SHORT REPORT

A survey-based report on the occurrence of cerebral palsy in Urban areas of Karachi

Ammara Rafique, Hajra Naz

Abstract

Cerebral Palsy (CP), a non-progressive motor disorder, which arises due to lesions of the brain during pregnancy, labour or shortly after birth effects 1-1.5/1000 live births. Altogether 658 CP cases were acquitted from 14 health organizations that permitted access to the data. Data was assembled with respect to topography, muscle tone, severity level and Gross Motor Function Classification System (GMFCS) is accompanied by the comorbidities and co-mitigating factors from 2010-2016. Data represented topographically showed a greater percentage of quadriplegic cases i.e.186 (39.9%). Spastic tone was the most commonly presented muscle tone i.e. 352 (53.4%) and 235 (57.7%) cases were in the mild severity zone. Level II was the most prevalent GMFCS i.e. 189 (34.4%). The most prevalent comorbidity was epilepsy i.e. 96 (14.58%) and co-mitigating factor was Attention Deficit/Hyperactivity Disorder i.e. 18 (2.73%) . A dominant male to female ratio was seen as 1.4:1. The prevalence of males was exhibiting an increase of 80.3% in contrast to females.

Keywords: Cerebral Palsy, Quadriplegia, Comorbidity.

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Introduction

Unlike Alzheimer's, Cerebral Palsy (CP) is a non-progressive neurological disorder associated with lesions during the prenatal, intrapartum or in toddler stage, thereby, modulating cognitive induced motor defects concurrent with the loss of sensation, communication, and swallowing of food etc. Worldwide occurrence ratio is estimated to be 1-1.5/1000 live births.[1]

Topographically, CP can be classified as spastic or ataxia. Monoplegia, diplegia, hemiplegia, paraplegia, tetraplegia, quadriplegia, double-quadriplegia, and pentaplegia are the sub-classifications. On the basis of severity it is classified as mild, moderate and severe. Gross Motor Function Classification System (GMFCS) from I to V level regarded as the reliable and applicable system, classifies CP in accordance with the mobility. Motor impairments are often accompanied by multiple comorbidities such as Epilepsy, Down's Syndrome, Myotonic Muscular Dystrophy (MMD) or Multiple Sclerosis (MS). The Co-mitigating factors like Attention Deficit/Hyperactivity Disorder (ADHD) and Autism may also co-exist.

In an attempt to replenish the scarcity of population-based studies in Pakistan, CP was regarded as the most common disability of early-childhood in the rural district of Sindh.[2] Many others have also contributed towards data compilation of CP affected children in Karachi,[3] Peshawar,[4] Gujranwala,[5] Faisalabad,[6] Islamabad,[7] and Rawalpindi.[8]

This survey was an endeavor to collect data on the occurrence of Cerebral Palsy in the urban areas of Karachi from the year 2010 to 2016 as there was no integrate manual or electronic database.

Methods and Results

The data acquisition aimed at including all the private and government organizations catering to CP. Electronic search and snowball sampling strategy particularly chain referral sampling was used, as one organization nominated another 50, in total we reached 70 organizations catering to CP. We adopted chain referral sampling to maximize the number of rehabilitation centers, special schools, trusts, and hospitals in the urban districts of Karachi. All the organizations were contacted via floating letters, appointments, emails, telephonic conversations, and social networks. Consent was taken from all the organizations.

The problems encountered while collecting the data reflected in terms of diminished response indicating a dearth of the maintenance of data records as stated by many organizations. Moreover, reluctance to furnish the data also hampered the acquisition process. Upon frequent visits for the data collection, 14 organizations granted us permission and the authorities signed informed consent. This entire process encompassed 6 months.

Various classification categories of CP based on the topography, muscular tone, severity level, and GMFCS were kept into consideration during the data acquisition

Department of Biochemistry, University of Karachi, Pakistan.
Correspondence: Ammara Rafique. e-mail: ammararafique92@gmail.com

