

Prevalence of Signs and Symptoms of Temporomandibular Disorders in IVF Children of West Bengal with Deciduous, Mixed and Permanent Dentition

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ABSTRACT

Introduction: Temporomandibular joint (TMJ) is a bi-condylar, and highly mobile, complex joint functioning harmoniously and performing important functions for human body. The purpose of this study was to evaluate the relationship between dentition and TM disorders in the IVF children of West Bengal. **Material & Methodology:** The prevalence of signs and symptoms related to temporomandibular disorders was examined in 137 IVF and 137 spontaneously conceived children with primary dentition, mixed and permanent dentition. A questionnaire was used in combination with the clinical examination. For comparison of proportions Z test was used. **Results :** The results showed that there was an increase in signs and symptoms from the primary to the mixed to permanent dentition group. There was no statistically significant difference in maximum mouth opening capacity among the groups. **Conclusion :** Similar kind of prevalence of signs and symptoms of temporomandibular disorders of IVF & spontaneously conceived children was found in this study and the dissimilarity was statistically not significant.

KEYWORDS: Deciduous Dentition, Permanent Dentition, Mixed Dentition, Temporomandibular Joint.

INTRODUCTION

World's first test tube baby Louise Brown, was born on 25th July 1978 after In-vitro-fertilization (IVF) by R. G. Edwards and P. Steptoe in Oldham, (1978) England.¹ This laid the foundation of assisted reproductive technologies. India is not far behind in the scientific and technological developments of test tube baby procedure. A few days later, an Indian team from Kolkata led by Dr. Subhas Mukherjee and Dr. Saroj Bhattacharya, announced the birth of 'Durga', on 3rd October 1978 – the second test tube baby in world.²

The TMJ is one of the most complex as well as most used joint in a human body.³ It is considered as is a bi-condylar, sensitive, and highly mobile joint

which functions simultaneously. This joint (TMJ) dysfunction has been generally considered to be a condition affecting only adults but different studies have expressed incidence of signs and symptoms in children as high as that seen in adults.⁴⁻¹⁰ The age of onset and the prevalence of TMJ dysfunction in the pediatric population are unknown in IVF children. Intracapsular dysfunction of TMJ has been manifested as joint noises. Crepitus, popping or clicking may be recognized as normal by the young patient or parents.¹¹ Children with one or more signs of TMD was found in 21.2% of cases. Some studies on children and adolescents reported a TMJ dysfunction prevalence varying between 6%-68%.^{12,13} Study of TMJ dysfunction in IVF children

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may be important in determining roll of artificial reproductive technology (art) on proper growth and development of TMJ in this group of children. The purpose of this study was to evaluate the prevalence of signs and symptoms related to TMJ disorders in deciduous, mixed and permanent dentition in IVF children.

MATERIALS AND METHODS

This original study was a analytic, cross sectional and descriptive in nature and approved by the Ethical Committee of Guru Nanak Institute of Dental Science and Research. TMJ status of 6-14 years old children were evaluated. The studied sample in both case and control groups based on the route of pregnancy were enrolled for the entire course of study. The case group consisted of term (gestational age = 37 to 42 weeks), singleton babies whom were outcomes of IVF of the studied area and were selected by a computer generated random number list. The control group consisted of 6-14 years old term, singleton and first spontaneously conceived children whom were referred to the department of Pedodontics and preventive dentistry for the primary dental health check-up. Case and control samples matched for the area of residence, parity, gestational age, maternal weight, maternal age, socio-economic status and year of birth. Neonatal medical records of the case and control groups were evaluated and studied variables such as sex, gestational age, birth weight and length, route of delivery, maternal age and parity were recorded. The exclusion criteria of the studied samples were, severe asphyxia, major congenital malformations, multiple pregnancies, chromosomal abnormalities genetic syndromes, psoriatic arthritis or muscle diseases, history of rheumatoid arthritis, and children who had received orthodontic treatment. Samples were also excluded from the study if signs of inflammation of the eardrum found by examination with otoscope. The study was conducted after informed consent was obtained from the concerned authorities and guardians of children. A total of 635 parents of studied samples were approached to participate in the present study. Out of the above total samples, the parents of 137 IVF and 137 spontaneously agreed to participate in the

