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Study Intelligence Quotient among Sample of Children Suffering from Cleft Lip and palate & Hypospadias attending Pediatric Surgery Clinic in Al-Hussien Hospital

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ORIGINAL ARTICLE

Study Intelligence Quotient Among Sample of Children Suffering from Cleft Lip and Palate and Hypospadias Attending Pediatric Surgery Clinic in Al-Hussien Hospital

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Abstract

Background: **The need for more reliable knowledge about speech development and surgical techniques is critical in caring for children born with cleft lip and palate (CLP).**

Aim and objectives: **The main goal of this research was to assess the level of intelligence in children born with cleft lip and palate (CLP) and hypospadias and to find out if there is any correlation between cleft lip and palate CLP and hypospadias malformations and Intelligence Quotient (IQ).**

Patients and methods: **This cross-sectional research was conducted in pediatric surgery clinics at Al-Azhar University Hospitals. Research was showed on 52 children with cleft lip and palate and hypospadias. All patients were divided into 2 groups: Cleft lip and palate group (n = 30) and Hypospadias group (n = 22).**

Results: **Regarding full-scale intelligence quotient of Wechsler Intelligence Scale of studied children. Full-Scale Intelligence in CLP group ranged from 72 to 104 with mean ± SD = 86.4 ± 7.56 while in hypospadias group the Full-Scale Intelligence ranged from 66 to 99 with mean ± SD = 86.18 ± 8.02.**

Conclusion: **The present study assessed the association between intelligence level and incidence of CLP and hypospadias. We concluded that there was significant correlation between low Wechsler Intelligence Scale score and both CLP and hypospadias.**

Keywords: Cleft palate, Craniofacial abnormalities, Hypospadias, Intelligence quotient, Velopharyngeal dysfunction

1. Introduction

Brain procedures that underpin intelligence are not fully understood, though current study has focused on four potential factors: brain size, sensory ability, neural transmission speed and efficiency, and working memory capacity.[1]

Any structural anomaly observed at the time of birth is considered birth defect. Genetic abnormalities and environmental exposures can affect these defects, but underlying aetiology is frequently unknown. Birth defects can be isolated and reveal in distinct mixture and pattern, affecting 1 and more organ systems. Epidemiology, types, and patterns of birth defects are covered in this topic.[2]

Cleft lip/palate (CLP) orofacial defect involves altered physiological anatomy that impacts infant's feeding ability. Cleft lip, cleft palate (CP), or both occur in infants. Dysfunction in seal, as with cleft lip, or in ability to coordinate muscle movement to create negative pressure, as with CP, causes feeding problems that can impair growth and bonding.[3]

At moment, it is unclear if what hypospadias in general and surgical procedures have negative impact on later psychiatric development. Numerous strategies have been conducted to investigate

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psychiatric development and psychiatric symptomology in hypospadias studied cases. Despite trend toward possible link among hypospadias and psychiatric symptoms, evidence is mixed.[4]

Concept of general intelligence, or g, is one of most thoroughly researched in behavioural sciences. Intelligence measures are connected to physical health and successful ageing and are predictive of wide range of educational, occupational, and life results, such as creative productivity.[1]

Main aim of this research was to assess the level of intelligence in children born with CLP and hypospadias and to find if there is correlation among CLP and hypospadias malformations and Intelligence Quotient (IQ).

2. Patients and methods

Children with CLP and hypospadias attending pediatric surgery clinics at Al-Azhar University Hospitals in the period of 1st of October 2021 to 31st of March 2022.

2.1. Inclusion criteria

Age: from age 6 to 14, sex: both sexes in CLP and males only in hypospadias, acceptance: acceptance of participants in this study by obtaining oral or written consent, the child does not have a disease syndrome, not injured during birth, not admitted in Neonatal ICU for any cause as jaundice, not have any psychiatric disorder as ADHD, Autism and does not have any other organic disorder.

2.2. Exclusion criteria

Age: older than 14 or younger than 6, refused to participate in this study, the child that has a disease syndrome, the child that was injured during birth, the child that was admitted in Neonatal ICU for any cause as jaundice, the child that has any psychiatric disorder as ADHD, autism, and the child that has any other organic disorder.

