



PREVALENCE AND PREDICTORS OF DROOLING IN CHILDREN WITH CEREBRAL PALSY (0-14 YEARS)

By

Bibi Umme Pinky

4th Year, B.Sc. in Speech & Language

Therapy Department Session: 2015-2016

Supervised by

Nahid Parvez

Assistant

Professor

Department of Speech and Language

Therapy BHPI, CRP, Chapain, Savar,

Dhaka-1343

Title: “Prevalence and Predictors of Drooling in Children with Cerebral Palsy (0-14 years)”

Aim of the study: To find out the prevalence and predictors of drooling among children (0-14) with Cerebral Palsy in Bangladesh.

Methodology: This is a quantitative type of cross sectional survey study where 206 samples were assigned purposively from CRP, Savar (Paediatric Department), CRP, Mirpur (Clinical Department of SLT), William & Marie Taylor School, Savar & Tauri Foundation. Self-report questionnaire and the drooling modified questionnaire was used for the study. Data was analyzed by using descriptive statistical analysis (SPSS= Statistical Package for the Social Sciences) method.

Result: The majority of the participants 59% of children with cerebral palsy had drooling problem and among them 12% had severe drooling problem.

Conclusion: Drooling is a common problem among cerebral palsy child. Researcher explored the prevalence of drooling among children with cerebral palsy. In this study,

among the 206 participants more of the participants 60% (123) were male and 40% (83) were female. The result showed that the highest number of participants 60% were in the age range 0-3 years. Drooling was confirmed as a problem for 59% of the selected population aging from 0- to 14-year-old children. The prevalence rate of severe drooling is 12% among the children with CP. So, TBI patients are vulnerable for presence of swallowing difficulties. Drooling can be much more severe in magnitude for children with CP according to the researcher.

5.1 Limitation

This is the first study on prevalence of drooling among cerebral palsy child in Bangladesh. So, there were some situation limitations and barriers while considering the results of the study in different aspects. Those are as follows:

- The investigator only questioned a small number of subjects (206) that was very small to generalize the result.
- This study was only conducted among pediatric patient in CRP, William and Marie Taylor School, Savar and Tauri Foundation, Mohammadpur. So, the data cannot be generalized to the practice of documentation by all Speech & Language Therapist in Bangladesh.
- Time and resources were limited that have a great deal of impact of the study.

5.2 Recommendation

By conducting the study, investigator found that majority of the patients had medium aspects of service. Moreover, this was the first ever study of prevalence & predictors of drooling among cerebral palsy child in Bangladesh. Continued and regular study in this area should play an essential part in improving quality of life of cerebral palsy child.

Recommendation for other researcher as follows:

- The researcher selected only 206 participants to conduct the whole study. It was a small number of participants to conduct a survey to find out the prevalence of drooling. So, the further study can be conducted with a range and large population.
- This study can be conducted in different places.

- Further investigation is required on the incidence of drooling problem in adults with CP & Down syndrome. Prevalence of drooling among head injury, Parkinson's disease and stroke patients.

References:

- Bass, N. (1999). Cerebral palsy and neurodegenerative disease. *Current Opinion in Pediatrics*, 11(6), 504-507. Retrieved from https://journals.lww.com/co-pediatrics/abstract/1999/12000/causes_of_cerebral_palsy.2.aspx
- Bavikatte, G., Sit, P. L., & Hassoon, A. (2012). Management of Drooling of Saliva. *British Journal of Medical Practitioners*, 5(1), a507.
- Bax, M., Goldstein, M., Rosenbaum, P., Leviton, A., Paneth, N., Dan, B., . . . Damiano, D. (2005). Proposed definition and classification of cerebral palsy. *Developmental Medicine & Child Neurology*, 47(8), 571-576. doi:10.1017/s001216220500112x
- Bjornson, K. F., McLaughlin, J. F., Loeser, J. D., Nowak-Cooperman, K. M., Russel, M., Bader, K. A., & Desmond, S. A. (2003). Oral motor, communication, and nutritional status of children during intrathecal baclofen therapy: a descriptive pilot study. *Arch Phys Med Rehabil*, 84(4), 500-6. doi:<https://doi.org/10.1053/apmr.2003.50030>
- Blasco, P. A. (2002). Management of drooling: 10 years after the Consortium on Drooling, 1990. *Dev Med Child Neurol*, 44(11), 778-81. doi:<https://doi.org/10.1017/S0012162201002924>
- Bowling, A. (2014). *Research methods in health: investigating health and health services*. UK: McGraw-hill education.
- Budhreja, S. N., Smiles, S. R., & Perianayagam, W. J. (1973). Surgical management of dribbling saliva in cerebral palsy. *Indian Journal of Surgery*, 35, 283-287.
- Burgmayer, S., & Jung, H. (1983). Hypersalivation in severe mental retardation. *International Journal of Rehabilitation Research*, 6(2), 193-197. Retrieved from https://journals.lww.com/intjrehabilres/citation/1983/06000/hypersalivation_in_severe_mental_retardation_.11.aspx
- Chang, S., Lin, C., Tung, L., & Chang, N. (2012). The association of drooling and health-related quality of life in children with cerebral palsy. *Neuropsychiatric Disease and Treatment*, 8, 599-604. doi:<https://doi.org/10.2147/NDT.S39253>
- Davis, M. J. (1979). Parotid Salivary Secretion and Composition in Cerebral Palsy. *Journal of Dental Research*, 58, 1808.
- Depoy, E., & Gitlin, L. N. (1998). *Understanding and Applying Multiple Strategies -*

