



## Original Research Article

# REVOLUTIONIZING RASHTRIYA BAL SWASTHYA KARYAKRAM (RBSK) : ADVANCING SCHOOL HEALTH RECORDS THROUGH DIGITAL INNOVATION IN UT OF DNH & DD

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### ABSTRACT

**Background:** Rashtriya Bal Swasthya Karyakram (RBSK) is a program to improve the overall quality of life of children. It involves screening of children from 0 - 18 years of age for 4 Ds- Defects at birth, Diseases, Deficiencies and Development delays, spanning 32 common health conditions. Scheduling of RBSK team visits was not conveyed to all stakeholders, no mechanism for follow up of children who were given referrals, huge data was enrolled manually, no continuity of data, and stakeholders were unaware about referrals. This often results in inadequate assessment of exact prevalence of health indices related to 4Ds.

**Materials and Methods:** It was a cross sectional study. Children of schools and Anganwadi of UT of DNH & DD were included as study population. The data was collected in the month of August 2023 during the school timings. All children aged 0 - 18 years were included in the study by mass screening of children registered under Angawandis and Schools. The data was collected and analyzed on the novel digital platform e-RBSK portal.

**Results:** Amongst the 4 D's screened in the Anganwadi children (0-6 years), there was presence of various birth Defects in 33 children, Deficiencies in 151 children, Diseases in 116 children and Developmental delays in 51 children. Among the children and adolescents of age group 6-18 years screened, there was presence of various Defects in 105, Deficiencies in 1108, Diseases in 2360, Developmental delays in 770 and adolescents' growth issues among 263.

**Conclusion:** The mass screening of beneficiaries in age group 0-18 years had prevalence of various Defects, Deficiencies, Disease and various Developmental Delays. A proper record and follow up of those identified cases will ensure early diagnosis, treatment and management of many health issues. The new digital portal ensures availability of real time data, access of the data to all stakeholders, will help in follow up of the referrals to the field level functionaries, and also following the progress of children longitudinally over a period of time. This initiative of digital school health system (e-RBSK) can be replicated elsewhere in India.

**Keywords:** RBSK, 0-18 years, screening of 4 D's, Digital School Health Records.

## INTRODUCTION

Worldwide, prevalence of children having congenital birth defects (per 1000 live births) ranges in-between 82 (low-income region) and 39.7 (high-income regions).<sup>[1]</sup> Various forms of nutritional deficiencies affect preschool children and its prevalence ranges in-between 4% and 70%. Developmental delays are also quite common in early childhood and it affects around 10% of the children.<sup>[2]</sup>

The Ministry of Health & Family Welfare, Government of India, under the National Health Mission launched the Rashtriya Bal Swasthya Karyakram (RBSK), an innovative and ambitious initiative, which envisages Child Health Screening and Early Intervention Services.<sup>[3]</sup>

Rashtriya Bal Swasthya Karyakram (RBSK) is one of its kind program to improve the overall quality of life of children enabling all children achieve their full potential and also provide comprehensive care to all the children in the community. This program involves screening of children from birth to 18 years of age for 4 Ds- Defects at birth, Diseases, Deficiencies and Development delays, spanning 32 common health conditions for early detection and free treatment and management, including surgeries at tertiary level. Children diagnosed with identified selected health conditions are provided early intervention services and follow-up care at the district level. These services are provided free of cost, thus helping their families reduce out of pocket expenditure incurred on the treatment.<sup>[3,4]</sup>

Though it is an ambitious approach to screen all the children, there are many issues in the implementation like the scheduling of the team to visit schools, the referrals made by the screening team, screening done in manual form therefore no relation to the previous year data.<sup>[5,6]</sup>

There is a need to digitize the entire procedure so that all the stakeholders can be brought about on a single platform with easy to access records and convenient documentation. Implementing a Digital Health Platform for RBSK screening (Digital School Health Programme) that envisages establishing state-of-the-art digital health systems which is user friendly, comprehensive data collection, real-time data and secure and reliable.

With this background, the objective of this study was to estimate the prevalence of Birth Defects, Deficiencies, Developmental delays and diseases among children of 0- 18 years age group.

