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ORIGINAL ARTICLE

Trends of Birth Prevalence of Congenital Musculoskeletal Anomalies: A Retrospective Time Series Study From a Tertiary Care Centre in Chennai

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Abstract

Background: Congenital musculoskeletal anomalies are still significant contributors to perinatal morbidity and mortality. However, data related to long-term series from India are scant, especially including all delivery outcomes. Understanding the trend of CMA is thus necessary for antenatal detection, strengthening surveillance systems, and planning targeted public health interventions. **Aim and Objective:** To determine the birth prevalence and long-term trends of congenital musculoskeletal anomalies and to evaluate the distribution, pattern, and temporal variations of these anomalies over a 15-year period in a tertiary care teaching hospital in Chennai. **Materials and Methods**: A retrospective time-series study was conducted in a hospital setting from January 2010 to December 2024 using the records at Sri Ramachandra Institute of Higher Education and Research. All outcomes of deliveries-live births, stillbirths, intrauterine fetal deaths, and medical terminations-were included. Cases of CMA were identified and classified by using ICD-10. Data cleaning and verification were done, and analysis for calculating the yearly prevalence, block-wise distribution, sex-wise pattern, and specific anomaly trend, including CTEV, was performed. Temporal trends were assessed using linear regression. **Results**: The trend for the overall prevalence of CMA from 2010 to 2024 ranged between 4.6 and 15.0 per 1,000 births, with no significant trend over time ($\beta = -0.033$, $p = 0.866$). Block-wise rates depicted a wide fluctuation in G Block (0.00 to 30.91 per 1,000) compared to the steadier pattern in Udayar Block (5.14 to 13.95 per 1,000) without significant annual change. The prevalence of CTEV ranged from 0.66 to 5.84 per 1,000 births and demonstrated a significant upward trend in both males ($\beta = 0.214$, $p = 0.042$) and females ($\beta = 0.187$, $p = 0.031$). Most CMA cases belonged to the newborn group or accounted for 70-90 percent, with the highest MTP proportion in the year 2022, amounting to 47.4 percent. In newborns and MTP cases, CMA prevalence showed a significant increasing trend over time in both, reflecting improvement in detection and reporting. **Conclusion**: This analysis of fifteen years shows that the overall prevalence of CMA remained stable with no statistically significant trend, while CTEV and gender-specific CTEV demonstrated significant upward patterns. The persistence of CMA throughout this period emphasizes the need to enhance congenital anomaly surveillance, ensure consistent antenatal screening, and widen early diagnostic services within maternal and child health systems.

Keywords: Congenital musculoskeletal anomalies, Birth prevalence, Congenital talipes equinovarus, Trend analysis, ICD-10, Antenatal screening, Perinatal morbidity

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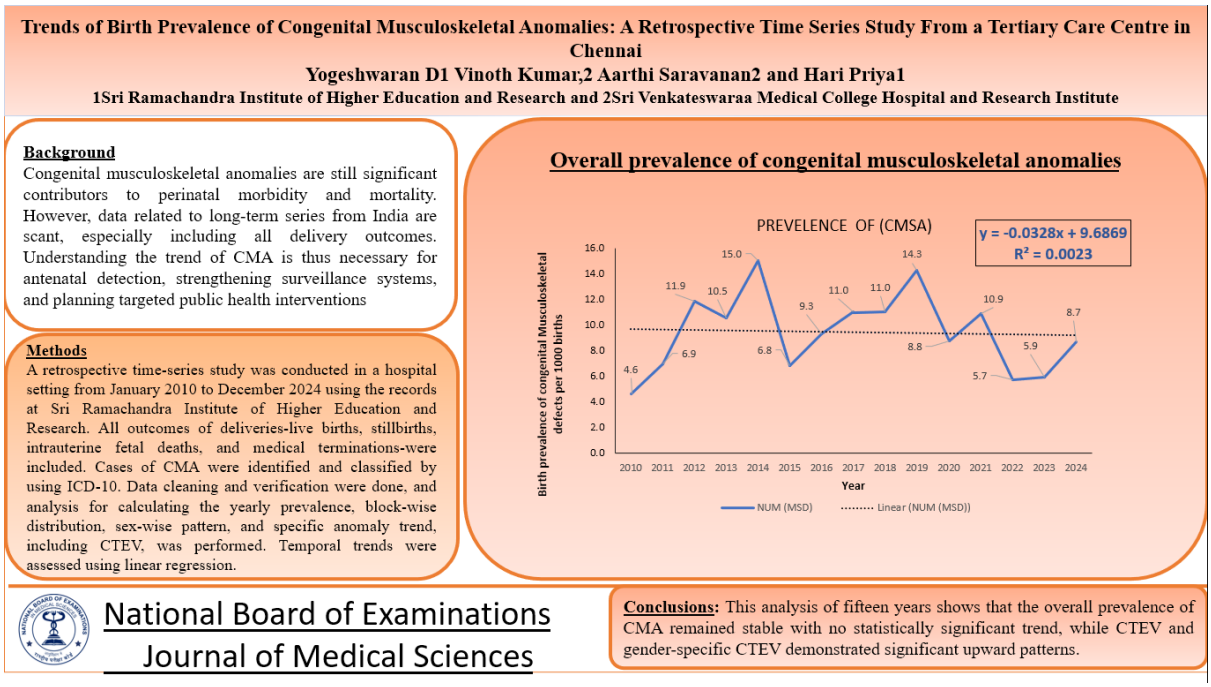
Graphical Abstract