2.3. Methods

Semi-structured clinical interview, clinical examination of CLP and hypospadias and Wechsler Intelligence Scale for children, fourth edition.

2.4. Statistical analysis

All data were collected, tabulated and statistically analyzed using SPSS 26.0 for windows (SPSS Inc., Chicago, IL, USA). χ^2 test of significance: was used so as to relate proportions among qualitative parameters. Independent T-test: was used in order to compare between two independent groups with parametric quantitative data.

3. Results

Number of male patients in the study population was 21 (70%). Age of child in the study population ranged from 6 to 13 with mean ± SD = 8.1 ± 1.77. Age of mother in the study population ranged from 26 to 35 with mean ± SD = 31.2 ± 2.01. Number of patients with low Income level in the study population was 5 (16.67%). And Number of patients with Breast feeding mode in the study population was 6 (20%) (see Table 1).

Table 2 showed Verbal Comprehension Index (Similarities, Vocabulary, and Comprehension) of Wechsler Intelligence Scale of studied children with CLP. Verbal Comprehension in study population ranged from 76 to 110 with mean ± SD = 95.93 ± 8.03. Perceptual Reasoning in the study population ranged from 60 to 100 with mean ± SD = 79.3 ± 9.51. Working Memory in the study population ranged from 75 to 112 with mean ± SD = 92 ± 8.12. Processing Speed in the study population ranged from 62 to 96 with mean ± SD = 77.23 ± 8.27, and

Table 1. Demographic and Clinical characteristics of studied children with Cleft lip and palate.

	Cleft lip and palate group (n = 30) n (%)
Sex	
Male	
n (percent)	21 (70 percent)
Female	
n (percent)	9 (30 percent)
Age of child (years)	
Mean ± SD.	8.1 ± 1.77
Median (IQR)	8 (7–9)
Range (Min-Max)	7 (6–13)
Age of mother (years)	
Mean ± SD.	31.2 ± 2.01
Median (IQR)	31 (30–32)
Range (Min-Max)	9 (26–35)
Income level	
Low	
n (%)	5 (17%)
Intermediate	
n (%)	17 (57%)
High	
n (%)	8 (27%)
Mode of feeding	
Breast	
n (%)	6 (20%)
Others	
n (%)	24 (80%)

Table 2. Wechsler Intelligence Scale for children and full-scale intelligence quotient of wechsler intelligence scale of studied children with cleft lip and palate.

	Cleft lip and palate group (n = 30)
Verbal Comprehension	
Mean ± SD.	95.93 ± 8.03
Median (IQR)	97 (92.25–102.25)
Range (Min-Max)	34 (76–110)
Perceptual Reasoning	
Mean ± SD.	79.3 ± 9.51
Median (IQR)	78 (74–86)
Range (Min-Max)	40 (60–100)
Working Memory	
Mean ± SD.	92 ± 8.12
Median (IQR)	89.5 (86.5–98)
Range (Min-Max)	37 (75–112)
Processing Speed	
Mean ± SD.	77.23 ± 8.27
Median (IQR)	77 (74–81.75)
Range (Min-Max)	34 (62–96)
Full-Scale Intelligence	
Mean ± SD.	86.4 ± 7.56
Median (IQR)	84 (82–92)
Range (Min-Max)	32 (72–104)

Full-Scale Intelligence in the study population ranged from 72 to 104 with mean ± SD = 86.4 ± 7.56.

Table 3 showed Demographic characteristics of studied children with Hypospadias. All patients in Hypospadias group were males. Age of child in the study population ranged from 6 to 12 with mean ± SD = 8.45 ± 1.63. Age of mother in the study population ranged from 27 to 34 with mean ± SD = 30.55 ± 1.82. Number of patients with the mother as a housewife in the study population was 15 (68%). Number of patients with Breast feeding mode in the study population was 17 (77.27%).

Table 3. Demographic and clinical characteristics of studied children with hypospadias.