## MATERIAL AND METHODS

**Type of Study:** Cross Sectional Study.

**Study Setting:** Union Territory of Dadra & Nagar Haveli and Daman & Diu.

**Study Population:** 0-18 years age.

**Sampling Method:** Universal Sampling. All beneficiaries in the age group of 0-18 years of age were screened.

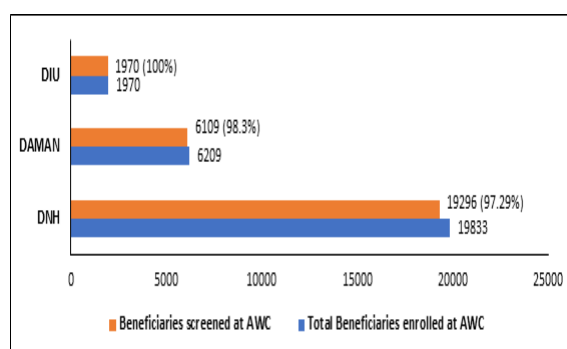
**Study Tool:** The format prescribed by MoHFW was used in the digital format in Digital School Health Records portal.

**Data Collections Method:** 212 teams consisting of health professionals viz; Medical Officer, Nursing Students, Para Medical Staffs, screened all the beneficiaries in the study area. This screening was done in the month of August immediately after school reopening.

**Data Analysis:** The collected data was analyzed using the e-RBSK portal.

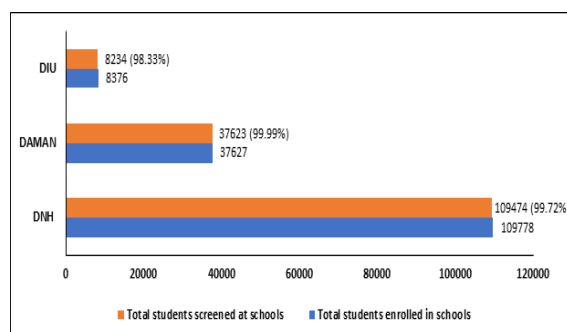
## RESULTS

In the UT of DNH & DD, there are 408 Anganwadi centers out of which 306, 62 and 40 are present in DNH, Daman and Diu respectively. Out of the total 28012 enrolled beneficiaries, 27375 beneficiaries (97.7%) were screened at Anganwadi Centre.



**Figure 1: Distribution of Screened Children (0 to 6 years) at Anganwadi Center**

DNH & DD, there are 459 school out of which 355, 65 and 39 are present in DNH, Daman and Diu respectively. All the schools in UT of DNH & DD that is Government, Grant in aid, Private schools were covered. Among the total of 155,781 enrolled beneficiaries, 155,331 beneficiaries (99%) underwent screening at these schools.



**Figure 2: Distribution of Screened Children (6 to 18 years) at Schools**

Table 1 shows the prevalence of Defects at Birth among 0 to 6 years age group children. In the present study, out of total 27375 children screened, the overall defects at birth were found to be 34 (0.12%) amongst which 17 (0.28 %) in DNH district, 05 (0.25%) in Daman District and 12

(0.06%) in Diu District. Out of which Congenital Heart Disease was 13 (0.05 %), Congenital Deafness was 06 (0.02%) and Down's Syndrome was 05 (0.02%). [Table 1]

Table 2 shows the prevalence of Deficiencies at Birth among 0 to 6 years age group children. In the present study, out of total 27375 children screened, the total deficiencies at birth were found to be 151 (0.14%) amongst which 36 (0.03%), 114 (0.10%) and 01 (<0.001%) were in DNH, Daman and Diu districts respectively. Severely Acute Malnourished children up to 60 months were found to be 110 (0.07%) and severe stunting was observed in 14 (0.01%) children. [Table 2]

Table 3 shows the prevalence of Diseases at Birth among 0 to 6 years age group children. In the present study, out of total 27375 children screened, the total children with diseases present at birth were found to be 116 (0.423%) amongst which 73 (0.378%), 40 (0.007%) and 03 (0.152%) in DNH, Daman and Diu districts respectively. The dental conditions were present in 39 (0.142%), skin conditions were present in 38 (0.138%) and reactive airway disease was present in 21(0.076%) children. [Table 3]

Table 4 shows the prevalence of developmental delays at Birth in 0 to 6 years age group children. In the present study, out of total 27375 children screened, the most common delay observed was speech and language delay 12 (0.0004%) followed by vision impairment 11 (0.0004%) and motor delay 8 (0.0003%). [Table 4]

Table 5 shows prevalence of Defects among 6 to 18 years age group children. In the present study, out of total 155331 children screened, the overall defects

were observed in 105 (0.068%) children, among which 49 (0.130%), 01 (0.012%) and 55 (0.05%) in DNH, Daman and Diu districts respectively. Congenital Heart Disease defect was observed in majority (44) children. [Table 5]