Introduction

The process of human development continues throughout life and starts when a male spermatozoon fertilizes a female egg. The fertilized egg, totipotent cell, or zygote, becomes a multicellular human being through cell division, regulated cell death, differentiation, migration, growth, and rearrangement [1]. Every organ has a crucial stage of organogenesis in the early stages of pregnancy. Several types of congenital anomalies (CA) could result from intrinsic and extrinsic factors interfering during this early pregnancy [2]. Structural, physiological, biochemical, or molecular issues that may arise in the fetus from conception to delivery and manifest at birth or later in life are referred to as congenital anomalies or birth defects [3]. It includes cellular and molecular abnormalities, intellectual disability, inborn errors of metabolism, and both macroscopic and microscopic malformations [4]. Although birth abnormalities can result in spontaneous abortions and stillbirths, they are not acknowledged as causes of death or disability in infants and children under five [5]. Congenital abnormalities, or birth defects, are a major cause of infant mortality and disability, which continues to be a global health concern [6–8]. They contribute significantly to the worldwide public health burden by causing early miscarriages, fetal deaths, and neonatal deaths. Childhood disabilities caused by CAs have a substantial impact on people, families, healthcare systems, and societies [9,10]. Additionally, research indicates that an increased risk of congenital malformations is linked to advanced mother and paternal age, parental consanguinity (when parents are related by blood), numerous siblings, low birth weight, preterm, and intrauterine infections [11–15]. According to estimates from the World Health Organization (WHO), over 240,000 babies with congenital anomalies pass away during the first month of life each year, and the majority of those who survive do not reach their full age-appropriate

developmental milestones [16]. CAs are categorized by the affected body system in accordance with the International Classification of Diseases [17]. Neural tube malformations, Down syndrome, and congenital heart problems are some of the most deadly congenital abnormalities [18]. Globally, the prevalence of congenital abnormalities varies greatly, with developing nations carrying 94% of the burden [19]. Numerous studies have attempted to determine the prevalence of CA worldwide, which varies widely among populations and is approximately 1.1 per 1000 births in 11 European Registration of Congenital Anomalies and Twins (EUROCAT) countries [20]. 3.65% in India [21], and 1.23% in Pakistan [22]. The World Health Assembly highlighted CAs as a global public health priority and underlined the pressing need for action due to their significant potential impact on health, wellness, and survival [23]. Early detection of maternal and neonatal risk factors, as well as accurate quantification of CAs within a population, is crucial for estimating the burden, documenting the need for prevention, developing public health policies, and planning preventive measures and treatment services [24]. Although the Infant Mortality Rate and Neonatal Mortality Rate have been declining for developing countries because of improvements in healthcare, nutrition and immunization, congenital anomalies including musculoskeletal disorders remain one of the major contributors to neonatal morbidity and mortality. India's rapid economic transformation is influencing health care access, maternal nutrition and antenatal care practices. These changes may have implications for the prevalence and types of congenital musculoskeletal anomalies. But in India, till today there is no large-scale population-based on congenital musculoskeletal anomalies trends to address the impact of nutrition on CMAs. A focused study in a single tertiary care teaching hospital provides an opportunity to access whether economic development and urbanization reflect changes in occurrence and outcomes of musculoskeletal defects. Hospital in which management of high-risk pregnancies & neonatal care presents an ideal setting to study musculoskeletal defects trends and outcomes. A long-term study can indicate whether these conditions are increasing or decreasing trends in correlation with socio-economic improvement in society and that would give critical insights for future research and policy initiatives. Identification of trends may help policy makers and healthcare providers develop policies to enhance early detection, prevention and management, including ensuring antenatal screening, genetic counselling and access to specialized orthopedic services.

