RESEARCH ARTICLE

A STUDY ON DEVELOPMENTAL DELAY AMONG CHILDREN LESS THAN 2 YEAR ATTENDING WELL BABY CLINIC - PREVALENCE AND ANTECEDENTS FACTORS

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ABSTRACT

Background: Early detection of neurodevelopmental abnormalities is important because of possibility of instituting early intervention program for that child. Trivandrum developmental screening test (TDSC) has sensitivity of 66.7% and specificity of 78.8%. This makes it a reasonably good test to screen children.

Aims & Objective: To study the prevalence of developmental delay among children less than 2 years attending well baby clinic using TDSC and antecedents factors of developmental delay.

Material and Methods: This cross sectional study was conducted on 200 patients visiting well baby clinic starting from age of 1 month till 2 years. Study was conducted for a period of 3 months from February 2013 to May 2013. Details pertaining to exact age, term or preterm status, maternal and paternal h/o was taken. Developmental screening was done using TDSC chart. Bell, pen, keys were used for assessment along with chart. Results were analyzed using SPSS 16.0.

Results: Total of 200 patients was screened.181 children were found to be normal with 85.6%- 94.2 % CI. In 19 children, delay was found with 5.8%-14.4 % CI. Preterm, IUGR, respiratory distress, sepsis, seizures in neonatal period showed significant p value for developmental delay. Microcephaly patients when screened for TDSC showed developmental delay with p value less than 0.05.All growth parameters (head, weight and length) when less than third centile showed significant association to developmental delay. The study also showed linear regression curve significant for awareness of developmental as maternal education improves.

Conclusion: Developmental screening with TDSC showed developmental delay prevalence 9.5%. All children should be screened in well baby clinic for developmental delay. In India, sources have found prevalence of 1.5-2.5% of developmental delay in children less than 2 years of age. High incidence of our study can be due to study done at tertiary care centre. Preterm and IUGR were found to have developmental delay with significant p value. Various antecedents' factors responsible for early brain injury showed significant p value. Hence every child attending well baby clinic should be screened for developmental delay with effective screening method such as TDSC.

Key-Words: Developmental Delay; Trivandrum Developmental Screening Test (TDSC); Developmental Screening; Well Baby Clinic

Introduction

The value of early identification of children with developmental delays has been well documented.[1] Paediatricians, unfortunately, frequently postpone referring eligible children and their families for early intervention services, and even more experienced clinicians have demonstrated difficulty in the identification of children with mild developmental delays, who are typically the children most amenable to early intervention.[2] As a result, there has been increasing emphasis on the use of appropriate developmental surveillance and screening for children. Developmental delay occurs when a child exhibits a significant delay in the acquisition of milestones or skills, in one or more domains of development (i.e., gross motor, fine motor, speech/language, cognitive, personal/social, or activities of daily living). A significant delay has been traditionally defined as discrepancy of 25 percent or more from the expected rate, or a discrepancy of 1.5 to 2 standard deviations from the norm. Global developmental delay is defined as a delay in two or more developmental domains. In addition to delays in development, physicians should also recognize deviations in development. Deviance occurs when a child develops milestones or skills outside of the typical acquisition sequence. An example of this can be seen in conditions such as cerebral palsy, in which the infant rolls over early secondary to increased extensor tone. Developmental dissociations may also occur. Dissociations arise when a child has