ResearchGate. Retrieved from ResearchGate:

https://www.researchgate.net/publication/304129228_Introduction_to_Research_Understanding_and_Applying_Multiple_Strategies

Ekedahl, C. (1974). Surgical treatment of drooling. *Acta Otolaryngol*, 75, 464–469.

Ekedahl, C., & Hallen, O. (2009). Quantitative measurement of drooling. *Acta otolaryngologica*, 75(2-6), 464-469. doi:<https://doi.org/10.3109/00016487309139776>

Erasmus, C. E., Van Hulst, K., Van Den Hoogen, F. J., Van Limbeek, J., Roeleveld, N., Veerman, E. C., . . . Jongerius, P. H. (2010). Thickened saliva after effective management of drooling with botulinum toxin A. *Dev Med Child Neurol*, 52(6), 114-8. doi:<https://doi.org/10.1111/j.1469-8749.2009.03601.x>

Finkelstein, D. M., & Crysdale, W. S. (1992). Evaluation and management of the drooling patient. *The Journal of Otolaryngology*, 21(6), 414-418. Retrieved from <https://europepmc.org/abstract/med/1494183>

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2011). *How to design and evaluate research in education*. New York: McGraw-Hill Humanities/Social Sciences/Languages.

Franklin, D. L., Luther, F., & Curzon, M. E. (1996). The prevalence of malocclusion in children with cerebral palsy. *European journal of orthodontics*, 18(6), 637-643. doi:<https://doi.org/10.1093/ejo/18.6.637>

Fridah, M. W. (2002). *sampling in research - Indiana University Bloomington*. Retrieved from Sampling in research: http://www.indiana.edu/~educy520/sec5982/week_2/mugo02sampling.pdf

Health, E. P. (2016). *Quantitative research - European Public Health*. Retrieved from European public health: <http://www.europeanpublichealth.com/research-methods/quantitative-or-qualitative-research/quantitative-research/>

Hegde, A. M., & Pani, S. C. (2009). Drooling of saliva in children with cerebral palsy—etiology, prevalence, and relationship to salivary flow rate in an Indian population. *Special Care in Dentistry*, 29(4), 163-168. doi:<https://doi.org/10.1111/j.1754-4505.2009.00085.x>

Hicks, C. M. (1999). *Research methods for clinical therapists : applied project design and analysis*. New York: Churchill Livingstone.