present study. After informed consents were collected from the parents, all children were examined for TMJ status. Children were examined from June 2009 to June 2011. To obviate error due to inter observer variations all examinations were made by a single examiner who was trained to record the TMJ status assessment form and also was not informed about the birth status of the children. Screening for TMD was an integrated part of this study. At first a brief TMD screening was done by a short questionnaire consisting of two questions. 1 Do you feel any kind of pain in the temple, face, temporomandibular joint, or jaws once a week or more? 2. Do you feel pain at the time of opening your mouth wide or chew, once a week or more? Significant findings had undergone more clinical examination and evaluation. The more elaborative questionnaire contained the following items. 1. Do you (the child) have limitation in mouth opening? 2. Do you (the child) have pain around or in the ears? 3. Do you (the child) have pain on chewing? 4. Have you (the child) ever had trauma to head and neck region? If yes, how many times? 5. Is the child under stressful conditions/ situation /environment? 6 Do you (the child) hear joint sounds? 7. Do you (the child) have arthralgia in other joints in your body? 8. Have you (the child) ever had lock jaw? If yes, how many times?

This self-report questionnaire was completed by all subjects or their parents. Then clinical examination of TM disorders was performed by a single trained examiner which include the following aspects: 1) Examination of TMJ sounds 2) Pain in the TMJ area 3) Tenderness on palpation in TMJ. 4) Deviation - deflection of more than 2 mm. 5) Masticatory muscle tenderness. 6) Restricted mouth opening - a distance of less than 30 mm was regarded as restricted opening. 7) Headaches more than once a week were included. The data was then statically analyzed using Z test.

RESULTS

Totally 137 IVF children and 137 spontaneously conceived children were studied. Among 137 IVF children 71 (51.82%) were male and 66 (48.17%) were female. Among spontaneously conceived children 70 (51.09%) were male and 67 (48.90%)

were female. IVF children and spontaneously conceived children were again divided into three sub groups of deciduous dentition, mixed dentition and permanent dentition. In each subgroup 46, 45, 46 IVF children and 43,47, and 47 spontaneously conceived children were selected respectively for the study [Tables 1 and 2].

Age (Year)	Sex				Total	
	Male		Female			
	No.	%	No.	%	No.	%
Deciduous dentition	25	54.34	21	45.62	46	33.57
Mixed dentition	23	51.11	22	48.88	45	32.84
Permanent dentition	23	50.00	23	50.00	46	33.57
Total	71	51.82	66	48.17	137	100

Table 1 : Age wise distribution of IVF Children

Age (Year)	Sex				Total	
	Male		Female			
	No.	%	No.	%	No.	%
Deciduous dentition	21	48.83	22	51.16	43	31.38
Mixed dentition	25	53.19	22	46.80	47	34.30
Permanent dentition	24	51.06	23	48.93	47	34.30
Total	70	51.09	67	48.90	137	100

Table 2 : Age wise distribution of Spontaneously Conceived Children

When considering total number of affected IVF and spontaneously conceived children in deciduous dentition group: the Z-Score is 0.1401. The p-value is 0.88866. The result is not significant at $p < 0.05$. When considering total number of unaffected IVF and spontaneously conceived children in deciduous dentition group: the Z-Score is -0.1401. The p-value is 0.88866. The result is not significant at $p < 0.05$. When considering TMJ sounds in IVF and spontaneously conceived children in deciduous dentition group: the Z-Score is 0.5282. The p-value is 0.59612. The result is not significant at $p < 0.05$. When considering pain in TMJ in IVF and spontaneously conceived children in deciduous dentition group: the Z-Score is -0.0482. The p-value is 0.96012. The result is not significant at $p < 0.05$. When considering Tenderness on palpation in TMJ in IVF and spontaneously conceived children