	Hypospadias group (n = 22) n (%)
Sex	
Male	
n (%)	22 (100%)
Age of child (years)	
Mean ± SD.	8.45 ± 1.63
Median (IQR)	9 (7–9.75)
Range (Min-Max)	6 (6–12)
Age of mother (years)	
Mean ± SD.	30.55 ± 1.82
Median (IQR)	30.5 (29.25–31.75)
Range (Min-Max)	7 (27–34)
Income level	
Low	
n (%)	5 (23%)
Intermediate	
n (%)	14 (64%)
High	
n (%)	3 (14%)
Mode of feeding	
Breast	
n (%)	17 (77%)
Others	
n (%)	5 (23%)

Table 4 showed Verbal Comprehension Index (Similarities, Vocabulary, and Comprehension) of Wechsler Intelligence Scale of studied children with Hypospadias. Verbal Comprehension in the study population ranged from 86 to 106 with mean ± SD = 95.14 ± 6.06. Perceptual Reasoning in the study population ranged from 72 to 97 with mean ± SD = 83.09 ± 7.72. Working Memory in the study population ranged from 76 to 102 with mean ± SD = 91.18 ± 7.89, processing Speed in the study population ranged from 65 to 91 with mean ± SD = 75.68 ± 6.5. Full-Scale Intelligence in the study population ranged from 66 to 99 with mean ± SD = 86.18 ± 8.02.

Table 5 showed Analyses of CLP and Hypospadias as risk factors for Low Wechsler Intelligence Scale score. Odds ratio of CLP was 1.255, and Confidence Interval was ranged from 1.126 to 1.400. Odds ratio of Hypospadias was 1.316, and Confidence Interval was ranged from 1.116 to 1.553.

4. Discussion

This cross-sectional study was conducted in pediatric surgery clinics at Al-Azhar University Hospitals. Research was showed on 52 children with cleft lip & palate and hypospadias. All patients were divided into 2 groups: CLP group (n = 30) and Hypospadias group (n = 22).

Table 4. Wechsler intelligence scale for children and full-scale intelligence quotient of wechsler intelligence scale of studied children with hypospadias.

	Hypospadias group (n = 22)
Verbal Comprehension	
Mean ± SD.	95.14 ± 6.06
Median (IQR)	94.5 (90–99)
Range (Min-Max)	20 (86–106)
Perceptual Reasoning	
Mean ± SD.	83.09 ± 7.72
Median (IQR)	81.5 (75.5–90)
Range (Min-Max)	25 (72–97)
Working Memory	
Mean ± SD.	91.18 ± 7.89
Median (IQR)	92.5 (86.5–96.5)
Range (Min-Max)	26 (76–102)
Processing Speed	
Mean ± SD.	75.68 ± 6.5
Median (IQR)	76 (70.75–79.5)
Range (Min-Max)	26 (65–91)
Full-Scale Intelligence	
Mean ± SD.	86.18 ± 8.02
Median (IQR)	86.5 (80.75–92.5)
Range (Min-Max)	33 (66–99)

Table 5. Analyses of cleft lip and palate and hypospadias as risk factors for low wechsler intelligence scale score.

	Wechsler intelligence scale score			
	OR	95% CI		P
		Lower	Upper	
Cleft lip and palate				
	1.255	1.126	1.400	>0.001
Hypospadias				
	1.316	1.116	1.553	0.001

As regard demographic characteristics of studied children with CLP. Number of male patients in the study population was 21 (70%). Age of child in the study population ranged from 6 to 13 with mean ± SD = 8.1 ± 1.77. Age of mother in the study population ranged from 26 to 35 with mean ± SD = 31.2 ± 2.01. Number of patients with low income level in the study population was five (16.67%).

Also, as regard demographic characteristics of studied children with Hypospadias, all patients in Hypospadias group were males. Age of child in the study population ranged from 6 to 12 with mean ± SD = 8.45 ± 1.63. Age of mother in the study population ranged from 27 to 34 with mean ± SD = 30.55 ± 1.82.

The study by Taye et al.,[5] aimed to evaluate risk factors related with congenital anomalies found that the majority (59.9 percent) of children was male and incidence of congenital anomalies was none significantly associated with maternal age.