Table 6 shows the prevalence of Deficiencies among 6 to 18 years age group children. In the present study, out of total 155331 children screened, 1108 (1.012%) children were found to have deficiencies, among which 811 (0.741%) and 297 (0.271%) children were from DNH and Daman districts respectively. The children suffering from anemia were 800 (0.515 %) and those with severe thinning were 186 (0.120%). [Table 6]

Table 7 shows the prevalence of Disease among 6 to 18 years age group children. In the present study, out of total 155331 children screened, 2360 (1.519%) were found to have disease, amongst which 1852 (1.692%), 507 (1.348%) and 01 (0.012%) children belong to DNH, Daman and Diu districts respectively. 1605 (1.033%) children had dental conditions, 612 (0.394%) children were suffering with skin conditions and 82(0.053%) children with otitis media. [Table 7]

Table 8 shows the prevalence of Development Delays among 6 to 18 years age group children. In the present study, out of total 155331 children screened, 770 (0.496%) children were found to have developmental delays, amongst which 358 (0.3275), 354 (0.941%) and 58 (0.704%) children belong to DNH, Daman and Diu districts respectively. 492 (0.317%) children had vision impairment, 101 (0.065%) mental retardation and 75 (0.048%) children were suffering from hearing impairment. [Table 8]

**Table 1: Prevalence of Defects at Birth among 0 to 6 years aged children (N = 27375)**

Sr no	Birth Defects	DNH	%	Daman	%	Diu	%	Total	%
1	Neural Tube Defect	1	0.01	0	0	0	0.00	1	0.00
2	Down's Syndrome	1	0.01	2	0.03	2	0.10	5	0.02
3	Cleft Lip & Palate	2	0.01	0	0.00	0	0.00	2	0.01
4	Talipes (club foot)	0	0.00	2	0.03	0	0.00	2	0.01
5	Developmental Dysplasia of Hip	1	0.01	0	0.00	0	0.00	1	0.00
6	Congenital Cataract	0	0.00	0	0.00	0	0.00	0	0.00
7	Congenital Deafness	6	0.03	0	0.00	0	0.00	6	0.02
8	Congenital Heart Disease	0	0.00	12	0.20	1	0.05	13	0.05
9	ROP (only at DH)	0	0.00	0	0.00	0	0.00	0	0.00
10	Microcephaly	1	0.01	0	0.00	2	0.10	3	0.01
11	Macrocephaly	0	0.00	1	0.02	0	0.00	1	0.00
Total		17	0.28	5	0.25	12	0.06	34	0.12

**Table 2: Prevalence of Deficiencies at Birth among 0 to 6 years age group children (N= 27375)**

Sr no	Deficiency	DNH	%	Daman	%	Diu	%	Total	%
1	Severe Anemia	1	0.00	11	0.03	0	0.00	12	0.01
2	Vitamin A Deficiency	6	0.01	0	0.00	0	0.00	6	0.00
3	Vitamin D Deficiency	6	0.01	1	0.00	0	0.00	7	0.00
4	SAM up to 60 months.	17	0.02	92	0.24	1	0.01	110	0.07
5	Goiter usually after 6 years	0	0.00	0	0.00	0	0.00	0	0.00
6	Severe Stunting	5	0.00	9	0.02	0	0.00	14	0.01
7	Vitamin B complex def.	1	0.00	1	0.00	0	0.00	2	0.00
8	Others (Specify)	0	0.00	0	0.00	0	0.00	0	0.00
Total		36	0.03	114	0.10	1	0.00	151	0.14

**Table 3: Prevalence of Diseases at Birth under 0 to 06 years age group children (N = 27375)**

Sr no	Disease	DNH	%	Daman	%	Diu	%	Total	%
1	Skin Conditions	11	0.057	26	0.004	1	0.051	38	0.138
2	Otitis Media	4	0.021	7	0.001	1	0.051	12	0.043
3	Rheumatic Heart Disease	0	0	0	0	0	0	0	0
4	Reactive Airway Disease	19	0.098	2	0	0	0	21	0.076
5	Dental Conditions	37	0.192	2	0	0	0	39	0.142
6	Convulsive Disorders	2	0.01	2	0	1	0.051	5	0.018
7	Childhood leprosy Disease	0	0	0	0	0	0	0	0
8	Childhood T.B.	0	0	1	0	0	0	1	0.003
9	Childhood Extra Pulmonary T.B.	0	0	0	0	0	0	0	0
Total		73	0.378	40	0.007	3	0.152	116	0.423