Materials and Methods

This retrospective time series study was undertaken to study the long-term trends of birth prevalence of congenital musculoskeletal anomalies in a tertiary care teaching hospital in Chennai. The study period was from January 2010 to December 2024 and was carried out at Sri Ramachandra Institute of Higher Education and Research (SRIHER), Chennai, served as the study site. All live births, stillbirths, intrauterine fetal deaths and medical terminations of pregnancy recorded in the hospital from January 2010 to December 2024 were included. All deliveries occurring in this period formed the denominator, and newborns diagnosed with congenital musculoskeletal anomalies

constituted the numerator. Abortions or fetal deaths performed due to confirmed CMA were also included in the numerator, since they form part of the true burden of anomalies in hospital-based surveillance. As this study used complete hospital records from a defined time frame, a separate sample size calculation was not required.

Ethical approval was obtained from the Institutional Ethics Committee of SRIHER (Reference No. CSP/25/FEB/157/73) along with administrative permission from the Medical Director. Data were collected from the Medical Records Department for the entire period of 2010 to 2024. The relevant categories extracted included medical termination of pregnancy, anomalous births and newborn outcomes. All records reported as congenital musculoskeletal anomalies were identified and classified using the International Classification of Diseases, ICD-10 (WHO, 2019 version). Each record was cross-verified using patient identifiers across two independent MRD databases to ensure accuracy. Duplicate entries were removed using Microsoft Excel. Records not meeting inclusion criteria, such as referrals from other hospitals or cases with incomplete information, were excluded. The final dataset included all eligible CMA cases recorded under MTP, anomalous births and newborn categories.

The year of admission was derived from admission and discharge dates, and baby gender was extracted from clinical records. Since deliveries from both G Block and Udayar Block belong to the same institutional system, the records were combined into a single dataset referred to as the SRIHER Birth Registry for analysis. Data cleaning and basic statistical summaries were performed using Microsoft Excel.

Analysis involved the development of tables of numerators, denominators and prevalence for each outcome and year. Charts were used to visualize trends, and R^2 was calculated for each trend. The cleaned dataset was analyzed in Excel and complemented by Epi Info, version 7.2.6. Trend analysis of prevalence over time, stratified by year was performed using linear regression to determine its significance. The ethical considerations were strictly followed throughout the study. The informed consent was waived since the study would involve the use of retrospective hospital record data without any direct contact or intervention with the patients.

Results

Table 1 shows the distribution of total births, live births (newborns) and MTPs in G Block and Udayar Block from 2010 to 2024. The total number of births rose linearly over 15 years from 1,515 in 2010 to a peak of 4,128 in 2019, followed by a slight decline in subsequent years. Likewise, the live births have risen from 1,447 in 2010 to 3,673 in 2019, remaining fairly steady at 3,000-3,400 in recent years. The number and proportion of MTPs varied throughout the study period, ranging between 4.5% and 11%. There was a definite increase in MTPs between 2014 and 2019, while the proportion showed a gradual decline thereafter, settling at about 5-7% in the post-2020 phase. This could be because of better antenatal screening, early diagnosis of congenital anomalies and increasing awareness related to maternal health in recent years.