Also, Nordenvall et al.,[6] reported that parental age was none significantly associated with the incidence of hypospadias. As well Weidner et al.,[7] found no effect of parental age on the risk of hypospadias.

The study by Taye et al.,[5] reported that the incidence of congenital anomalies was none significantly associated with mother education.

The study by Butwicka et al.,[8] reported that there was no effect of parental education on the risk of hypospadias.

Infants with birth defects have lower birth weight.[9]

Persson et al.,[10] reported that individuals with cleft palate were significantly lighter in weight.

Also, Fredell et al.,[11] revealed that low birth weight is vital risk factor for hypospadias, However, Fernandez et al.,[12] revealed that no variations were recognized when relating non-associated to co-occurring craniofacial − hypospadias cases with regards to mother's years old, gestational years old, weight at birth.

In cleft palate group Verbal Comprehension in the study population ranged from 76 to 110 with mean ± SD = 95.93 ± 8.03. Perceptual Reasoning in the study population ranged from 60 to 100 with mean ± SD = 79.3 ± 9.51. Working Memory in the study population ranged from 75 to 112 with mean ± SD = 92 ± 8.12. Processing Speed in the study population ranged from 62 to 96 with mean ± SD = 77.23 ± 8.27. Full-Scale Intelligence in the study population ranged from 72 to 104 with mean ± SD = 86.4 ± 7.56. There was no significant correlation between Full-Scale Intelligence and sex, income, residence. However, Full-Scale Intelligence in Breast feeding group ranged from 86 to 104 with mean ± SD = 94 ± 7.01 while in Artificial feeding group the Full-Scale Intelligence ranged from 72 to 98 with mean ± SD = 84.5 ± 6.52 with statistically important variation (P = 0.019) among two categories.

In the Hypospadias group we found that Verbal Comprehension in the study population ranged from 86 to 106 with mean ± SD = 95.14 ± 6.06. Perceptual Reasoning in the study population ranged from 72 to 97 with mean ± SD = 83.09 ± 7.72. Working Memory in the study population ranged from 76 to 102 with mean ± SD = 91.18 ± 7.89. Processing Speed in the study population ranged from 65 to 91 with mean ± SD = 75.68 ± 6.5. Full-Scale Intelligence in the study population ranged from 66 to 99 with mean ± SD = 86.18 ± 8.02. Research found that there was no significant correlation among Full-Scale Intelligence results and Income level and Residence in hypospadius population. Full-Scale Intelligence in Breast feeding group ranged from 77 to 99 with mean ± SD = 89 ± 6.03 while in Artificial feeding group the Full-Scale Intelligence ranged from 66 to 83 with mean ± SD = 76.6 ± 6.58 with statistically important variation (P = 0.009) among two categories.

The study by Persson et al.,[13] stated that, in as well as having more negative educational results, young people with CP and CLP have significantly lower odds of achieving high grade in Physical Education performance. This finding is consistent with findings of another research, which found that people with CP were significantly lighter in weight, shorter in stature, and had lower muscle strength than their peers Persson et al.,.[10]

Also, the study by Persson et al.,[14] revealed that those with CLP had no big variations in general intellectual ability when compared with control group. Group with only cleft palate scored significantly lower on general intelligence than control group.

Furthermore, our outcomes were in line with Nopoulos et al.,[15] who revealed that when

compared with their matched controls, subjects with oral clefts had significantly lower full-scale IQ, performance IQ, and verbal IQ scores. Studied cases demonstrated specific deficits in verbal fluency after controlling for IQ.

In addition, Persson et al.,[13] and Yazdy et al.,[16] have found that people with cleft have higher prevalence of cognitive dysfunction and learning difficulties, lower school achievement, and higher use of special education services than people without cleft.

5. Conclusion

The present study assessed the association between intelligence level and the incidence of cleft lip and hypospadias. We concluded that there was significant correlation between Low Wechsler Intelligence Scale score and both of cleft lip and hypospadias.

Conflict of interest

No conflicts of interest.

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