widely differing rates of development in different developmental domains. For example, children with autism often have typical gross motor development but significantly delayed language development, therefore language development has dissociated from gross motor development. Finally, developmental regression must be considered. Regression is when a child loses previously acquired skills or milestones, and although less common than the other patterns, should cause the greatest concern since it is often associated with serious neurological and inherited metabolic disorders. Screening is defined as a brief, formal, standardized evaluation that aids in the early identification of patients at risk for a developmental and/or behavioural disorder. The ideal screening method should use a standardized and validated tool with established psychometric qualities, be easy to perform and interpret, be inexpensive to administer, and have good sensitivity and specificity. Furthermore, this tool should be norm referenced and standardized on a population which is representative of the group to be tested. The American Academy of Paediatrics (AAP) describes "good" screening tools as those with sensitivity and specificity in the 70-80% range. Screening tools can assist in identifying at-risk children; however, they do not provide diagnoses. When a child passes a screening test it provides an opportunity to promote developmentally appropriate activities and discuss age appropriate milestones. Children who fail a screening test need close follow-up and additional assessment. Additional assessment and early intervention referral should not be delayed by what has typically been called a "wait and see" approach. Early treatment of both developmental and behavioural problems is less costly than treatment for long standing, fully developed disorders and improves the quality of life for both the child and family. Referral for an in-depth diagnostic evaluation by a developmental-behavioural specialist and referral for interventions (i.e. speech and language therapy, occupational therapy, physical therapy, special educational services etc.) do not require a diagnosis.[3]

Materials and Methods

A cross sectional study was performed at Sheth LG General Hospital with approval from ethical committee. Study was performed from February to May 2013.Patients attending well baby clinic were selected. Age criteria were from 1 month age to two years. A standardized questionnaire was used to collect information on the various antecedents' factors using "recall since birth" method. After that child was screened with help of TDSC chart.[4] His weight, length and head circumference were taken. Data were entered and analyzed using Statistical package for the Social Sciences (SPSS) software for windows version 16.0.

Results

Total of 200 patients were screened.181 children were found to be normal with 85.6%- 94.2% CI. In 19 children, delay was found with 5.8%-14.4 % CI. Preterm and term babies when analyzed for developmental delay significant association was found. The P value (0.00004) is less than 0.05 suggestive that preterm is considered as a significant antecedent factor influencing development. Among preterm significant difference was not found among small for gestational age, appropriate for gestational age. The small for gestational age children born full term showed P value 0.04 suggestive of significance. (Table 1)

Patients with sepsis, (P=0.0002) and respiratory problem (P=0.02) seizures in NICU showed developmental delay with significant P value. Birth asphyxia, meningitis, and neonatal jaundice failed to show P value less than 0.05 (Table 2).

Head circumference less than third centile showed developmental delay with significant P value (P= 0.0001). All three growth parameters weight, length and head circumference when less then third centile (P=0.0001) showed significant association. Visual abnormality hearing abnormality and constipation when compared with TDSC results showed developmental delay association with significant P value. Mother's education and father's occupation showed significant linear trend value less than 0.05. These means with mother's education increases awareness regarding developmental delay (Table 3).

Table-1: 1Gestational Age and TDSC

Gestational Age		Normal	Delay	P value
Full Term (n=181)	SGA (n=31)	26 (86.7%)	5 (13.3%)	0.04
	AGA (n=147)	141 (95.9%)	6 (4.1%)	
	LGA (n=3)	3 (100.0%)	0	
	Total	171 (94.5%)	10 (47.4%)	
Preterm (n=19)	SGA (n=6)	4 (66.7%)	2 (33.3%)	0.404
	AGA (n=13)	6 (46.2%)	7 (53.8%)	
	Total	10 (5.5)	9 (5.5%)	

Table-2: NICU Problems and its Relation with TDSC

TDSC		Normal	Delay	P value
Birth Asphyxia	Yes (n=7)	7 (100.0%)	0	0.4
	No (n=193)	174 (90.1%)	19 (9.9%)	
Respiratory Problem	Yes (n=7)	4 (57.1%)	3 (42.9%)	0.02
	No (n=193)	177 (91.7%)	16 (8.3%)	
Meningitis	Yes (n=1)	0	1(100.0%)	0.09
	No (n=199)	181 (91.05%)	18 (9.0%)	
Sepsis	Yes (n=12)	6 (50.0%)	6 (50.0%)	0.0002
	No (n=188)	175 (93.1%)	13 (6.9%)	
Neonatal Jaundice	Yes (n=41)	36 (83.9%)	5 (16.1%)	0.14
	No (n=159)	146 (91.8%)	13 (8.2%)	
Seizures	Yes (n=2)	2 (100.0)	0	0.81
	No (n=198)	179 (90.4%)	19 (9.6%)	