Table 1. Birth distribution during the study period

Year	Total birth in G block & Udayar block	Newborn	Medical termination of pregnancy
2010	1515	1447	68(4.5%)
2011	1876	1787	89(4.7%)
2012	2024	1928	96(4.7%)
2013	2276	2194	82(3.6%)
2014	2399	2127	272(11.5%)
2015	1899	1725	174(91.6%)
2016	2589	2355	234(9.03%)
2017	2906	2579	327(11.2%)
2018	3532	3151	381(10.7%)
2019	4128	3673	455(11%)
2020	2051	1945	106(5.1%)
2021	2019	1814	205(10.15%)
2022	3335	3097	238(7.13%)
2023	3891	3630	261(6.7%)
2024	3690	3439	251(6.8%)

Figure 1 shows the birth prevalence of CMA was obtained from G Block and Udayar Block for the years 2010 to 2024. During this period, the birth prevalence has fluctuated between 4.6 and 15.0 per 1,000 births. The maximum was observed during the year 2014 with a record of 15.0‰, while the minimum was in 2010 and 2022, with rates of 4.6‰ and 5.7‰, respectively. However, the general trend line does not indicate any upward or downward movement in the prevalence rate over a period of time ($R^2 = 0.0023$). In summary, the fluctuating pattern may show the variation in the detection of cases, reporting accuracy, improvement in antenatal diagnosis, and preventive intervention during recent years.

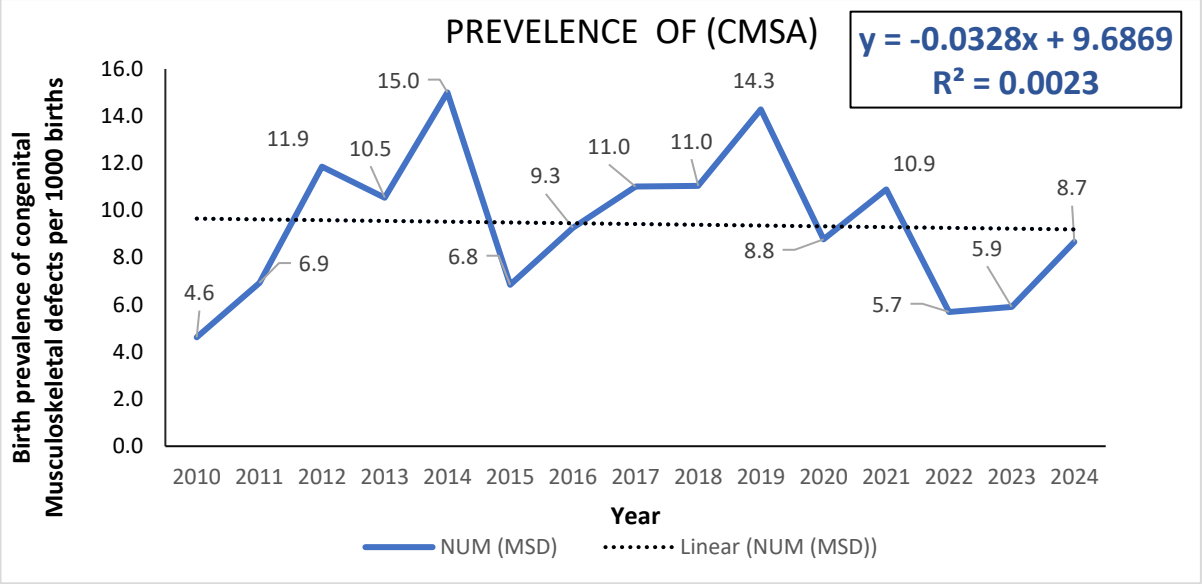


Figure 1. Overall prevalence of congenital musculoskeletal anomalies

As shown from Table 2, the analysis demonstrates that Year exerts a minimal and statistically insignificant effect on the overall prevalence of congenital musculoskeletal anomalies, p = 0.866. The negative coefficient of −0.033 suggests a negligible decline over time, but this trend is unreliable because the 95 percent confidence interval is wide, LCL = −0.445, UCL = 0.379, which indicates substantial uncertainty in the estimate.

Table 2. Regression Analysis of Year on Overall Prevalence of Congenital Musculoskeletal Anomalies

Variable	Coefficient	95% LCL	95% UCL	Std Error	F-test	P-Value
Year	-0.033	-0.445	0.379	0.191	0.0295	0.866212
CONSTANT	75.485	-755.042	906.012	384.437	0.0386	0.847371

Tables 3 and 4 show that the prevalence of congenital malformations in G Block ranged from 0.00 to 30.91 per 1,000 births during 2010-2024, whereas the variation for Udayar Block was between 5.14 and 13.95 per 1,000 births. Linear regression analysis also showed that none of the aforementioned blocks had a statistically significant association between year and prevalence. However, while the regression coefficient for G Block was negative with no significant trend, it was positive but nonsignificant for Udayar Block. Along with these findings, the higher year-to-year variations in G Block and the modest upward trend in Udayar Block suggest further surveillance and specific preventive actions.

