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Early Life Events and Probable Risk for Behavior Problems During Childhood

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Abstract: Behavior problems in children are on rise in recent years. The study was conducted with objectives to study the influence of maternal factors, pregnancy conditions and infancy characteristics on behavior problems during childhood. By a means to identify and provide corrective support during childhood. 489 girls and 636 boys aged 9 to 15 years from three primary and secondary schools located in Mysore city were screened for behavior status. Mothers of all children were contacted to obtain information about age at pregnancy, health problems experienced during prenatal period, type of delivery, postnatal problems encountered and feeding problems during infancy of the target population. Standardized questionnaires were used to elicit a relevant data. **Findings**: our study has highlighted the inclination in the age inappropriate behavior problems among young children. To a great extent 39 to 34% of Girls and boys were found to be inflicted with behavior problems. Higher percentages of children mother's with behavior problems were either younger than 18 years or older than 30 years. Age at pregnancy was found to have significant association to behavior problems ($\chi 2$ =25.9, P<0.001). Nausea, vomiting, pica and morning sickness occurred in higher number of mothers of children with behavior problems, Chi square analysis revealed a strong statistical association with behavior problems. Cesarean section was performed in higher percentage of children with behavior problems ($\chi 2$ =21.9, P<0.001). Health problems ($\chi 2$ =28.9), UTI and skin infections ($\chi 2$ =4.08; NS), complications like gestational diabetes and hypertension ($\chi 2$= 4.3) were seen in markedly higher proportion of mothers of children with behavior problems. Chi square analysis indicated statistical association (P<0.02). Nineteen and twenty two percent of boys and girls with behavior problems respectively had low birth weight, while 10 to12 percent were macrosomic babies. (Girls: χ 2= 1.76; P=0.41; Boys: $\chi 2$=10.95; P<0.04). Feeding problems was found to occur in the

study population among both normal children and those with behavior problems. Twelve to thirteen percent of normal children and twenty three to twenty five percent children with behavior problemswere found to have feeding problems (girls: $\chi 2=14.15$; boys: $\chi 2= 10.64$). Higher percentage of children with behavior problems suffered from frequent fever and jaundice as compared to the normal counterparts. **Conclusion:** It could be possible that a combination of maternal factors, condition at partution and fetal factors together with environmental conditions influence the behavior systems of the child.

Key words: Early years, Feeding problems, Childhood, Behavior problems, Health problem, Maternal factors

Introduction

Pregnant women with early evidence of neurobehavioral abnormalities exhibit certain biological markers such as poor EEG profiles, low vagal tone responses, altered maternal epinephrine and norepinephrine levels, such women are reported to be susceptible for giving birth to children who develop behavior problems [1,2]. Genetically determined characteristics of emotional and behavioral responses (within child) including temperament, neuropsychological and cognitive function such as mental control and social cognitive process causes behavior insults leading to behavior problems [3].

Pregnancy complications including ectopic pregnancy, spontaneous abortion, fetal chromosomal abnormalities, certain congenital anomalies, placenta previa, gestational diabetes, preeclampsia, multiple births, PTD, and Caesarean section; in turn are associated with an increased risk of preterm birth and perinatal as well as maternal mortality and morbidity. Infants born preterm, especially multiples, are at increased risk of morbidity, mortality, and long-term disability [4,-8].

Findings by Kazaura et al. (2006) reported that the risk factors including maternal age, race, marital status, smoking, birth weight, gestation age, labour complications, antenatal care, previous unfavourable outcomes (e.g. stillbirth, neonatal deaths), maternal morbidity (e.g. malaria and HIV infection) and poor socio-economic conditions influence neonatal mortality [6,7]. Poor nutritional status during pregnancy has been associated with irreversible damage to the infant brain and central nervous system leading to poor brain development and intelligence (Wardlaw & Kessel, 2002).

Research on development during the fetal period is well established with regards to the association between the baby's growth in the womb, and later

vulnerability to physical disorders such as cardiovascular disease and other aspects of metabolic syndrome. Recently the environmental effects on fetal development with respect to emotional, behavioural and cognitive outcomes are now becoming important [9-11].

