



Research Article

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GARBHOPAGHATAKARA BHAVA, PRECONCEPTIONAL RISK FACTORS FOR AUTISM: A CROSS-SECTIONAL SURVEY

Kulkarni Reena ^{1*}, Simha Sameera ², C Srilakshmi ³

¹ Professor and Head, Department of Kaumarabhritya, SDM Institute of Ayurveda and Hospital, Bengaluru, Karnataka, India

² Scholar, IV Year BAMS, SDM Institute of Ayurveda and Hospital, Bengaluru, Karnataka, India

³ Assistant Professor, Department of Kaumarabhritya, SDM Institute of Ayurveda and Hospital, Bengaluru, Karnataka, India

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*Corresponding author

E-mail: dreenakulkarni@gmail.com

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ABSTRACT

Background: Garbhopaghatakara bhava, inclusive of altered maternal habits, diet, behaviours, and exposures in the perinatal period disrupt normal growth and development of the foetus. Autism spectrum disorders (ASD) are characterized by impaired social behaviour and communication skills. Many risk factors for ASD are identified but with no generalization of definite aetiology. Psychosocial anomalies in Ayurveda have been explained under the spectrum of unmada. Such diseases are said to present early in life and persist throughout the lifespan when associated with garbhopaghatakara bhava. This study explores the association of garbhopaghatakara bhava with the etiopathogenesis of ASD. Materials and Methods: Parents of 50 children who have ASD enquired about garbhopaghatakara bhava using a structured survey format. Results: Male preponderance (80%) with middle socio-economic strata (62%) predominated the study population. 48% had delayed speech and communication with poor eye contact, and 24% with delay in gross motor milestones. Garbhopaghatakara bhava leading to ashaya dushti (structural and functional variation in uterine milieu) were secondary to abortions (22%), hypothyroidism (10%), advanced parental age (64%), diabetes mellitus (8%). Amongst diet and activities in the mother, madhura-katu rasa (22%), eating less (28%), frequent meals (28%), day sleep (42%), night waking (54%), excess travel (18%) and withhold of urges (16%) were seen. The genetic risk was sporadic (14%). Discussion: Garbhopaghatakara bhava can act by changing the epigenetics or disturbing the nutrition, psyche, and intellectual faculties in the child. Conclusion: Baseline information about the association of garbhopaghatakara bhava with ASD was identified. However, further analytical studies can provide substantial information and evidence.

Keywords: Autism spectrum disorder, Ayurveda, garbhopaghatakara bhava, pre-conceptional risk factors, unmada

INTRODUCTION

Garbhopaghatakara bhava refers to the diet, activities, exposures, diseases and other habits of the mother and father, including genetic factors, especially during the pre-conceptional and perinatal period that can result in the altered health status of the foetus. Autism Spectrum Disorders (ASD) is a group of neurodevelopmental disorders arising early in development, persists across the life span, and is characterized by difficulties with social reciprocity, communication, and sensory spheres. Children show a variety of cognitive strengths and IQs with isolated 'savant abilities'.¹ Such altered psychological, behavioural, and psychiatric disorders in Ayurveda are dealt with under a broad spectrum of diseases called unmada. Unmada can manifest as altered functions (vibhrama) of mano (mental faculties), buddhi (ability to make decisions), samijnana (orientation to time, place, and person), smrti (memory), bhakti (Desire/enthusiasm towards a particular topic of interest) sheela (routine natures or habits) cheshta (bodily activities) and achara (social conduct)², with or without prajnaparadha (intellectual blasphemy/consciously indulging with unwholesome activities). Thus, features of ASD do match the criteria of unmada when a comparative evaluation of the disease biology is done. Garbhopaghatakara bhava can be unmada to a child, with related exposures during preconceptional, perinatal, infancy or early childhood period. The etiopathogenesis of ASD is still unclear. Many risk factors, including genetic, environmental, and

immune-related causes, have been established but with poor generalization.³ Fewer studies are available in this aspect, while research exploring garbhopaghatakara bhava in the Indian context is unavailable. There has been a daunting increase in the prevalence of ASD in recent times, up to 1 in 54 children across the globe⁴ and 1 in 100 in India.⁵ Many parents approach Ayurveda as a therapeutic option for ASD. Thus, the current research attempts to ascertain the garbhopaghatakara bhava, especially pre-conceptional risk factors associated with ASD.