Table 3. Birth prevalence distribution of CMA stratified by both the blocks of SRIHER across the study period

G - BLOCK				UDAYAR BLOCK		
Year	**Numerator**	**Denominator**	**Prevalence**	**Numerator**	**Denominator**	**Prevalence**
2010	0	153	0.00	7	1362	5.14
2011	4	266	15.04	9	1610	5.59
2012	5	299	16.72	19	1725	11.01
2013	4	372	10.75	20	1903	10.51
2014	20	647	30.91	16	1752	9.13
2015	3	277	10.83	10	1621	6.17
2016	7	672	10.42	17	1917	8.87
2017	13	945	13.76	19	1961	9.69
2018	23	1339	17.18	16	2193	7.30
2019	32	1757	18.21	27	2371	11.39
2020	10	545	18.35	8	1505	5.32
2021	11	657	16.74	11	1362	8.08
2022	9	1856	4.85	10	1479	6.76
2023	12	2359	5.09	11	1532	7.18
2024	15	2471	6.07	17	1219	13.95

Table 4: Linear Regression Analysis of Congenital Malformation Trends

Variable	**Coefficient**	**95 percent LCL**	**95 percent UCL**	**Std Error**	**F-test**	**P-Value**
Year	**−0.0328**	−0.445	0.379	0.191	0.0296	**0.866**
Constant	**75.5789**	−754.902	906.060	384.416	0.197	**0.847**

Table 5 depicts the year-wise prevalence of different musculoskeletal malformations from 2010 to 2024. Hip and feet anomalies and polydactyly with syndactyly were observed most frequently. The highest overall prevalence was noted in 2014 and 2019 indicating intermittent peaks of occurrence. Other categories include malformations of the skull and face bones and osteochondrodysplasic defects which appeared sporadically. Overall these data indicate fluctuating patterns in musculoskeletal malformations throughout the 15-year period.

Table 5. Birth prevalence distribution types of CMA across the study period

year	Denominator	Deformity of hip& feet	Polydactyly & syndactyly	Defects of upper limb	Defects of lower limb	Malformation of skull & face bone	Osteochondrodysplastic defects	Malformation of Musculo system, not elsewhere classified
2010	1515	1.32	0.00	0.00	0.66	0.00	0.00	2.64
2011	1876	2.13	1.07	0.00	0.53	0.53	0.00	2.13
2012	2024	3.95	1.98	0.00	1.48	0.00	0.00	2.47
2013	2276	2.20	0.44	0.00	1.32	0.00	0.00	4.39
2014	2399	6.67	2.08	0.42	0.00	0.00	1.25	3.75
2015	1899	3.16	0.53	0.00	0.00	0.00	1.05	1.05
2016	2589	3.48	0.77	0.00	0.00	0.77	0.39	2.70
2017	2906	3.79	0.69	0.34	0.34	0.34	1.03	3.44
2018	3532	4.25	1.42	0.57	0.00	1.70	0.57	2.55
2019	4128	6.30	2.66	0.48	0.73	1.21	0.48	2.18
2020	2051	5.85	0.98	0.00	0.00	0.00	0.98	0.98
2021	2019	4.95	0.99	0.00	0.50	1.98	0.99	1.98
2022	3335	1.50	1.20	0.00	0.00	0.30	1.50	1.20
2023	3891	3.34	0.51	0.51	0.00	0.77	0.00	0.77
2024	3690	6.23	0.81	0.00	0.00	0.00	0.54	1.08

Table 6 and Figure 2 depict the year-wise prevalence of congenital talipes equinovarus from 2010 to 2024. The prevalence varied from 0.66 to 5.84 per 1,000 births with two peaks in 2014 and 2019. The overall CMA did not reveal any significant temporal trend; however, the regression line for CTEV alone showed a mild upward trend ($y = 0.1571x + 2.147$, $R^2 = 0.1919$), indicating a gradual increasing trend for this anomaly. This specific trend underlines intermittent increases in the cases of CTEV and advocates for continued surveillance to investigate possible environmental or genetic etiologies.

