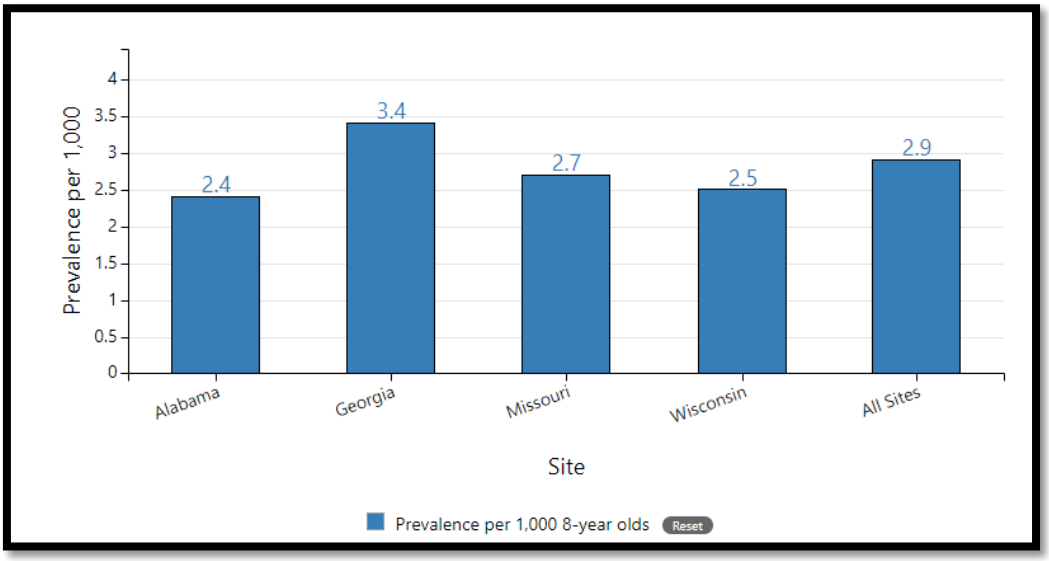

Figure 1: CP prevalence rate among 8 years old children with ADDM
(Source: García-Galant et al. 2020)

Figure 1 indicates that CP impacted 1 out of 4 per 1,000 live births or per 1,000 children. In Cerebral palsy disease, cerebral stands for brain damage, and palsy defines weakness and issues with muscle movements. It has been observed that among 1000 children 3 at least children affected by these issues from 8 years age group, and. In the year 2010, the ADDM CP network expanded its areas, and it was found that 82.9% of children have been impacted by this problem.

The aim of the study:

This study aims to know more about the cognitive training process for those children who are going through cerebral palsy issues.

Research objectives are mentioned below:

RO1: To investigate the process of cognitive pieces of training for those children with cerebral palsy

RO2: To identify the symptoms of cerebral palsy-affected children

RO3: To specify the concept of cerebral palsy

RO4: To know more about the importance of cognitive training for the CP affected children

The below-mentioned are research questions:

RQ1: What is cerebral palsy for children?

RQ2: What are the processes of cognitive pieces of training for those children with cerebral palsy?

RQ3: Which types of symptoms have been faced by cerebral palsy-affected children?

RQ4: How much of this cognitive training is important for CP-impacted children?

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Literature review

Identify the concept of cerebral palsy

Cerebral palsy is mainly one kind of disorder that impacts children and the affected persons are not able to neither move their muscles nor maintain their balance and posture. As per the views of Stadskleiv (2020), this CP is identified by the X-ray of the brain and brain image, and "computed tomography (CT scan)" or "magnetic resonance imaging (MRI)". This cerebral palsy is mainly observed in the children between first and second year after birth.

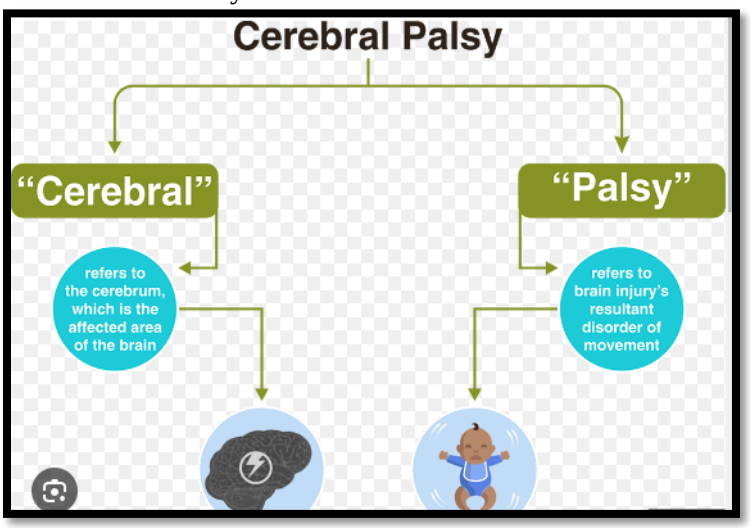

Figure 2: Cerebral palsy - Cell therapy

(Source: Stadskleiv 2020)