MATERIALS AND METHODS

Inclusion criteria: Children diagnosed with autism spectrum disorder registered in outpatient and inpatient departments of SDM Institute of Ayurveda and Hospital (SDMIAH), Bengaluru, Karnataka, India.

Exclusion criteria: Normal children, children with learning disabilities, and developmental delay are excluded.

Methodology of the study: As this cross-sectional survey involved human participants, ethical approval was obtained from Institutional Ethics Committee (IEC) on 24-04-2021 with IEC no: SDMIAH/IEC/31/2021. The survey study screened 300 children visiting kaumarabhritya OPD with developmental delay, speech disorders, communication issues, hyperactivity, and other neurodevelopmental concerns. Fifty subjects with ASD were

selected as per the inclusion and exclusion criteria. An information sheet was provided to each subject, the trial's purpose was explained, and written assent/consent was taken for participation in the study.

Recruitment: The subjects willing to participate in the study were screened according to the inclusion and exclusion criteria by a screening form followed by written consent. Data collection was done by a detailed history taking regarding the known and probable risk factors of ASD, based on garbhopaghatakara bhava in a structured survey format along with screening based on M-CHAT⁶ and ISAA⁷. Thus, 50 Children fulfilling the diagnostic and inclusion criteria for autism spectrum disorders (ASD) consulting at SDMIAH were recruited for the study.

Statistical analysis- The data obtained from the study were statistically analysed, and inferences were drawn with frequency tables and cross-tabulation using SPSS version 22.3.

OBSERVATIONS AND RESULTS

Fifty children with a diagnosis of ASD participated in the cross-sectional survey. The outcomes of the study are summarized below. On enquiry into the chief complaints, most of the participants had delayed speech and communication and poor eye contact 24 (48.0%), delayed gross motor milestones 12 (24%), followed by loss of acquired speech and communication after normal development 11 (22%). 36 (72%) were first in the birth order, with 14 (28%) being second.

Table 1: Distribution of children based on family history and sibling history suggestive of probable beejā dushti

Factor suggestive of Beeja dushti		Frequency	Percent (%)
Family history	None	31	62.0
	Seizure	1	2.0
	Speech disorder	11	22.0
	Depression	3	6.0
	ASD/ADHD	3	6.0
	Intellectual disability	1	2.0
Sibling status	Normal	11	22.0
	Autism	4	8.0
	Other neuro-developmental issues	1	2.0
	Not applicable	34	68.0
Paternal illness	No	49	98.0
	Diabetes Mellitus	1	2.0
Consanguinity	No	47	94.0
	Grade 2	1	2.0
	Grade 3	2	4.0
	No	47	94.0

Table 2: Distribution of children based on probable ashaya dushti based on pre-conceptual-diseases, habits, and medication in mother

Preconceptional factors		Frequency	Percent (%)
Maternal illness	None	24	48.0
	PCOD	4	8.0
	Diabetes Mellitus	3	6.0
	Hypothyroidism	5	10.0
	Hyperthyroidism	1	2.0
	Hypertension	1	2.0
	Abortions	4	8.0
	Recurrent abortions	5	10.0
	PCOD and Recurrent abortions	2	4.0
	Diabetes and chronic hypertension	1	2.0
Maternal medication	None	41	82.0
	Medications are taken, unknown	1	2.0
	Ovulation induction	2	4.0
	Thyroxin	1	2.0
	Antihypertensive	1	2.0
	Medications for PCOD	4	8.0
Maternal surgical interventions	None	44	88.0
	Explorative / Operative Laparoscopy	5	10.0
Type of conception	Natural conception	49	98.0
	IVF Pregnancy	1	2.0
Habits	Divaswapna (sleeping in the day)	21	42
	Ratrijagarana (Night wakening)	27	54
	Madya/ dhoomapana (alcohol and smoke)	0	0
	Vegadharana (withholding natural urges)	8	16
	Yana (excess travel)	9	18%