**Table 4: Prevalence of Developmental Delays at Birth among 0 to 6 years age group children (N = 27375)**

Sr no	Developmental Delays	DNH	%	Daman	%	Diu	%	Total	%
1	Vision Impairment	1	0.01	10	0.16	0	0	11	0.0004
2	Hearing Impairment	1	0.01	3	0.05	0	0	4	0.0001
3	Neuro-motor Impairment	1	0.01	2	0.03	1	0.05	4	0.0001
4	Motor delay	3	0.02	5	0.08	0	0	8	0.0003
5	Cognitive Delay	1	0.01	3	0.05	0	0	4	0.0001
6	Speech and Language Delay	4	0.02	7	0.11	1	0.05	12	0.0004
7	Behavioural Disorder (Autism)	2	0.01	1	0.02	0	0	3	0.0001
8	Learning Disorder	2	0.01	0	0	0	0	2	0.0001
9	Attention Deficit Hyperactivity Disorder	1	0.01	2	0.03	0	0	3	0.0001
Total		16	0.08	33	0.54	2	0.1	51	0

**Table 5: Prevalence of Defects among 6 to 18 years age group children (N = 155331)**

Sr no	Defects	DNH	%	Daman	%	Diu	%	Total	%
1	Neural Tube Defect	0	0.000	1	0.003	0	0.000	1	0.001
2	Down's Syndrome	5	0.005	0	0.000	0	0.000	5	0.003
3	Cleft Lip & Palate	4	0.004	3	0.008	0	0.000	7	0.005
4	Talipes (club foot)	2	0.002	0	0.000	0	0.000	2	0.001
5	Developmental Dysplasia of Hip	2	0.002	0	0.000	0	0.000	2	0.001
6	Congenital Cataract	4	0.004	3	0.008	0	0.000	7	0.005
7	Congenital Deafness	3	0.003	3	0.008	1	0.012	7	0.005
8	Congenital Heart Disease	11	0.010	33	0.088	0	0.000	44	0.028
9	Retinopathy of prematurity (only at DH)	24	0.022	6	0.016	0	0.000	30	0.019
Total		49	0.130	1	0.012	55	0.050	105	0.068

**Table 6: Prevalence of Deficiencies among 6 to 18 years age group children (N = 155331)**

Sr no	Deficiency	DNH	%	Daman	%	Diu	%	Total	%
1	Severe Anaemia	714	0.652	86	0.229	0	0.000	800	0.515
2	Vitamin A Deficiency (Bitot Spot)	30	0.027	18	0.048	0	0.000	48	0.031
3	Vitamin D Deficiency (Rickets)	11	0.010	4	0.011	0	0.000	15	0.010
4	Severe Thinning	27	0.025	159	0.423	0	0.000	186	0.120
5	Obesity	8	0.007	13	0.035	0	0.000	21	0.014
6	Goiter	21	0.019	17	0.045	0	0.000	38	0.024
Total		811	0.741	297	0.271	0	0.000	1108	1.012

**Table 7: Prevalence of Disease among 6 to 18 years age group children (N = 155331)**

Sr no	Disease	DNH	%	Daman	%	Diu	%	Total	%
1	Skin Conditions	442	0.404	170	0.452	0	0.000	612	0.394
2	Otitis Media	39	0.036	43	0.114	0	0.000	82	0.053
3	Rheumatic Heart Disease	5	0.005	0	0.000	0	0.000	5	0.003
4	Reactive Airway Disease	14	0.013	7	0.019	0	0.000	21	0.014
5	Dental Conditions	1329	1.214	275	0.731	1	0.012	1605	1.033
6	Convulsive Disorders	23	0.021	12	0.032	0	0.000	35	0.023
Total		1852	1.692	507	1.348	1	0.012	2360	1.519

**Table 8: Prevalence of Developmental Delays among 6 to 18 years age group children (N = 155331)**

Sr no	Development Delay	DNH	%	Daman	%	Diu	%	Total	%
1	Vision Impairment	137	0.125	298	0.792	57	0.692	492	0.317
2	Hearing Impairment	61	0.056	14	0.037	0	0.000	75	0.048
3	Neuro-motor Impairment	4	0.004	5	0.013	0	0.000	9	0.006
4	Motor delay	5	0.005	3	0.008	0	0.000	8	0.005
5	Mental Retardation	89	0.081	11	0.029	1	0.012	101	0.065
6	Speech and Language Delay	16	0.015	15	0.040	0	0.000	31	0.020
7	Behavioral Disorder (Autism)	4	0.004	2	0.005	0	0.000	6	0.004
8	Learning Disorder	19	0.017	3	0.008	0	0.000	22	0.014
9	Attention Deficit Hyperactivity Disorder	23	0.021	3	0.008	0	0.000	26	0.017
Total		358	0.327	354	0.941	58	0.704	770	0.496