Figure 2 mentioned the meaning of cerebral palsy, and C stands for brain and P stands for disorder or movement. There are different types of cerebral palsy available and those are ataxic, spastic, hypotonic, athetosis, and mixed cerebral palsy.

Overview of the importance of cognitive training for those children who are affected by CP

There is various importance’s available with this cognitive training that is used for the CP impacted children. As highlighted by Ko et al. (2021), the brain is the most important part of the body and with the help of this training; children can easily recover from the disease. The importance is memory improvement, improved focus, and mental flexibility development for problem-solving and reasoning. The children must develop their brains, so they can better their future. There are many children available who have to struggle to solve a problem and complete a task. Therefore, it is important to develop the memory and keep focus on one thing.

Analyze the symptoms that have been faced by cerebral palsy-affected children

There are various symptoms available that have been faced by children after birth due to cerebral palsy. As per the views of Byrne et al. (2019), this effect is usually not visible after birth, it is mainly observed at an early age. The symptoms are weak arms or legs, muscle spasms, random, uncontrolled movements, walking on tiptoes, shaking hands, and delays in reaching developmental milestones.

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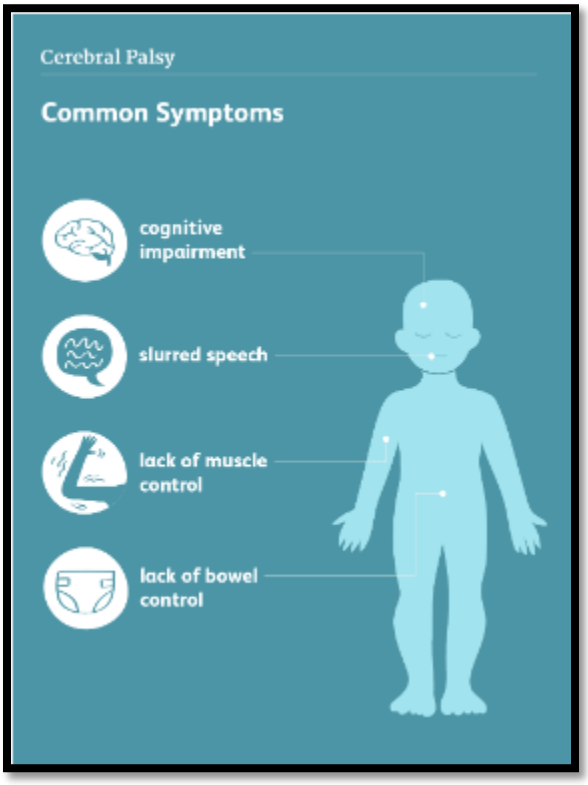

Figure 3: Signs, symptoms, and complications of CP

(Source: Byrne et al. 2019)

The above-mentioned Figure 3 indicates that there are few more symptoms available, and that mainly creates boundaries for the children's development. Therefore, it is the duty of the parents to give their children proper treatment and make a better future for them.

Specify the cognitive training process for children with cerebral palsy

The main training process is done through the brain, and there are several exercises available for brain development with the help of cognitive training. As illustrated by Sivaratnam et al. (2020), brain exercise can boost brain development, and the brain is never stopped, always active even during sleep timings. There are a few exercises available like meditation, playing memory games, completing jigsaw puzzles, listening to music, playing musical instruments, and many more things. In case a child can go through this training process, then there is a chance of brain development and better movement of muscles.

Methodology

The researcher has taken help from the Primary Quantitative Data Collection Method with the help of Google Survey Form to collect information. As highlighted by El Helou, George, & Macdonald (2023), the data collection process is very important as it can give a successful outcome to the study. On the other hand, the SPSS software tool was used to analyze all the collected data and the questions were created based on the topic-related theories.

There were 13 questions and 75 responses were taken, and as participants trainers, doctors, and parents were given their responses. Along with that, a positivism philosophy and descriptive research design were used to complete the study (Flick, 2015). The chosen processes were appropriate for this study, as they gave the research a successful outcome. The collected information was based on statistical and quantitative methods. The topic-related theories are totally appropriate and take responses only from the related persons.