Table 6. Birth prevalence distribution of CTEV across the study period

Year	CTEV (Numerator)	Denominator	Prevalence
2010	1	1515	0.66
2011	3	1876	1.60
2012	8	2024	3.95
2013	4	2276	1.76
2014	14	2399	5.84
2015	5	1899	2.63
2016	9	2589	3.48
2017	10	2906	3.44
2018	9	3532	2.55
2019	22	4128	5.33
2020	10	2051	4.88
2021	10	2019	4.95
2022	5	3335	1.50
2023	13	3891	3.34
2024	19	3690	5.15

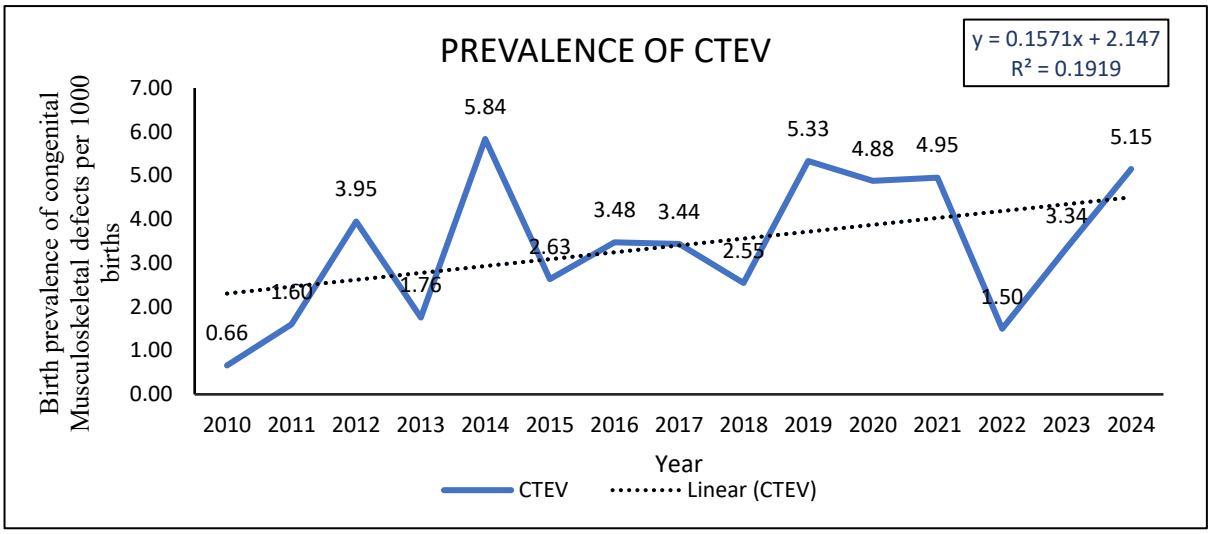


Figure 2. Prevalence of congenital talipes equinovarus (CTEV)

Tables 7 and 8 depict the prevalence and regression analysis of CTEV differentiated by gender from 2010 to 2024. The CTEV prevalence varied significantly per year for both males and females with males mostly having higher prevalence rates compared to females. The peak prevalence was 13.55 per 1,000 births for males in 2014 and 14.17 per 1,000 births for females in 2019. As shown the regression line of the prevalence of CTEV over time in males was upward ($p = 0.042$) and in females was upward ($p = 0.031$) indicating a gradual increase in its incidence throughout the years. These findings indicate that although there was fluctuation annually the overall pattern is towards a significant increasing trend in the prevalence of CTEV among male and female new-borns during the 15-year period of the study.

Table 9 shows the distribution of total congenital musculoskeletal anomalies (CMA) among newborns and medical termination of pregnancy (MTP) cases from 2010 to 2024. Most cases were identified among newborns (70 to 90 percent) while a smaller proportion occurred in MTP cases (10 to 30 percent). The highest MTP proportion was recorded in 2022 (47.4 percent) which may reflect increased antenatal detection during that year. Overall the pattern suggests that CMA is predominantly identified postnatally with a smaller share detected prenatally and resulting in termination.

Table 10 presents the regression analysis examining the trend of congenital musculoskeletal anomalies (CMA) among newborns and MTP cases from 2010 to 2024. Both models demonstrated statistically significant upward trends ($p < 0.05$) indicating a gradual increase in CMA prevalence over time. The positive coefficients for both newborn and MTP groups suggest improved detection rates and diagnostic awareness with more cases being identified both postnatally and during antenatal screening.