in deciduous dentition group: the Z-Score is -0.0482. The p-value is 0.96012. The result is not significant at $p < 0.05$. When considering deviation-deflection in TMJ in IVF and spontaneously conceived children in deciduous dentition group: the Z-Score is -0.0482. The p-value is 0.96012. The result is not significant at $p < 0.05$. When considering Masticatory muscle tenderness in IVF and spontaneously conceived children in deciduous dentition group: the Z-Score is -0.0482. The p-value is 0.96012. The result is not significant at $p < 0.05$. When considering Headache in IVF and spontaneously conceived children in deciduous dentition group : The Z-Score is -0.0482. The p-value is 0.96012. The result is not significant at $p < 0.05$. When considering male affected group in IVF and spontaneously conceived children in deciduous dentition group The Z-Score is -0.8452. The p-value is 0.39532. The result is not significant at $p < 0.05$. When considering female affected group in IVF and spontaneously conceived children in deciduous dentition group The Z-Score is 0.8452. The p-value is 0.39532. The result is not significant at $p < 0.05$. (Table 3 and 4)

Symptoms	Total number of affected IVF children				Un affected IVF children			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
TMJ Sounds	1	4.00	1	4.76	21	84.00	17	80.95
Pain in TMJ	0	0.00	1	4.76				
Tenderness on palpation in TMJ	1	4.00	0	0.00				
Deviation-deflection in TMJ	1	4.00	0	0.00				
Masticatory muscle tenderness	0	0.00	1	4.76				
Restricted mouth opening	0	0.00	1	4.76				
Headache	1	4.00	0	0.00				
Total	4	16.00	4	19.04				
Total (including male and female)	8 (17.39%)				38 (82.60%)			

Table 3.Frequency (%) of reported symptoms of temporomandibular disorder in IVF Children in deciduous dentition.

Symptoms	Total number of affected spontaneously conceived children				Un affected spontaneously conceived children			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
TMJ Sounds	1	4.76	0	0.00	16	76.19	20	90.90
Pain in TMJ	0	0.00	1	4.54				
Tenderness on palpation in TMJ	1	4.76	0	0.00				
Deviation-deflection in TMJ	1	4.76	0	0.00				
Masticatory muscle tenderness	0	0.00	1	4.54				
Restricted mouth opening	1	4.76	0	0.00				
Headache	1	4.76	0	0.00				
Total	5	23.80	2	9.09				
Total (including male and female)	7 (16.27%)				36 (83.72%)			

Table 4. Frequency (%) of reported Symptoms of temporomandibular disorder in spontaneously conceived children in deciduous dentition.

When considering total number of affected IVF and spontaneously conceived children in mixed dentition group: the Z-Score is 0.0957. The p-value is 0.92034. The result is not significant at $p < 0.05$. When considering total number of unaffected IVF and spontaneously conceived children in mixed dentition group: the Z-Score is -0.0957. The p-value is 0.92034. The result is not significant at $p < 0.05$. When considering TMJ sounds in IVF and spontaneously conceived children in mixed dentition group The Z-Score is 0.0311. The p-value is 0.97606. The result is not significant at $p < 0.05$. When considering pain in TMJ in IVF and spontaneously conceived children in mixed dentition group The Z-Score is 0.0311. The p-value is 0.97606. The result is not significant at $p < 0.05$. When considering Tenderness on palpation in TMJ in IVF and spontaneously conceived children in mixed dentition group The Z-Score is 0.0311. The p-value is 0.97606. The result is not significant at $p < 0.05$. When considering Deviation-deflection in TMJ in IVF and spontaneously conceived children in mixed dentition group The Z-Score is -0.9839. The p-value is 0.32708. The result is not significant at $p < 0.05$. When considering Masticatory muscle tenderness in IVF and spontaneously conceived children in mixed dentition group The Z-Score is -