- Hussein, I., Kershaw, A. E., Tahmassebi, J. F., & Fayle, S. A. (1998). Hussein I, Kershaw AE, Tahmassebi JF, Fayle SA. The management of drooling in children and patients with mental and physical disabilities: a literature review. *International journal of Paediatric Dentistry*, 3-11. doi:<https://doi.org/10.1046/j.1365-263X.1998.00055.x>
- Hutton, J. L., & Pharoah, P. O. (2006). Life expectancy in severe cerebral palsy. *Arch Dis Child*, 91(3), 254–8. doi:<https://doi.org/10.1136/adc.2005.075002>
- Iammatteo, P. A., Trombly, C., & Luecke, L. (1990). The Effect of Mouth Closure on Drooling and Speech. *American Journal of Occupational Therapy*, 44(8), 686-691. doi: <https://doi.org/10.5014/ajot.44.8.686>
- Jan, M. S. (2006). Cerebral palsy: Comprehensive Review and Update. *Ann Saudi Med*, 26(2), 123-132. doi:<https://doi.org/10.5144/0256-4947.2006.123>
- Jones, M. W., Morgan, E., Shelton, J. E., & Thorogood, C. (2007). Cerebral Palsy: Introduction and Diagnosis (Part I). *Journal of Pediatric Health Care*, 21(3), 146-152. doi:<https://doi.org/10.1016/j.pedhc.2006.06.007>
- Khandaker, G., Muhit, M., Karim, T., Smithers-sheedy, H., Novak, I., Jones, C., & Badawi, N. (2018). Epidemiology of cerebral palsy in Bangladesh: a population-based surveillance study. *Developmental Medicine & Child Neurology*, 61(5), 601-609. doi:<https://doi.org/10.1111/dmcn.14013>
- Kilpatrick, N. M., Johnson, H., & Reddihough, D. (2000). Sialorrhea: a multidisciplinary approach to the management of drooling in children. *Journal of Disability and Oral Health*, 1(1), 3-9. Retrieved from https://www.stephenhancocks.com/download.php?op=view_article&article_id=115
- Kuban, K. C., & Leviton, A. (1994). Cerebral palsy. *N Engl J Med.*, 330(3), 188-95.
- Lespargot, A., Langevin, M., Muller, S., & Guillemont, S. (1993). SWALLOWING DISTURBANCES ASSOCIATED WITH DROOLING IN CEREBRAL- PALSIED CHILDREN. *Dev Med Child Neurol*, 35(4), 298-304. doi: <https://doi.org/10.1111/j.1469-8749.1993.tb11641.x>
- Little, S. A., Kubba, H., & Hussain, S. S. (2009). An evidence- based approach to the child who drools saliva. *Clinical Otolaryngology*, 34(3), 236-239. doi:<https://doi.org/10.1111/j.1749-4486.2009.01917.x>

- Meningaud, J. P., Pitak-Arnop, P., Chikhani, L., & Bertrand, J. C. (2006). Drooling of saliva: A review of the etiology and management options. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, *101*(1), 48-57. doi:<https://doi.org/10.1016/j.tripleo.2005.08.018>
- Morales Chávez, M. C., Nualart Grollmus, Z. C., & Silvestre Donat, F. J. (2008). Clinical prevalence of drooling in infant cerebral palsy. *Med Oral Patol Oral Cir Bucal*, *13*(1), E22-6.
- Murthy, G. V., Mactaggart, I., Mohammad, M., Islam, J., Noe, C., Khan, A. I., & Foster, A. (2014). Assessing the prevalence of sensory and motor impairments in childhood in Bangladesh using key informants. *Arch Dis Child*, *99*(12), 1103-8. doi:<https://doi.org/10.1136/archdischild-2014-305937>
- Mutch, L., Alberman, E., Hagberg, B., Kodama, K., & Perat, M. V. (1992). Cerebral palsy epidemiology: where are we now and where are we going? *Dev Med Child Neurol.*, *34*(6), 547-51. doi:<https://doi.org/10.1016/j.tripleo.2005.08.018>
- Nunn, J. H. (2000). Drooling: review of the literature and proposals for management. *J Oral Rehabilitation*, *27*(9), 735-743. doi:<https://doi.org/10.1046/j.1365-2842.2000.00575.x>
- Palisano, R., Rosenbaum, P., Walter, S., Russell, D., Wood, E., & Galuppi, B. (1997). Development and reliability of a system to classify gross motor function in children with cerebral palsy. *Dev Med Child Neurol.*, *39*(4), 214-223.
- Parkes, J., Hill, N., Platt, M. J., & Donnelly, C. (2010). Oromotor dysfunction and communication impairments in children with cerebral palsy: a register study. *Developmental Medicine and Child Neurology*, *52*(12), 1113-1119. doi:<https://doi.org/10.1111/j.1469-8749.2010.03765.x>
- Reid, S. M., Johnson, H. M., & Reddihaugh, D. S. (2010). The Drooling Impact Scale: a measure of the impact of drooling in children with developmental disabilities. *Dev Med Child Neurol*, *52*, e23-8. doi:<https://doi.org/10.1111/j.1469-8749.2009.03519.x>
- Reid, S. M., Carlin, J. B., & Reddihaugh, D. S. (2011). Classification of topographical pattern of spasticity in cerebral palsy: A registry perspective. *Research in Developmental Disabilities*, *32*(6), 2909-2915. doi:<https://doi.org/10.1016/j.ridd.2011.05.012>