Table-3: 3Weight, Length and Head Circumference

Characteristics		Normal TDSC	Delay TDSC	P value
All 3 < 5th centile (n=4)		0	4 (3%)	<0.0001
All 3 normal (n=196)		189 (96.4%)	7 (3.6%)	
Head Circum-ference	Microcephaly (n=21)	12 (6%)	9 (5%)	<0.0001
	Normal (n=179)	169 (85%)	10 (5%)	
Constipation	Yes (n=23)	18 (78.3%)	5 (21.7%)	0.04
	No (n=174)	161 (92.55%)	13 (7.5%)	
Hearing Abnormality	Yes (n=2)	0	2 (10.5%)	0.008
	No (n=198)	181 (100.0%)	17 (89.5%)	

Discussion

Total 200 patients were analyzed, out of which 181 patients passed TDSC which had 95% confidence interval of 85.6-94.2% and 19 failed to pass TDSC. As estimated by the World Health Organization (WHO), about 5% of the world's children 14 years of age and under have some type of moderate to severe disability.[7] In India, sources have found prevalence of 1.5-2.5% of developmental delay in children less than 2 years of age. High rate of prevalence in our study can be due to screening done at tertiary care centre. These impairments impact not only the child and the family, but also the society, in terms of the cost of providing health care, educational support, and treatment services.[12] Evidence supports that early treatment of developmental disorders leads to improved outcomes for children and reduced costs to society.[5,6] Preterm and term babies when analyzed for developmental delay, significant association was found. The P value is less than 0.05 suggestive that preterm is considered as a significant antecedent factor influencing development. Many studies can be quoted to show that late preterm infants compared with term infants had lower MDI (85 vs. 89) and PDI (88 vs. 92), both P < 0.0001, respectively delay. Late preterm infants have worse 24-month neurodevelopment outcomes than term infants.[7] Our study does not show significant p value among preterm i.e. SGA and AGA preterm. The full term SGA showed developmental delay with p value less than 0.05.One such study showed risk for developmental delay in SGA 14.2% (SGA 21.9%, no SGA 7.7%, P< 0.05, adjusted OR 2.75, CI 1.25-6.08), SGA or IUGR are at risk for prenatal and post natal insults. Of all pre-existing maternal and pregnancy-related factors studied, SGA, maternal pre-pregnancy obesity, being one of a multiple, and male sex was associated with the risk of developmental delay in early childhood after moderately preterm birth.[8]

In our study various antecedent factors such as respiratory problem, sepsis, seizure showed significant relation with P <0.005 to developmental delay. All this are known risk factors for developmental delay and it is suggestive of insult to developing brain. Birth asphyxia, meningitis does not show significant p value use in our study because the study was done from well-baby clinic and it was on recall basis. Those children who are severely asphyxiated or falls in high risk category attends high risk clinic. Head circumference less than fifth centile showed significant p value suggests that head less than fifth centile is significantly associated with development delay. Microcephaly is known risk factor or indicator of developmental delay. Head circumference, length, and weight, less than fifth centile also showed significant p value which suggests that all three together has significant association with delay TDSC. This babies are likely to be either preterm or IUGR which is known risk factor for developmental delay. Hearing abnormality and vision abnormality showed significant p value. This confirms the sensitivity of TDSC to detect developmental delay in all four domains. Mother's education and its awareness showed significant linear trend value less than 0.05. It showed

significant associations between education and awareness of mother. Higher the education more likely to be aware of delayed status of baby.

Conclusion

Developmental screening is must in all children attending well baby clinic. Neurodevelopment outcome improves if these children are identified early. TDSC is simple, effective screening tool to identify developmental delay. Late preterm infants have poorer neurodevelopmental outcomes than term infants. Adverse sociodemographic factors negatively affect developmental outcomes across the continuum of low birth weight and appear to have far greater effects on long-term cognitive outcomes than most of the biological risk factors. Reinforced focus on prevention of IUGR, developmentally supportive NICU, and literacy status of women may all contribute toward more favourable developmental outcomes in moderately preterm-born children.

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