Findings and Analysis

Hypothesis testing

Hypothesis 1
H1: There is a positive connection between Cognitive Training and Cerebral Palsy
H0: There is no connection observed between Cognitive Training and Cerebral Palsy
Hypothesis 2
H2: There is a strong interconnection between Children and Cerebral Palsy
H0: There is no interconnection available between Children and Cerebral Palsy
Hypothesis 3
H3: There is a significant association between Behavioral therapy and Cerebral Palsy
H0: There is no association visible between Behavioral therapy and Cerebral Palsy
Demographic Data
Age

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30	5	33.3	33.3	33.3
	31-40	4	26.7	26.7	60.0
	41-50	3	20.0	20.0	80.0
	More than 51	3	20.0	20.0	100.0
	Total	15	100.0	100.0	

Table 1: Age analysis

(Source SPSS)

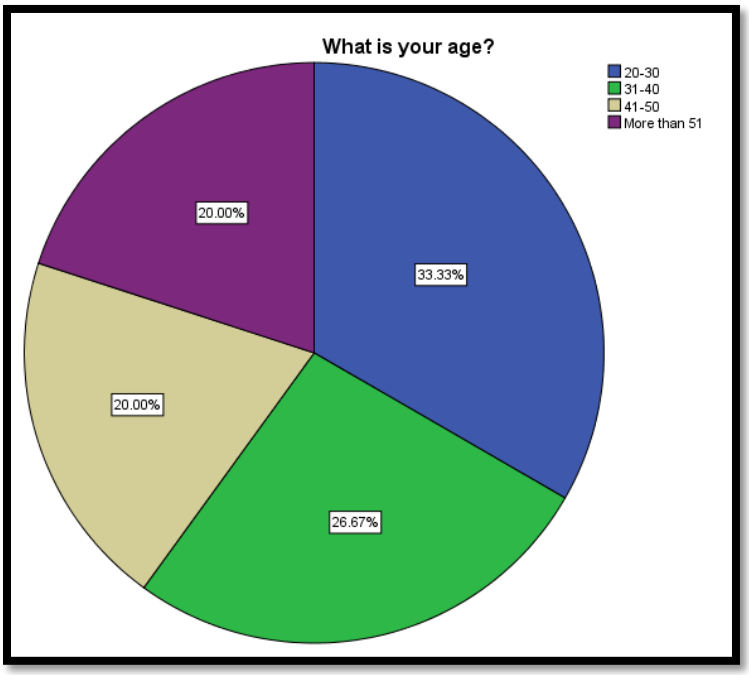

Figure 4: Age analysis

(Source: SPSS)

In the above-mentioned Figure 4, it is observed that 33.3% of people are available from the 20 to 20 age group. On the other hand, the 31 to 40 age group participants are only 26.67% (Jackman et al. 2020). The last 20% of people were under 41 to 50 and more than 50 age group members.

Gender

What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	7	46.7	46.7	46.7
	Male	4	26.7	26.7	73.3
	Prefered not to say	4	26.7	26.7	100.0
	Total	15	100.0	100.0	

Table 2: Gender analysis

(Source: SPSS)

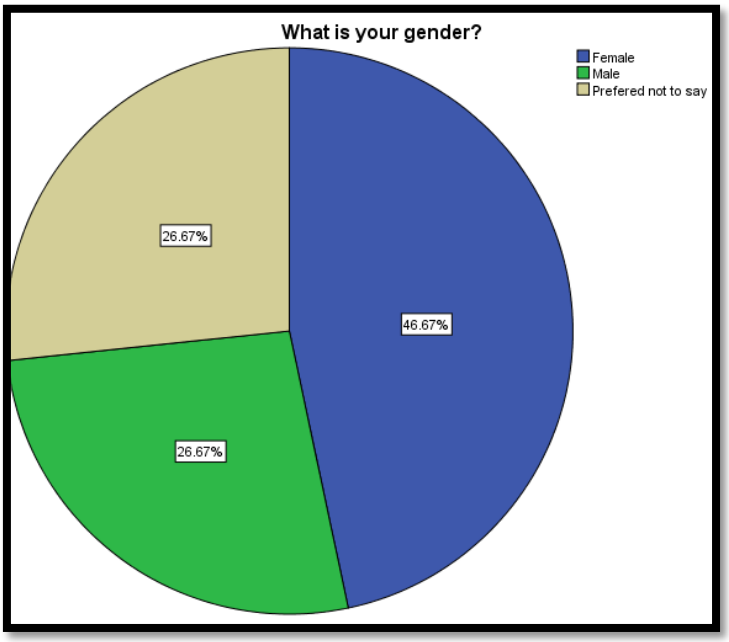

Figure 5: Gender analysis

(Source: SPSS)

There were male, female, and preferred not to say, three options available as per figure 5. Among them, 46.7% of females and 26.7% of males are available (Schölderle, Haas, & Ziegler, 2021). The rest preferred not to say, options were chosen by 26.75 participants.