Table 3: Distribution of children based on preconceptional dietary factors (Aharaja bhava) in mothers

Aharaja bhava		Frequency	Percent (%)
Predominant rasa	Nothing specific; all types consumed	22	44.0
	Madhura	3	6.0
	Amla	4	8.0
	Katu	11	22.0
	Madhura and katu	9	18.0
	Red Mud	1	2.0
Predominant diet	Shakhaahara (Vegetarian diet)	20	40.0
	Mamsaahara (Mixed diet)	30	60.0
Altered eating habits	Upavasa	10	20.0
	Prमितashana	14	28.0
	Adhyashana	14	28.0
	Vishamashana	6	12.0
	Viruddhaahara	4	8.0

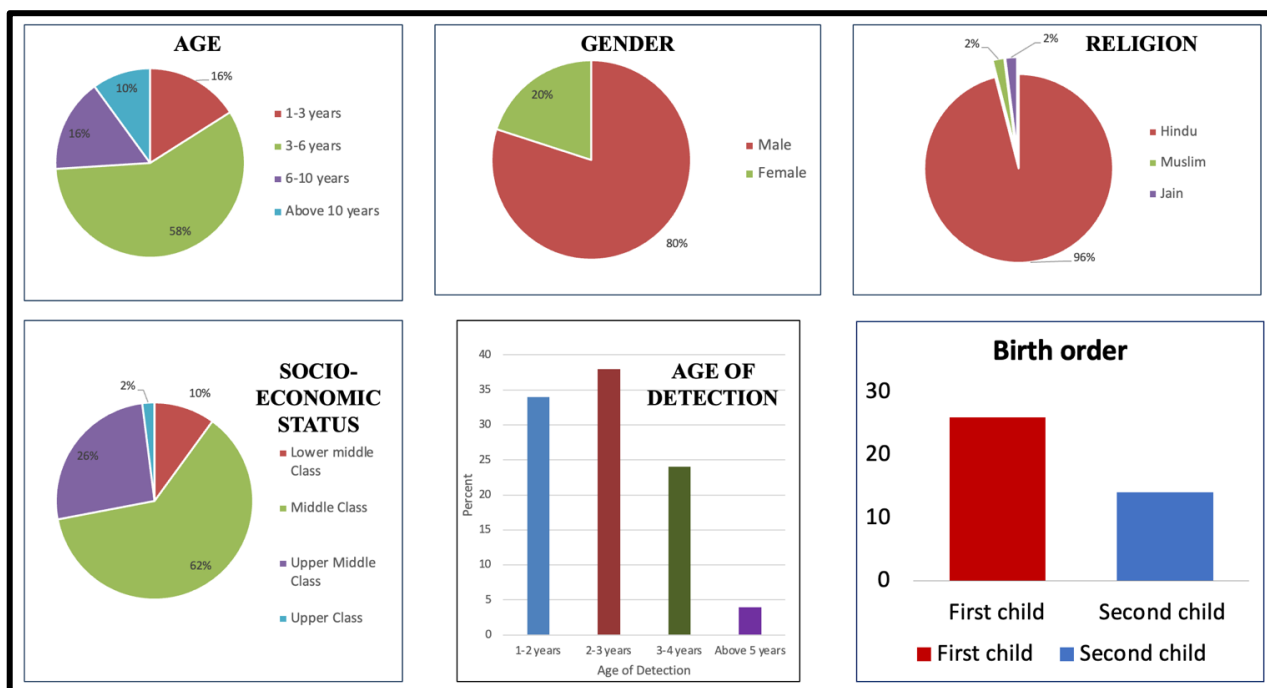


Figure 1: Baseline Data

Family history of speech disorders had 22% incidence, followed by ASD/ADHD and depression in 3% of cases. 4 (8%) children had siblings with autism. 1 (2%) child had a sibling with hyperactivity (Other neurodevelopmental issues). Consanguinity was reported in 3 cases (6%). One child was diagnosed with cridu-chat syndrome. 34 (68%) only child was diagnosed with ASD (Table 1). Pre-conceptional history of abortions was reported in 11 (22%) cases, out of which seven were recurrent (>3 abortions before conception). The most common pre-conceptional systemic disorders were PCOD 6 (12%), hypothyroidism (10%) and diabetes mellitus (8%). Frequent medicines were for PCOD (8%), ovulation inducers (4%) and thyroxin (2%). 1 IVF Pregnancy was noted in the survey (table 2). 10% underwent surgery in the pre-conceptional period. Predominant habits identified were day sleep (42%), night wakening (54%), excess travel (18%) and withholding natural urges (16%). Interestingly none indulged in alcohol and smoking.

Amongst frequently consumed taste preferences were madhura (sweet-22%), katu (spicy and pungent-18%) and amla (sour-8%). Again, a spicy, mixed diet was the predominant food taken by mothers. Predominantly consumed non-vegetarian foods were chicken (52%), mutton (34%) and fish (48%) (Table 3). 14 (28%) individuals reported having indulged in prमितashana (eating

less) and adhyashana (frequent meals). 10 (20%) reported to did upavasa (fasting).

DISCUSSION