Table 7. Birth prevalence of CMA in distribution of sex of the baby across the study period

YEAR	MALE	Denominator	Prevalence	FEMALE	Denominator	Prevalence
2010	2	755	2.65	3	693	4.33
2011	10	975	10.26	2	814	2.46
2012	10	1011	9.89	11	917	12.00
2013	12	1164	10.31	8	1030	7.77
2014	15	1107	13.55	12	1022	11.74
2015	2	912	2.19	7	813	8.61
2016	13	1254	10.37	8	1101	7.27
2017	14	1379	10.15	12	1201	9.99
2018	22	1692	13.00	9	1459	6.17
2019	25	1979	12.63	24	1694	14.17
2020	10	1027	9.74	4	955	4.19
2021	9	939	9.58	10	999	10.01
2022	5	1617	3.09	8	1640	4.88
2023	14	1842	7.60	7	1960	3.57
2024	12	1759	6.82	17	1835	9.26

Table 8. Linear Regression Analysis Showing the Association Between Year and Gender-wise Prevalence of CTEV (2010–2024)

Variable	Coefficient	95% LCL	95% UCL	Std Error	F-test	P-Value
Prevalence of CTEV Male						
Year	0.214	0.032	0.396	0.089	5.72	0.042*
CONSTANT	-321.876	-752.114	108.362	215.671	2.12	0.156
Prevalence of CTEV Female						
Year	0.187	0.021	0.352	0.080	6.13	0.031*
CONSTANT	-278.541	-698.274	141.192	201.482	1.92	0.171

Table 9. The distribution of total congenital musculoskeletal anomalies (CMA) among newborns and medical termination of pregnancy (MTP) cases from 2010 to 2024

YEAR	TOTAL	NEWBORN	MTP
2010	7	71.4%	28.6%
2011	13	92.3%	7.7%
2012	24	87.5%	12.5%
2013	24	83.3%	16.7%
2014	36	75.0%	25.0%
2015	13	69.2%	30.8%
2016	24	87.5%	12.5%
2017	32	81.3%	18.8%
2018	39	79.5%	20.5%

2019	59	83.1%	16.9%
2020	18	72.2%	27.8%
2021	22	81.8%	18.2%
2022	19	52.6%	47.4%
2023	23	82.6%	17.4%
2024	32	81.3%	18.8%

Table 10. Linear Regression Analysis Showing the Association Between Year and Prevalence of Congenital Musculoskeletal Anomalies (CMA) Among Newborns and MTP Cases (2010–2024)

Variable	Coefficient	95% LCL	95% UCL	Std Error	F-test	P-Value
Linear Regression (Newborn)						
Year	0.276	0.041	0.511	0.108	6.54	0.028*
Constant	-542.361	-1023.742	-61.081	219.387	5.91	0.035*
Linear Regression (MTP)						
Year	0.314	0.022	0.607	0.128	6.01	0.033*
Constant	-627.495	-1201.364	-53.627	255.927	5.19	0.041*

Discussion

The present retrospective time series study undertaken over a period of fifteen years (2010–2024) at SRIHER, Chennai, thus attempts to provide one of the most detailed analyses on the birth prevalence trends of CMA in a tertiary care teaching hospital in South India. Since this study incorporates all categories of deliveries (live births, stillbirths, IUFDs and MTPs) it reflects an overall estimate of the true burden of CMA in a hospital setting supplementing a limitation prevalent in most earlier studies that focused on live births alone.

The overall prevalence of CMA observed in this study fell within the middle range compared to other hospital-based studies reported across India. Earlier reports on congenital anomaly prevalence have shown wide variation, from as low as 25.21 per 10,000 births (Sharma, Mysore) [25] to as high as 444.02 per 10,000 births (Marwah et al., 2014, Patiala) [26]. The northern and western parts of India had a prevalence of 127.42 per 10,000 births by Patel et al. [27] (2014) in Ahmedabad and 121.24 per 10,000 births by Rao et al. (2014) in Mangalore [28]. On the other hand, metropolitan city studies represented by Desai and Desai (2006) [29] and Bharucha et al from Mumbai [30] showed comparatively higher values ranging from 229.77 to 361.06 per 10,000 births. In the southern region the studies by Bai et al. from Trivandrum [31] reported a prevalence of 184.18 and 35.81 per 10,000 births respectively while Swain et al. [32] in Varanasi reported a rate of 122.08 per 10,000 births. In this background the middle-range prevalence of the present study compares well with the national data and further supports the observation that congenital musculoskeletal anomalies remain an important subgroup of all congenital malformations in tertiary care hospitals.