Multiple clinical studies have, in fact, repeatedly confirmed that prenatal maternal factors, such as infection, stress and malnutrition are pivotal in shaping behavioral and cognitive functions of the offspring[12-13]

Research has revealed that the past personal or family history of psychiatric illness or substance abuse, past personal history of sexual, physical or emotional abuse, current exposure to intimate partner violence or coercion, current social adversity and coincidental adverse life events are noted to be the risk factors for poor mental health during pregnancy[14].

Psychological disturbances during pregnancy are associated with inadequate antenatal care, low-birth weight and preterm delivery. While the diminished emotional involvement, neglect and hostility towards the newborn were notably associated during postpartum[15]

Problem behaviors in children pose a serious challenge for parents, teachers and caregivers. Their early identification and remediation is a matter of perennial concern. There is continual need to profile the contemporary picture of problem behaviors in children periodically [16].

Hence forth our research was undertaken with an aim to study the influence of maternal factors, pregnancy conditions and infancy characteristics on behavior problems during childhood. By a means to identify and provide corrective support during childhood.

Methodology

Study Population –

This was a cross sectional study carried out in one of the major city of Karnataka from South India. A total of 1125 children (Boys: 636 and Girls: 489) aged between 9 to 14 years were selected from the mainstream schools. One each of private, government as well as two government aided schools having English or the vernacular (Kannada) as medium of instruction cooperated in conducting this study. All children studying in 4^{th} to 9^{th} standard were the participants.

Research Design: This was a cross sectional study.

Tools / Techniques: all the information obtained was through self reporting questionnaires prepared in simple English language for children to follow. They were translated into Kannada language, language expert from Kuvempu Institute of Kannada Studies; University of Mysore helped in translation. Questionnaires so prepared were standardized based on pilot study. Children were given choice to use questionnaire in language they were comfortable.

Demographic Assessment: Family information such as religion, family type, parents' education, occupation, selected house hold articles (two and four wheelers, TV, computer, fridge and washing machine) and type of diet practiced was elicited using appropriate questionnaire. This required ticking the right option; children from 4^{th} and 5^{th} standards were assisted in making entries. Information obtained for parent's occupation was confirmed from school records.

Classification of occupation: the occupation of mothers and fathers were graded as low, lower middle, middle, upper middle and high according to Desai et al; 2010 [17].

SES classification: Socio economic status of the parents was computed based on parent's education, occupation, type of house and household articles. Each of these variables were scored, and the sum of total score which ranged between 5 – 28 was distributed into three equal ranges and labeled as low SES- scores < 9; while 10 -18 and > 19 were designated as middle and high SES respectively. The selected children were classified into the respective socio economic status.

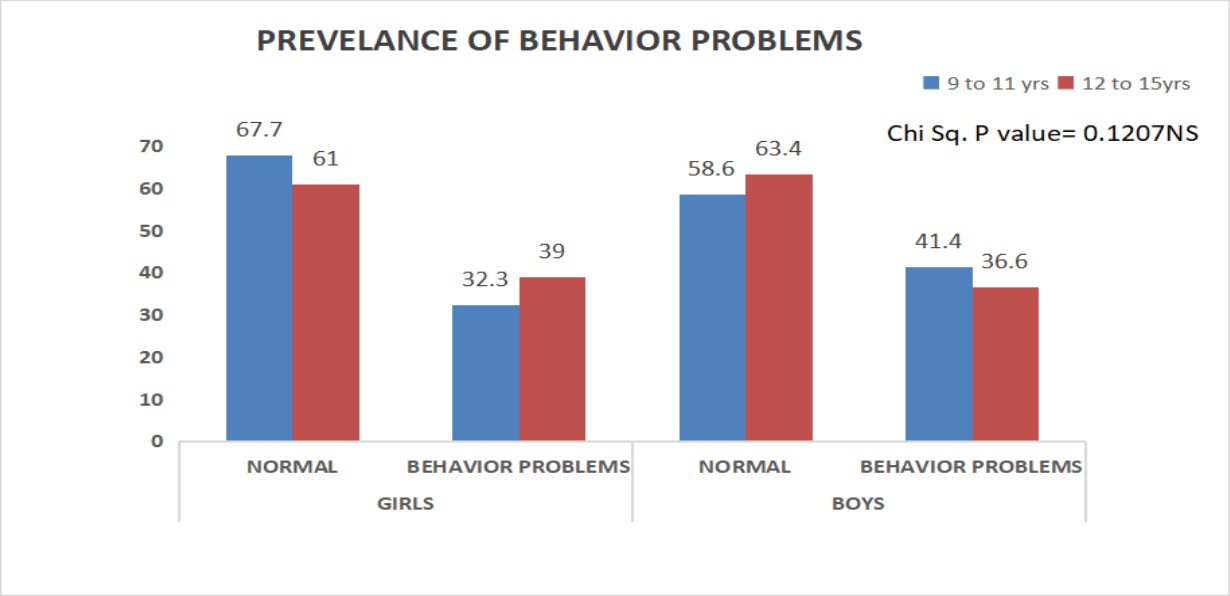
Behavior Assessment - 'Abbaris Child and Adolescent Self Report' (ACASRQ) questionnaire modified by Sushma et.al to assess children with non pathological behavior issues in Indian children was adopted [18]. Based on this children were grouped into those with behavior problems and normal children.