Autism spectrum disorders remain the most puzzling neurodevelopmental illness with obscure aetiology. Enquiring into pre-conceptional garbhopaghatakara bhavas mentioned in the samhitas^{8,9} in 50 children yielded exciting facts. Age of detection between 1 to 4 years signifies the critical period of language and social development, which is in agreement with the previous studies on autism by Gray and Tongue¹⁰, Mandell *et al.*¹¹ and Paul *et al.*¹² Male preponderance is in this study and recent studies as well, ASD is shown to affect 4-5 times more in males than in females on average.¹³ Selective inhibition of 11-β-hydroxysteroid dehydrogenase in males could be a probable cause.¹⁴ Further, maternal stressors can impact the placental-brain-axis differentially based on sex, and the placenta may be considered a sexually dimorphic organ, with one sex possibly more vulnerable than the other.¹⁴ Lower socio-economic status¹⁵ could be associated with a higher chance of looking towards economical alternative therapies, as is with this study. Increased presentation in children with speech and communication issues or social withdrawal has also been the cardinal manifestation in

earlier research.¹⁶ They further could have been influenced by poor parental interaction, change of place, use of mobile phones, gadgets and television etc., in the critical stage of language and social development.¹⁷ Further, unmade lakshana also includes dhivibhrama (altered mental faculty of making decisions), satva pariplava (fickle mindedness with hyperactivity), paryakula drishti (poor eye contact), abaddha vak (improper speech, delay in onset of speech), hridaya shunyata (poor emotional expressions)¹⁸ implies its similarity with ASD. Beeja refers to the genetic material from both parents that initiates all creation.¹⁹ Presence of family or sibling history of similar illnesses, speech issues, or chronic diseases indicates genetically transmitted illnesses. The presence of consanguinity further increases the X-linked transmission of illnesses in the family.¹⁶ Long term illnesses can influence the gene changes, which can be transmitted through gametes (shukra shonita). This is further evidenced by the presence of a similar association in this study. Studies have reported regions on chromosomes 2q²⁰, 4, 16p²⁰, 10, 18, 19 and 22 with the highest significance for region 7q²⁰ of the 22nd chromosome.²¹ RELN gene was associated with ASD.²² Few studies have found an association between cri-du-chat syndrome and fragile-X syndrome, which is consistent with this study.²³ Thus, consanguineous marriage and a long-term illness can be a risk factor for ASD.²⁴