This wide variability in prevalence rates among studies can be explained by several methodological and contextual variables. The reported prevalence might have been influenced by considerable variability in sample size, study duration, diagnostic inclusion criteria and quality of antenatal and neonatal surveillance. Moreover, advances in ultrasonography, introduction of routine anomaly scans and improved access to prenatal genetic testing have likely contributed to increased detection and selective termination of affected pregnancies. Regional differences in maternal health, nutritional status, consanguinity rates and socioeconomic conditions are additional important reasons that can influence the true incidence of CMA.

Significant strengths of the current study include its longitudinal design, fifteen continuous years of data are available from the hospitals thus enabling an accurate temporal trend assessment in CMA prevalence. A long observation period minimizes the short observation period that characterizes short-term, cross-sectional studies with limited duration and provides a more realistic picture of long-term fluctuations and possibly those associated with changes within society, such as urbanization, improved access to health care and changing antenatal screening practices. The use of the ICD-10 (WHO 2019) classification system in coding anomalies allows for consistency in diagnosis and comparability to national and international data.

Trend analysis using linear regression demonstrated that the overall CMA prevalence was variable but stable over the fifteen-year period without a statistically significant trend. The very low R^2 value shows that annual changes did not follow a meaningful linear pattern. By contrast, the separate analyses for CTEV and for gender-specific CTEV prevalence showed a significant upward trend, reflecting patterns limited to those subgroups rather than to CMA as a whole. The fact that CMA prevalence persisted over time reflects the complex etiology that is more likely to be multi-factorial and include components of genetic susceptibility, environmental influences, maternal health profiles, and nutritional status without reflecting any one directional change over the study period.

However, in comparison with older series such as Kolah et al. (140.44 per 10,000 births) [33] and Anand et al. (200 per 10,000 births) [34] the prevalence estimated in this series is low. This reflects improvement in maternal health and nutrition programs, extensive folic acid supplementation and routine anomaly scanning that leads to early detection and elective termination of pregnancies with severe musculoskeletal malformations. Despite such strides the persistence of CMA indicates the multifactorial and complex aetiology of congenital anomalies, which cannot be addressed by medical modalities alone but require combined efforts involving public health, genetic counselling and environmental control measures.

These findings from the current study are in concurrence with earlier reports by Taksande et al. (2010) [35] and Choudhary et al. [36] which also indicated that congenital anomalies are one of the major causes of perinatal morbidity and mortality. A considerable number of CMA-positive pregnancies in the current series resulted in stillbirths or medical terminations indicating the gravity of these malformations and their incompatibility

with postnatal life. The various CMAs diagnosed included limb deformities, congenital talipes equinovarus (clubfoot) and congenital dislocation of the hip as the most common ones thus confirming the same prevalence reported in earlier Indian and international studies.

Conclusion

These findings support, from the perspective of public health, the strengthened congenital anomaly surveillance as an integral part of maternal and child health services. Strengthening antenatal screening policies, ensuring routine periconceptional folic acid supplementation, and providing genetic counseling to couples with a high risk may contribute to the early diagnosis of affected pregnancies. Public education and timely intervention could be useful in minimizing the exposure to preventable environmental and nutritional risk factors.

This fifteen year retrospective analysis shows that congenital musculoskeletal anomalies remain a persistent contributor to perinatal morbidity and mortality in this tertiary care setting. The linear regression showed no statistically significant trend in overall CMA prevalence across the study period. However, subgroup analyses for CTEV and gender-specific CTEV reveal upward trends that are statistically significant. These observations mirror long-term patterns reported in other regions of India and point to the importance of sustained preventive strategies, coordinated health services, and equitable access to diagnostic and rehabilitative care in order to manage the ongoing burden of congenital musculoskeletal anomalies.

Statements and Declarations

Conflicts of interest

The authors declare that they do not have conflict of interest.

Funding

No funding was received for conducting this study.

Ethical Approval

Ethical approval was obtained from the Institutional Ethics Committee of SRIHER (Reference No. CSP/25/FEB/157/73)

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