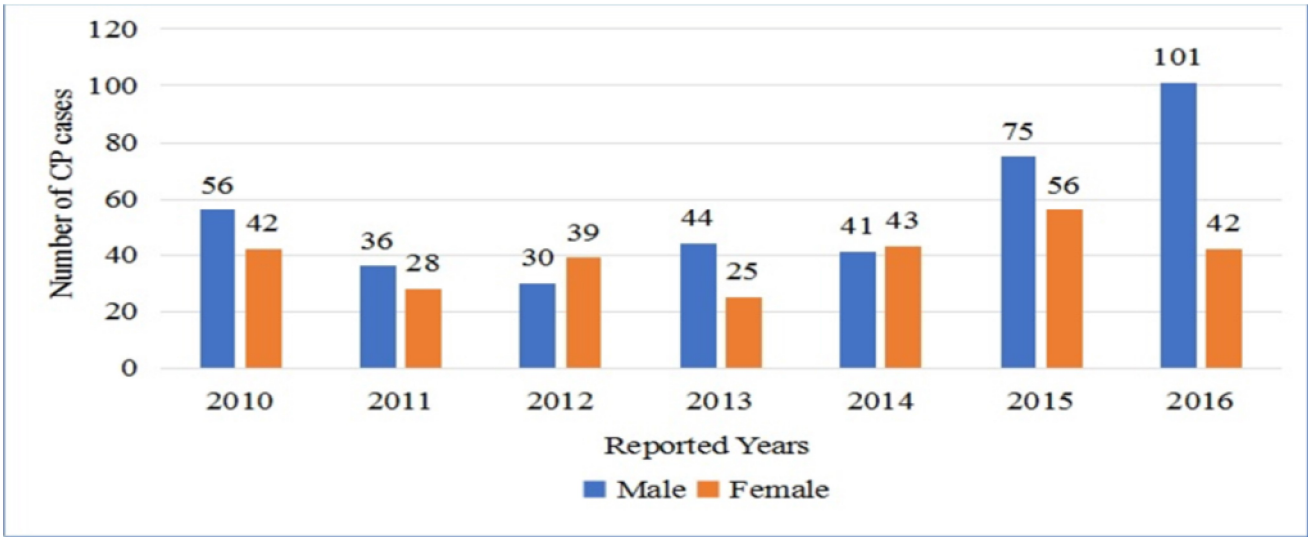

Figure: Quantitative presentation of Cerebral Palsy from 2010-2016.

process. We collected the authentic data only from the clinical assessment forms, hospital or special school admission files, nursing staff registers, or medical records maintained by the officials. The data related to comorbidities (Down's syndrome, Myotonic Muscular dystrophy, Multiple Sclerosis, and Epilepsy) and the Co-mitigating factors (Attention Deficit/Hyperactivity Disorder and Autism) were also collected from the available records. To avoid any errors or double count, the entire details with the name and date of birth for each case were recorded.

The response rate from the organizations for data provision was only 20%. Altogether 658 cases were collected from 14 health organizations from 2010 to 2016 years depicted more 383 (58.2%) males than 275 (41.7%) females. The trend of occurrence of CP reflected an increase in males at the end of the year 2016 (Figure). Our findings depicted that quadriplegia, diplegia followed by hemiplegic presentations were the most common disorders thus accounting to 186 (39.9%), 182 (39.0%), and 60 (12.8%) respectively. The least common was monoplegia 5 (1%). The most prevalent manifested muscle tone was Spastic i.e. 352 (53.4%) followed by atonic, ataxia and athetoid/dyskinetic type of CP represented 77 (11.7%), 22 (3.3%), and 67 (10.1%) respectively.

A greater percentage of CP affectees could be categorized in mild severity zone i.e 235 (57.7%). Level II and IV were the most prevalent GMFCS accounting to 189 (34.4%), and 121 (22.0%) respectively. Epilepsy was the most dominating co-morbidity i.e. in 96 (14.58%) cases, however, Myotonic Muscular Dystrophy (MMD) was found in 3 (0.45%) cases, Down's Syndrome (DS) in 2 (0.30%), and no cases of Multiple Sclerosis (MS) were found. The co-mitigating factors Attention Deficit/Hyperactivity Disorder and Autism were found in 18 (2.73%) and 9 (1.36%) cases respectively (Table).

Table: Qualitative presentation of Cerebral Palsy from 2010-2016.