Income Range

What is your income range?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15,000 to 20,000	4	26.7	26.7	26.7
	21,000 to 25,000	2	13.3	13.3	40.0
	26,000 to 30,000	6	40.0	40.0	80.0
	More than 31,000	3	20.0	20.0	100.0
	Total	15	100.0	100.0	

Table 3: Income range analysis

(Source: SPSS)

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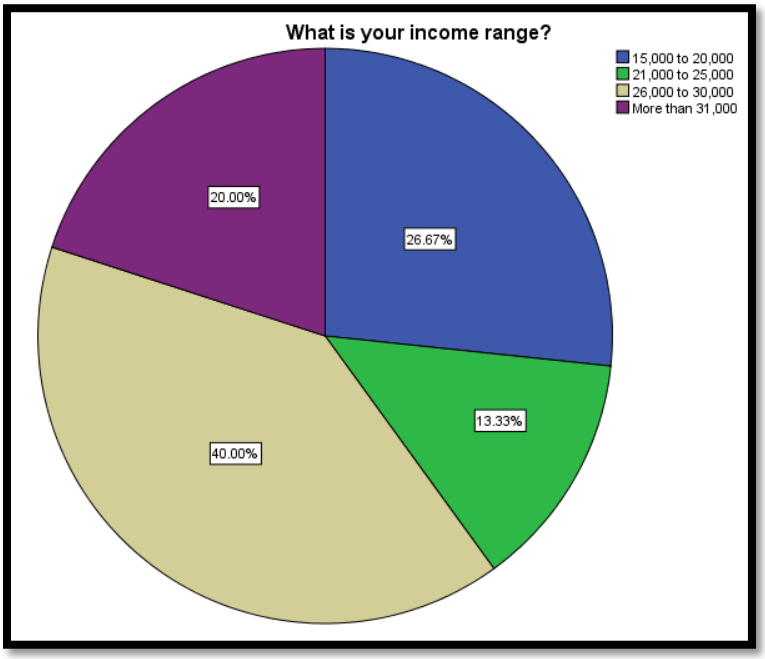

Figure 6: Income analysis

(Source: SPSS)

Figure 6 indicates that 40% of people are under the 26 to 30 thousand income range and 26.7% of participants were under the 15,000 to 20,000 income range. The rest 20% earned more than 31 thousand and 13.3% were from 21,000 to 25,000 thousand (Pereira et al. 2019).

Descriptive analysis

Hypothesis 1

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.997[a]	.994	.993	.20526	.994	2097.771	1	13	.000	2.646

a. Predictors: (Constant), Cognitive_Training

b. Dependent Variable: Cerebral_Palsy

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88.386	1	88.386	2097.771	.000[b]
	Residual	.548	13	.042		
	Total	88.933	14			

a. Dependent Variable: Cerebral_Palsy

b. Predictors: (Constant), Cognitive_Training

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.009	.143		-.063	.951
	Cognitive_Training	.665	.015	.997	45.801	.000

a. Dependent Variable: Cerebral_Palsy

Table 4: Hypothesis 1

(Source: SPSS)

The above-mentioned the table 4 indicates that there is a signified connection available between cerebral palsy and cognitive training. The sig value from both the model summary and the ANOVA table is .000 which is highly correlated (Anvarovna & Mahamatjonovna, 2023). However, as per the coefficients table, the connection is not appropriate as the Sig value of it is .951 which is more than 0. Various numerical hypotheses are available that create a piece of clear information; hence, the audience can easily understand the study topics.

Hypothesis 2

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.993[a]	.986	.985	.31104	.986	906.238	1	13	.000	.434

a. Predictors: (Constant), Children

b. Dependent Variable: Cerebral_Palsy

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	87.676	1	87.676	906.238	.000[b]
	Residual	1.258	13	.097		
	Total	88.933	14			

a. Dependent Variable: Cerebral_Palsy

b. Predictors: (Constant), Children

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.136	.213		.640	.534
	Children	.664	.022	.993	30.104	.000

a. Dependent Variable: Cerebral_Palsy

Table 5: Hypothesis 2

(Source: SPSS)

The table 5 shows that, there is a significant interconnection available between cerebral palsy and children available. In the coefficient's table, the sig value is not correlated as it is .534 which is higher than 0 (Dan, 2021). The hypothesis section mainly indicates the possible outcomes of the research work that was done based on the experiments and collected information. This hypothesis has a Sig value which is 0 and in case it has crossed above 0 then the connection will be lost.