- Reid, S. M., Carlin, J. B., & Reddihough, D. S. (2011). Distribution of motor types in cerebral palsy: how do registry data compare? *Dev Med Child Neurol.*, *53*(3), 233-238. doi:<https://doi.org/10.1111/j.1469-8749.2010.03844.x>
- Reid, S. M., Muccutcheon, J., Reddihough, D. S., & Johnson, H. (2012). Prevalence and predictors of drooling in 7-to14-year-old children with cerebral palsy: a population study. *DEVELOPMENTAL MEDICINE & CHILD NEUROLOGY*, *54*, 1032-1036. doi:<https://doi.org/10.1111/j.1469-8749.2012.04382.x>
- Reilly, S., & Skuse, D. (1992). Characteristics and management of feeding problems of young children with cerebral palsy. *Dev Med Child Neurol*, *34*(5), 379–88. doi:<https://doi.org/10.1111/j.1469-8749.1992.tb11449.x>
- Sagar, P., Handa, K. K., Gulati, S., & Kumar, R. (2016). Submandibular Duct Re-routing for Drooling in Neurologically Impaired Children. *Indian Journal of Otolaryngology and Head & Neck Surgery*, *68*(1), 75-79. Retrieved from <https://doi.org/10.1007/s12070-015-0926-4>
- Salkind, N. J. (2010). Predictor Variable. *ENCYCLOPEDIA*. doi:<https://dx.doi.org/10.4135/9781412961288.n329>
- Santos, M. T., Ferreira, M. C., Leite, M. F., & Guaré, R. O. (2010). Salivary parameters in Brazilian individuals with cerebral palsy who droolch. *Child Care Health and Development*, *37*(3), 404-409. doi:<https://doi.org/10.1111/j.1365-2214.2010.01176.x>
- Scully, C., Limeres, J., Gleeson, M., Tomas, I., & Diz, P. (2009). Drooling. *Journal of Oral Pathology & Medicine*, *38*(4), 321-327. doi:<https://doi.org/10.1111/j.1600-0714.2008.00727.x>
- Senner, J. E., Logemann, J., Zecker, S., & Gaebler-Spira, D. (2004). Drooling, saliva production, and swallowing in cerebral palsy. *Developmental Medicine and Child Neurology*, *46*(12), 801-806. doi:<https://doi.org/10.1017/S0012162204001409>
- Shiel, W. (2018). *Definition of Prevalence - MedicineNet*. Retrieved from MedicineNet: https://www.medicinenet.com/arthritis/article.htm#what_is_the_arthritis_foundation
- Şıgan, S. N., Uzunhan, T. A., Aydınlı, N., Eraslan, E., Ekici, B., & Çalışkan, M. (2013). Effects of oral motor therapy in children with cerebral palsy. *Annals of Indian Academy of Neurology*, *16*(3), 342–346. doi:10.4103/0972-2327.116923

- Sochaniwskyj, A., Koheil, R., Bablich, K., Milner, M., & Kenny, D. (1986). Oral Motor Functioning, Frequency of Swallowing and Drooling in normal children and in children with cerebral palsy. *Arch Phys Med Rehabil*, 67, 866–874. Retrieved from [https://www.archives-pmr.org/article/0003-9993\(86\)90031-6/abstract](https://www.archives-pmr.org/article/0003-9993(86)90031-6/abstract)
- Tahmassebi, J. F., & Curzon, M. E. (2003). Prevalence of drooling in children with cerebral palsy attending special schools. *Developmental medicine and child neurology*, 45(9), 613-617. doi:<https://doi.org/10.1017/S0012162203001117>
- Tahmassebi, J. F., & Luther, F. (2004). Relationship between lip position and drooling in children with cerebral palsy. *European Journal of Paediatric Dentistry*(5), 151-156. Retrieved from <http://admin.ejpd.eu/download/2004-03-05.pdf>
- Van De Heyning, P. H., Marquet, J. F., & Creten, W. L. (1980). Drooling in children with cerebral palsy. *Acta oto-rhino-laryngologica belgica*, 34(6), 691-705. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/7223419>
- van der Burg, J. J., Jongerius, P. H., van Limbeek, J., van Hulst, K., & Rotteveel, J. J. (2006). Social interaction and self-esteem of children with cerebral palsy after treatment for severe drooling. *European Journal of Pediatrics*, 165(1), 37-41. doi:<https://doi.org/10.1007/s00431-005-1759-z>
- Weiss-Lambrou, R., Tetreault, S., & Dudley, J. (1988). The relationship between oral sensation and drooling in persons with cerebral palsy. *The American journal of Occupational Therapy*, 43, 155–161. doi:10.5014/ajot.43.3.155

[N.B. For better understanding of the study, please see hard copy & for any further information please contact: ummepinky97@gmail.com]