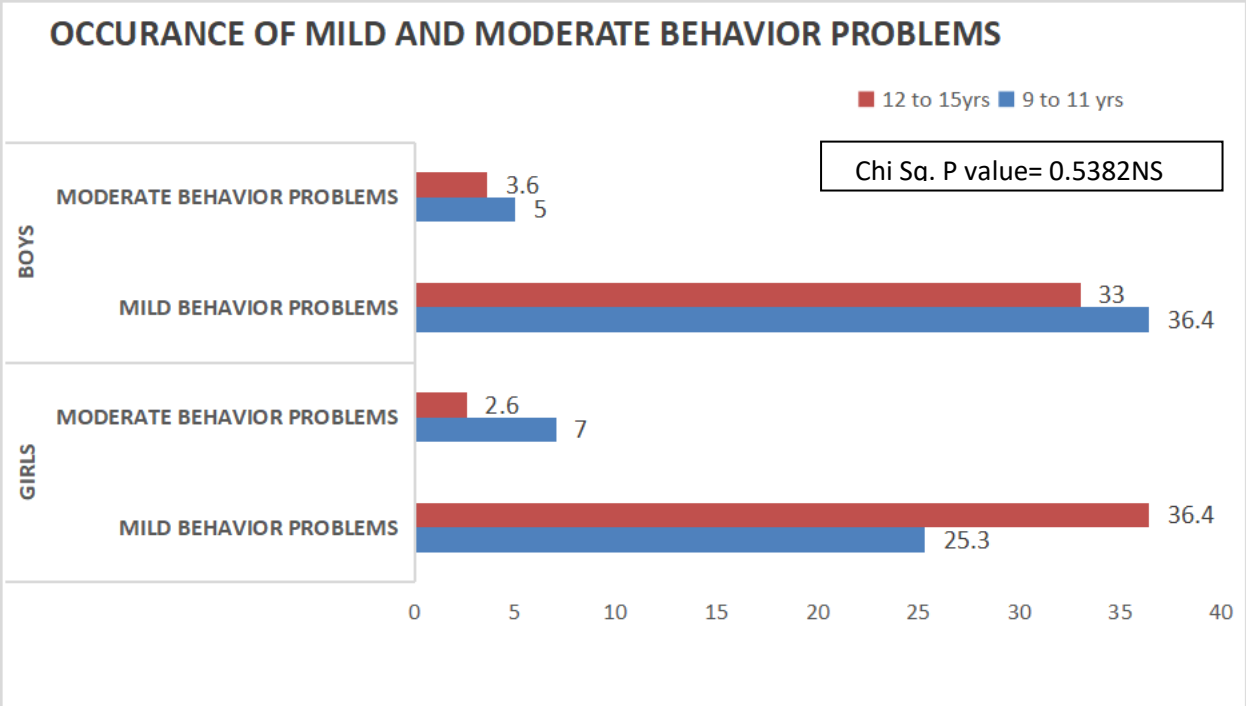
Assessment on Maternal factors and Pregnancy Status: This was a detailed assessment carried out to evaluate maternal age, type of delivery, mother's health status during pregnancy, maternal factors and type of feeding problems during infancy and early childhood