0.9783. The p-value is 0.32708. The result is not significant at $p < 0.05$. When considering Restricted mouth opening in IVF and spontaneously conceived children in mixed dentition group The Z-Score is 1.0276. The p-value is 0.30302. The result is not significant at $p < 0.05$. When considering Headache in IVF and spontaneously conceived children in mixed dentition group The Z-Score is 1.0672. The p-value is 0.28462. The result is not significant at $p < 0.05$. When considering male affected group in IVF and spontaneously conceived children in mixed dentition group The Z-Score is -0.2313. The p-value is 0.8181. The result is not significant at $p < 0.05$. When considering female affected group in IVF and spontaneously conceived children in mixed dentition group The Z-Score is 0.4122. The p-value is 0.6818. The result is not significant at $p < 0.05$. (Table 5 and 6).

Symptoms	Total number of affected IVF children				Un affected IVF children			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
TMJ Sounds	1	4.34	0	0.00	19	82.60	18	81.81
Pain in TMJ	1	4.34	0	0.00				
Tenderness on palpation in TMJ	1	4.34	0	0.00				
Deviation-deflection in TMJ	0	0.00	0	0.00				
Masticatory muscle tenderness	0	0.00	1	4.54				
Restricted mouth opening	0	0.00	1	4.54				
Headache	1	4.34	2	9.09				
Total	4	17.39	4	18.18				
Total (including male and female)	8 (17.77%)				37 (82.22%)			

Table 5. Frequency (%) of reported symptoms of temporomandibular disorder in IVF Children in mixed dentition.

Symptoms	Total number of affected spontaneously conceived children				Un affected spontaneously conceived children			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
TMJ Sounds	1	4.34	0	0.00	20	86.95	19	82.60
Pain in TMJ	1	4.34	0	0.00				
Tenderness on palpation in TMJ	1	4.34	0	0.00				
Deviation-deflection in TMJ	1	4.34	0	0.00				
Masticatory muscle tenderness	1	4.34	2	8.69				
Restricted	0	0.00	0	0.00				
Total	4	17.39	4	18.18				

mouth opening								
Headache	0	0.00	1	4.34				
Total	5	21.73	3	13.04				
Total (including male and female)	8 (17.39%)				39 (84.78%)			

Table 6. Frequency (%) of reported Symptoms of temporomandibular disorder in spontaneously conceived children in mixed dentition.

When considering total number of affected IVF and spontaneously conceived children in permanent dentition group: the Z-Score is 0.0716. The p-value is 0.9442. The result is not significant at $p < 0.05$. When considering total number of unaffected IVF and spontaneously conceived children in permanent dentition group : The Z-Score is -0.0716. The p-value is 0.9442. The result is not significant at $p < 0.05$. When considering TMJ sounds in IVF and spontaneously conceived children in permanent dentition group The Z-Score is 0.022. The p-value is 0.98404. The result is not significant at $p < 0.05$. When considering pain in TMJ in IVF and spontaneously conceived children in permanent dentition group The Z-Score is -0.4351. The p-value is 0.65994. The result is not significant at $p < 0.05$. When considering Tenderness on palpation in TMJ in IVF and spontaneously conceived children in permanent dentition group The Z-Score is 0.0272. The p-value is 0.97606. The result is not significant at $p < 0.05$. When considering

Deviation-deflection in TMJ in IVF and spontaneously conceived children in permanent dentition group The Z-Score is -0.568. The p-value is 0.56868. The result is not significant at $p < 0.05$. When considering Masticatory muscle tenderness in IVF and spontaneously conceived children in permanent dentition group The Z-Score is 0.4845. The p-value is 0.63122. The result is not significant at $p < 0.05$. When considering Restricted mouth opening in IVF and spontaneously conceived children in permanent dentition group The Z-Score is 0.0154. The p-value is 0.98404. The result is not significant at $p < 0.05$. When considering Headache in IVF and spontaneously conceived children in permanent dentition group The Z-Score is 0.4845. The p-value is 0.63122. The result is not significant at $p < 0.05$. When considering male affected group in IVF

and spontaneously conceived children in permanent dentition group The Z-Score is -0.3651. The p-value is 0.71138. The result is not significant at $p < 0.05$. When considering female affected group in IVF and spontaneously conceived children in permanent dentition group The Z-Score is 0.3651. The p-value is 0.71138. The result is not significant at $p < 0.05$. (Table 7 and 8).