		Male	Female	Total: n (%)
1. Topographical distribution	Quadriplegia	109	77	186 (39.9)
	Diplegia	97	85	182 (39.0)
	Hemiplegia	42	18	60 (12.8)
	Paraplegia	11	9	20 (4.2)
	Triplegia	10	3	13 (2.7)
	Monoplegia	1	4	5 (1.0)
2. Muscle tone	Spastic	204	148	352 (53.4)
	Atonic	37	40	77 (11.7)
	Ataxic	14	8	22 (3.34)
	Athetoid/Dyskinetic	46	21	67 (10.1)
3. Severity	Mild	137	98	235 (57.7)
	Moderate	75	37	112 (27.5)
	Severe	30	30	60 (14.7)
4. GMFCS	Level I	33	22	55 (10.0)
	Level II	102	87	189 (34.4)
	Level III	41	22	63 (11.4)
	Level IV	73	48	121 (22.0)
	Level V	68	52	120 (21.8)
5. Comorbidities	Epilepsy	61	35	96 (14.5)
	MMD	2	1	3 (0.45)
	DS	1	1	2 (0.3)
6. Co-Mitigating factors	ADHD	14	4	18 (2.73)
	Autism	5	4	9 (1.36)

ADHD: Attention Deficit/Hyperactivity Disorder, DS: Down's Syndrome,
MMD: Myotonic Muscular Dystrophy, GMFCS: Gross Motor Function Classification System.

Discussion

It is a long-struggled journey of approaching 70 organizations, facing their refusals while visiting only 14 set-ups to consolidate the data. Our findings reported the greater male vulnerability to CP exhibiting a male to female ratio of 1.4:1, consistent with the native authors[3-7] could be explainable to greater injury to the male brain in case of adversities during the antenatal or perinatal period. These reports are however inconsistent with Khan and his collaborators documenting a female CP dominance.[8] The contradiction could be due to more females reporting as compared to males. Few studies showed that intraventricular haemorrhage (IVH), bilirubin, and death reported significantly more in males as compared to females making them prone to developmental disabilities including CP, mental retardation, autism, or ADHD.[9] In Pakistan, it is a norm for the majority of the population as the family is more concerned for males as compared to females and maybe this is one of the reason why males are more actively taken to educational/vocational training centers and physiotherapy clinics. Further research is needed to address the clear scientific reasons for the disparity among males and females in Pakistan as there can be involvement of many simple or complex biological, physiological, pathological and environmental factors.

Our current findings document that spastic quadriplegia, diplegia, and hemiplegia presentations are common which are concordant with the previous studies.[3-8] This could be plausibly linked to small gestational age-induced periventricular leukomalacia.[10] This survey demonstrates 96 (14.5%) cases of Epilepsy more than the other comorbidities.

Conclusion

A dominant male to female ratio was reported as 1.4:1. The prevalence of males was exhibiting an increase of 80.3% in contrast to females. It is almost impossible for absolute determination of CP occurrence in the urban areas of Karachi from the year 2010 to 2016 without the provision and documentation of manual or electronic databases. Without data it is impossible to prevent the risks of CP on a massive scale.

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References

1. Colver A, Fairhurst C, Pharoah P. Cerebral palsy. Nurs Child Young People. 2017; 29:11.
2. Ibrahim S, Bhutta Z. Prevalence of early childhood disability in a rural district of Sind, Pakistan. Dev Med Child Neurol. 2013; 55:357-63.
3. Bangash A, Hanafi M, Idrees R, Zehra N. Risk factors and types of cerebral palsy. J Pak Med Assoc. 2014; 64: 103-7.
4. Ahmad A, Akhtar N, Ali H. Prevalence of cerebral palsy in children of District Swabi, Khyber Pakhtunkhwa - Pakistan. Khyber Med Univ J. 2017; 9: 88-91.
5. Ali Z, Umar S, Shah A, Basit A, Oneeb A, Irfan H. Frequency of various types of cerebral palsy amongst the admitted children at a tertiary care hospital and retrospective etiologic analysis on the basis of history, examination and laboratory support. Pak J Med Health Sci. 2017; 11: 75-9.
6. Nazir B, Butt A, Shamoon M, Sheikh S, Malik M, Hashmat N. Etiology and Types of Cerebral palsy. Pak Paed J. 2003; 27: 152-6.
7. Zafer H, Amjad I, Malik AN, Shaukat E. Effectiveness of Constraint induced movement therapy as compared to bimanual therapy in Upper motor function outcome in child with hemiplegic Cerebral palsy. Pak J Med Sci. 2016; 32:181-4.
8. Khan A, Ahmad K, Ayaz S, Ayyub A, Akhlaq U. Cerebral Palsy in Pakistani Children: A Hospital Based Survey. Cukurova Med J. 2014; 39: 705-11.
9. Tioseco J, Aly H, Essers J, Patel K, El-Mohandes A. Male sex and intraventricular hemorrhage. Pediatr Crit Care Med. 2006; 7: 40-4.
10. Folkerth R. Periventricular leukomalacia: overview and recent findings. Pediatr Dev Pathol. 2006; 9:3-13.