Statistical analysis:
Data obtained was analyzed using excel software -2007 version and X-STAT 3Dplot. 752 package for descriptive analysis. Mean scores, standard deviation

and percentage were calculated for interpreting eating pattern. Non parametric statistical analysis was executed on Diet type practiced; regularity of consuming different meals; completing packed lunch at school by children. Statistical results were presented based on the alpha significant level at $p \leq 0.05$

Percent Occurrence of Behavior Problems Among the Selected Children





Occurrence of behavior problems were 33.7 and 38.8 % boys and girls respectively had behavior problems. Although girls were more affected than boys, the differences were small and statistically not significant. In general practice, behavior problem is classified as mild, moderate and severe cases depending on behavior characteristics, in the study population none of the children were in severe grade. 87 % of the affected participants were found to have mild form and others exhibited moderate form of behavior problems. The occurrence rate of mild and moderate form of behavior problems was similar among boys and girls and therefore was statistically not significant.

Maternal Age During Pregnancy, Prenatal Care and Type of Delivery Of The Target Child

Variables	**Details**	**Girls (489) %(n)**		**Boys (636) %(n)**	
		Normal	**Behavior problem**	**Normal**	**Behavior problem**
Age at the time of pregnancy	Less than 18 years	5.8 (18)	12.0 (21)	3.8 (15)	7.3 (18)
	19 to 30 years	89.8 (281)	77.2 (136)	91.8 (357)	86.2 (213)
	More than 31 years	4.4 (14)	10.8 (19)	4.4 (17)	6.5 (16)
χ^2 value (P<0.01)	**25.9**				
Condition during pregnancy	Nausea /vomiting	76.0 (238)	82.3 (145)	75.5 (294)	80.2 (198)
	Pica	16.3 (51)	29.5 (52)	14.3 (56)	25.9 (64)
	Morning sickness	21.4 (67)	42.0 (74)	17.2 (67)	31.2 (77)
χ^2 value (P<0.01)	**26.6**				
Prenatal care	**Received**	100(313)	100(176)	100(389)	100 (247)
	Not received	-	-	-	-
χ^2 value (P<0.01)	**0.9; NS**				
Type of delivery	Normal	66.1 (207)	48.3 (85)	65.8 (256)	55.9 (138)
	Cesarian	33.9	51.7 (91)	34.2	44.1 (109)

		(106)		(133)	
χ^2 value (P<0.01)	**21.9**				

Health Problems Encountered During Pregnancy of the Target Child

Health problems	**Girls (489) %(n)**		**Boys (636) %(n)**		**χ^2 value (P<0.05)**
	Normal	**Behavior problem**	**Normal**	**Behavior problem**	
Muscle cramps	56.2 (176)	59.7 (105)	53.4 (208)	68.0 (168)	**3.54**
Heart burn	20.1 (63)	40.3 (71)	12.6 (49)	22.7 (56)	**0.003 NS**
Depression	9.9 (31)	19.8 (35)	6.2 (24)	10.5 (26)	**9.66**
Body weight loss	61.7 (193)	65.9 (116)	53.9 (210)	82.2 (203)	**0.001 NS**
χ^2 value (P<0.01)	**Chi sq = 4.3**				

Certain maternal factors are considered to influence baby's health, importantly maternal age at pregnancy, health problems experienced during pregnancy, prenatal care obtained as well as the type of delivery. Age at time of delivery also bear a strong association with child's general health and mental wellbeing. Therefore to identify whether or not mother's age could influence behavior problems in child, maternal age at the time of pregnancy of the target child (selected for the study) was elicited. It could be noted that higher percentage of children mother's with behavior problems were either younger than 18 years or older than 30 years.