Most children with ASD in our study were either the only or first children. Previous studies also reported a higher prevalence of ASD in the only child or first born²⁵ and in children with a change of place²⁶, nuclear families, those with poor social interactions and with increased use of mobiles, gadgets, and television.²⁷ Chronic maternal illnesses resulting from dosha dushti circulate all over and vitiate rasa (first dhatu, a product of digestion), even garbhashaya and shonita. In such a status, if the lady conceives, it can transmit and trouble the offspring to be malformed or diseased or result in pregnancy loss.²⁸ Fetal nutrition, growth, development, intellect, psyche, and emotions depend on the mother through maternal gamete and traits^{29,30}. Such afflictions are called ashaya dushti and can be either too fatal or can be managed with some effort. Thus, the presence of abortion, hypothyroidism and diabetes mellitus in this study confirms facts of the etiopathology of ASD. Maternal medications and exposures can also influence the development of ASD. It has been reported that valproate and SSRI before conception have been shown to increase the risk of ASD in studies.^{31,32} However, in our study, no association was found concerning valproate and SSRI during the pre-conceptual period. Surgical interventions pre-conceptionally can lead to increased stress, called surgical stress, via sympathetic nervous system stimulation,³³ leading to hormonal and neurobiological changes in the mother. Habits like day sleep, night wakening, excessive travel, and withholding natural urges vitiates vata, disturbing the homeostasis of dosha in the lady. This may be associated with the change in the uterine milieu (ashaya dushti), which could act as a risk factor for ASD. Previous studies have shown an inconsistent association between assisted reproductive techniques and ASD.³⁴

The mother's diet grossly influences the foetus's growth and development, nutrition, activities, strength, and complexion.³⁵ Thus, any variations in the maternal diet can vitiate the vata, pitta and kapha dosha in the mother. They, in turn, imbalance the various activities determined by dosha in garbha resulting in disruptions.³⁶ Further, the health, contentment of the senses, interest in initiating activities, voice, complexion, happiness and nourishment of beeja all depends on the satmya (acclimatized restorative practices of diet and activities). Vitiating vata, pitta and kapha can result in abnormalities in the foetus with respect to its structure (vata), the function of organ systems, enzymatic activities (pitta) or intellect and immunity (kapha).³⁷ Thus,

maternal diet and activities have solid epigenetic influences on the foetus. In this study, spicy, sweet, and sour food was preferred by mothers in the pre-conceptual period, whose epigenetic effects on the foetus cannot be neglected. These can be viewed as persistent use of an imbalanced diet (low caloric, low protein, heavy carbohydrate, fat, or protein meal) and its nutritional effects. Deficits in trace elements like iron, folic acid, calcium, and vitamin B-12 have been well documented in children with ASD.³⁸ Indulgence in excessive heavy meat meal also affects the metabolic, neurological, and cutaneous functions of the foetus. Altered eating habits in the form of less eating, frequent munching, and fasting, eating unwholesome food were also identified in considerable proportion. The specific effects of the same, though not identified but influence the epigenetic factors and result in abnormal or restricted growth of the foetus, abortions etc.⁹ Recent studies have documented toxic effects of certain foods on the growing foetus, especially in ASD.³⁹ Previous studies have cited mercury or lead among few heavy metal deposits in the brain of the ASD children and hence postulated the need for chelation.³⁹ Though their role with respect to ASD is not well established, restricted intake during the critical age of brain development should be adapted as a prevention methodology.

CONCLUSION

ASD in recent times poses a greater social health risk in children and a disease burden owing to the alarmingly rising prevalence. The study aimed to identify the role of garbhopaghatakarahava on pre-conceptual factors of ASD. The preliminary data obtained can serve as valid basic information to plan further research on these lines. Similar trials with analytical controls and experimental designs can pool substantial data regarding the risk factors for autism, their mechanism and treatment. These facts aid in exploring newer possibilities as well.

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ABBREVIATIONS

- ASD – Autism Spectrum Disorders
- M-CHAT – Modified Checklist for Autism in Toddlers
- ISAA - Indian Scale for Assessment of Autism

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