Symptoms	Total number of affected IVF children				Un affected IVF children			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
TMJ Sounds	1	4.34	1	4.34	16	69.56	15	65.21
Pain in TMJ	1	4.34	1	4.34				
Tenderness on palpation in TMJ	1	4.34	2	8.69				
Deviation-deflection in TMJ	0	0.00	1	4.34				
Masticatory muscle tenderness	2	8.69	1	4.34				
Restricted mouth opening	1	4.34	0	4.34				
Headache	1	4.34	2	8.69				
Total	7	30.43	8	34.78				
Total (including male and female)	15 (32.60%)							

Table 7. Frequency (%) of reported symptoms of temporomandibular disorder in IVF Children in permanent dentition.

Symptoms	Total number of affected spontaneously conceived children				Un affected spontaneously conceived children			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
TMJ Sounds	1	4.16	1	4.34	16	66.66	16	69.56
Pain in TMJ	1	4.16	2	8.69				
Tenderness on palpation in TMJ	2	8.32	1	4.34				
Deviation-deflection in TMJ	1	4.16	1	4.34				
Masticatory muscle tenderness	1	4.16	1	4.34				
Restricted mouth opening	1	4.16	0	0.00				
Headache	1	4.16	1	4.34				
Total	8	33.33	7	30.43				
Total (including male and female)	15 (31.91%)							

Table 8. Frequency (%) of reported Symptoms of temporomandibular disorder in spontaneously conceived children in permanent dentition.

DISCUSSION

According to different studies, the frequency of signs and symptoms of TM disorders increases during childhood, and reaches in adolescence a prevalence level nearly similar to adults.^{8,14-18} Signs and symptoms of TMJ dysfunction increased with age.¹⁹ According to a study prevalence of signs related to TMJ disorders in children ranges from 22% to 68%.⁹ In our study we observed the same trend in case of IVF children (in case of deciduous, mixed and permanent dentition group as age advances percentage of affected population was also increased like 17.39%, 17.77% and 32.60% respectively) some investigators found a significant relationship between clinical signs of TM disorders and occlusal factors.¹⁹⁻²¹ but some studies have shown a lack of significance between signs and symptoms of TM disorders and the type of occlusal variables. In the present study though we had divided the sample sizes according to dentition pattern but we had not consider any occlusal variables, so we were unable to make any kind of comment in this regard. Prevalence of headache in childhood was high and as in adults.²² In Finnish adolescents headache had the highest prevalence among the other subjective symptoms.²³ In our study, the most frequent sign also was headache (5.109%). Researchers found muscle tenderness was the most frequent sign in a sample of children aged 6-8 years.²⁴ In our study muscle tenderness was the second highest manifestation of temporomandibular disorders along with TMJ Sounds and Tenderness on palpation in TMJ. Investigators reported clicking in children at a rate ranging from 6.8 to 65%.^{5,7,8,20,21} In our study it was little less(3.64%). Authors proposed that the rates of clicking are more evident with increasing age.⁸ Bruxism increased in mixed dentition, so it frequently may be associated with TM disorders.²⁵ Studies revealed that though there is high frequency of signs and symptoms, there is minimum need for treatment of TM disorder in children and adolescents because of its mild and occasional character.⁸ Till date no reviews on the prevalence of signs and symptoms of temporomandibular disorders in IVF children are available in national

and international level. So no comparison was possible with the previous study.

CONCLUSION

In this study IVF children expressing similar kind of prevalence of signs and symptoms of temporomandibular disorders as like spontaneously conceived children and the dissimilarity was statistically not significant. This study invites further scope for cross sectional and longitudinal study for the researcher. Hopefully this kind of study will bring positive assurance to numerous parents of IVF children.

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