Ninety to ninety two percentage of mother's of normal children and 77 to 86 percent mothers of children with behavior problems were between the age of 19 to 30 years at the time of pregnancy. Age at pregnancy was found to have significant association to behavior problems (Chi sq=25.9, P=0.0001). Nausea and vomiting, pica and morning sickness that are usually associated with pregnancy were experienced by most mothers, nevertheless children mothers with behavior problems experienced these in higher proportion. Chi square analysis revealed a strong statistical association between the

mothers of children with and without behavior problems. This suggests that certain health conditions during pregnancy may effect baby's development.

It is encouraging to note that mothers of all children regardless of behavior problems received prenatal care. Further, method of delivery in used for the target child was considered to have an association with the behavior status. Markedly higher percentage of children with behavior problems were found to have born with cesarian section; as against normal children. Although the difference in percentage between the two i.e with and without behavior problems was less, Chi square analysis indicated an extremely significant association (Chi sq=21.9, P=0.0001). It could be possible that a combination of maternal factors, condition at partution and fetal factors together with environmental conditions influence the behavior systems of the child

Health Problems Encountered Following Delivery

Variables	**Details**	**Girls (489) %(n)**		**Boys (636) %(n)**		**χ^2 value (P<0.05)**
		Normal	**Behavior problem**	**Normal**	**Behavior problem**	
Health problems	Constipation	38.0 (119)	42.0 (74)	44.7 (174)	48.9 (104)	**0.34 NS**
	Gestational Diabetes	6.0 (21)	16.5 (29)	8.2 (32)	9.3 (23)	**3.54 NS**
	Blood pressure/ Hypertension	10.5 (33)	23.3 (41)	11.8 (46)	19.4 (48)	**0.31 NS**
	Disturbed sleep	18.2 (57)	36.4 (64)	16.2 (63)	22.3 (55)	**0.94 NS**
	Low back pain	19.8 (62)	43.2 (76)	19.7 (77)	29.6 (73)	**1.18 NS**
χ^2 value (P<0.05)		**28.9**				
Infections	UTI	32.3 (101)	31.8 (56)	24.4 (95)	34.8 (86)	**4.84**
	Skin problem	23.0 (72)	25.6 (45)	25.5 (99)	25.5 (63)	**0.005 NS**
χ^2 value (P<0.05)		**4.08 ;NS**				

Discomfort and certain health problems have common association with pregnancy. Problems such as constipation, disturbed sleep, low back pain as well as complications like gestational diabetes and hypertension are commonly reported. Occurrence of health problems and complications were markedly higher in children mothers with behavior problems. Constipation was most frequently reported problem followed by disturbed sleep and low back pain. Chi square analysis indicated statistically significant association.

Gestational diabetes and hypertension was found in higher frequency among mothers of children with behavior problem as compared to their normal counterparts. Nevertheless, occurrence was markedly in higher percentage of mothers of girls with behavior problems.

Among infections, UTI and skin infections were found in higher proportions among all mothers, the frequency varied from 23 to 32 percent. Occurrence rate was essentially similar among mothers of normal children and those with behavior problems. Chi square analysis did not indicate statistical association.

Health problems encountered by mothers after delivery were also elicited. The most frequently encountered health problem was muscle cramps, 53 to 68 percent mothers of all children regardless of the behavior problems suffered from muscle cramps. Occurrence rate of heart burn among the groups of mother (gender and behavior problems) varied markedly, highest percentage of mothers who experienced heart burn were those of girls with behavior problems. Depression was also noted by a small percentage of mothers wherein mothers of children with behavior problems where in much higher proportion (10.5 and 19.8% boys and girls). Chi square analysis indicated statistical association (P= 0.002). Body weight change was reported by 60 to 82 percent mothers, since weight loss due to loss of body water after partuition is a normal physiological process. Mothers of all children experienced weight loss.

Conclusion:

Maternal health research is a public health priority due to the vicious life cycle outcome impact of maternal state and child health developments. Maternal age at pregnancy, health problems experienced during pregnancy, as well as the type of delivery appears to bear a strong association with occurrence of behavior problems in children. To a great extent higher proportion of children with behavior problem experienced

feeding problem and poor age appropriate behaviors.

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