Hypothesis 3

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.995[a]	.990	.989	.26244	.990	1278.266	1	13	.000	1.118

a. Predictors: (Constant), Behavioral_therapy

b. Dependent Variable: Cerebral_Palsy

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88.038	1	88.038	1278.266	.000[b]
	Residual	.895	13	.069		
	Total	88.933	14			

a. Dependent Variable: Cerebral_Palsy

b. Predictors: (Constant), Behavioral_therapy

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.058	.181		.321	.753
	Behavioral_therapy	.980	.027	.995	35.753	.000

a. Dependent Variable: Cerebral_Palsy

Table 6: Hypothesis 3

(Source: SPSS)

The above-mentioned Table 6 indicates that the Sig value of the model summary table is .000 and the ANOVA table Sig value is also .000 and which means the hypothesis is highly signified. As per the views of Anvarovna & Mahamatjonovna (2023), there is a strong interconnection available between cerebral palsy and behavioral therapy. However, as per the coefficients table the hypothesis is not signified as the Sig value of this table is .753. The hypothesis value is basically connected with the variables, population, and the relationship between the variables. This is mainly described the clear statement about the findings of the research. P values, significance levels, and statistical significance have been observed in the hypothesis table.

Discussion

There were Different topic-related discussions have been done, and it was found that children at an early aged mostly affected by these issues. As stated by Duymaz (2020), the children are mainly facing issues with delayed language development, and they are facing issues with speaking. There are different cognitive training processes have been introduced and with the help of that, children are making

development. The main issues that occurred with the brain and muscles movement and from infants till 8 years age group children are facing these issues. The study was completed based on the quantitative data collection process and the SPSS tool helped to analyze the information (Byrne, Duncan, &Pickar, 2019). The brain disorder and muscles movement problem is very common into those children and that need proper treatment for overcoming. The whole study outcome is totally appropriate as it gives a successful result to the work. Data collection process was also justified as there were only genuine responses received and no biased information was taken or observed.

On the other hand, various games are played with the children for brain development. There are various strategies that might be helpful for this state's patients and those are extra support with communication with the help of technology, pictures, and gestures. As per the views of Ubalde & Liang(2021), parents should encourage their children to play with technology as it can do better improvement in their learning process. They can easily play and learn things from technical instruments and that will give the best fits into their body. Children are playing various online games and cardiovascular fitness training has been providing them throughout the training process. CP has been introduced as a non-progressive injury to an immature brain (El Helou, George, & Macdonald, 2023). There were various hypotheses and the relationships were discussed and the most relation were finding out as signified.

Conclusions

It can be concluded that there were various impacts observed on cerebral palsy-impacted children. Infants till 8 years age group children are facing this problem. On the other side, black children and white children have commonly faced these issues and boys have faced this issue more than girls. This is not a common issue and this problem is faced by 1 out of 4 per 1,000 children. There is different training processes have introduced and it was observed that all of those processes are directly linked with brain activities. The main issues faced by brains and muscles therefore it is important to maintain a exercise process and develop the brain quickly.

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Appendix: Questioners

(**Survey Link**: https://docs.google.com/forms/d/1Z1zLNBNC3Z4gIMkegN6Gw5ufHlocVSpy-Y_x-gvqkes/edit)

1.What is your age?

2.What is your gender?

3.What is your income range?

DV: Cerebral Palsy

1. Infants and Preschool years children are mainly facing this CP issues
2. This problem impacts the development of a baby's brain while it's growing in the womb isa mainly caused for Cerebral Palsy

IV1: Cognitive Training

1. Computer-based exercises, physical movement, paper-and-pencil activities, manipulatives all are under cognitive training
2. Delayed language development is one type of celebral palsy that treated through Cognitive training

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3. Engagement, exploration, explanation, elaboration, and evaluation are the 5E model of this training

IV2: Children

1. This training program for children encourage different patterns of neuronal activation
2. Boys are mainly facing issues than girls and black children than white children are commonly faced this issues
3. 75%-85% children muscles are getting stiff and as a result their movements can be awkward

IV3: Behavioral therapy

1. This therapy helps children to overcome from feelings of inadequacy and meaninglessness
2. Break up from tasks into smaller more manageable steps is one kind of behavioral theory for CP effected children