## DISCUSSION

Across countries and their diverse economic landscapes, statistics reveal a concerning trend: an estimated 64.3 infants per thousand live births are born annually with various birth defects. Among these cases, 7.9 per thousand suffer from cardiovascular defects, while 4.7 per thousand are afflicted with neural tube defects. These figures underscore the global challenge of addressing birth defects, irrespective of socioeconomic status. In the context of India, where there is a substantial birth cohort of nearly 26 million annually, the implications are particularly significant. Given this vast population, India would naturally account for the largest share of birth defects worldwide. This stark reality emphasizes the urgent need for comprehensive healthcare strategies and interventions to mitigate the prevalence of birth defects and ensure the well-being of infants and families across the nation.<sup>[12]</sup>

This study screened 42706 children and adolescents from schools and Anganwadis in August 2023 while in a study done by Tiwari et al,<sup>[12]</sup> 26977 children and adolescents were screened. In our study, birth defects were observed in 139 (0.32%) participants, deficiency in 1259 (2.95%), disease in 2476 (5.8%) and developmental delays in 821 (1.92%) children whereas in the study conducted by Tiwari et al,<sup>[12]</sup> birth defects was present in 53 (0.2%) children, deficiency of some kind was found in 434 (1.6%) children, 21768 (80.69%) children were having some disease and 113 (0.4%) children were found to have developmental delays. Among birth defects, in our study, congenital heart disease was observed in majority 57 (41%) children. In the study conducted by Tiwari et al,<sup>[12]</sup> congenital heart disease was found to be the most common condition, affecting 37 (69.81%) children which is much higher as compared to our finding. Neural tube defects was found in 2 (<0.001%) children and Down's syndrome in 10 (0.02%) children in our study. Verma et al. also reported a prevalence rate of 0.1% for Down's syndrome in India in their 1998 report.<sup>[7]</sup> In our study, the most common form of deficiency was found to be severe anemia where 812 (1.9%) children suffered from it which is a very significantly higher number as compared to Tiwari et al,<sup>[12]</sup> where only 30 (0.11%) children suffered.

Vitamin A deficiency was observed in 54 (4.3%) children in our study which is much lower than 257 (59.2%) children as in Tiwari et al,<sup>[12]</sup> study. According to the data provided by the National Institute of Nutrition, Indian Council of Medical Research, 61% of preschool children were found to have subclinical Vitamin A Deficiency (VAD). This criterion revealed a public health concern across all the NNMB states surveyed, with rates ranging from 52% in Maharashtra to 88% in Madhya Pradesh. 110 (72.84%) children of 0- 6 years age had severe acute malnutrition in our study which composed the majority of deficiency as compared to 142 (32.72%) children in the study by Tiwari et al.<sup>[12]</sup> In Tiwari et al.'s study, Severe Acute Malnutrition (SAM) emerged as the second most prevalent deficiency, predominantly affecting females in the 6 weeks to 6 years age group.<sup>[12]</sup> Numerous studies have highlighted that over 6 percent of children under the age of five experience SAM.<sup>9</sup> Additionally, Thakur et al. discovered that nutritional anaemia frequently accompanies SAM, often necessitating hospitalization.<sup>[10]</sup>

In our study, the highest prevalence of diseases among children was dental conditions, affecting 1644 (66.4%) individuals, followed by skin conditions observed in 650 (26.25%) children. Tiwari et al. found that 64% of beneficiaries in their study had skin conditions, a higher percentage than in our study, followed by reactive airway disorders (7.6%) and dental caries (6.8%).<sup>[12]</sup> However, in our study, reactive airway disease was present in only 42 (1.7%) children, significantly lower than the findings of Tiwari et al. Sambo et al. reported a 21% incidence of various skin infections in rural communities, consistent with our findings.<sup>11</sup> Additionally, the Indian Council of Medical Research (ICMR) reported a median prevalence of reactive airway disease, including asthma, among children to be 4.75%.<sup>[9]</sup>

For developmental delays, vision impairment was most common form of developmental delay seen in 503 (61.3%) children in our study. Vision impairment was seen in 39 (34.5%) children in the study by Tiwari et al,<sup>[12]</sup> which is lower as compared to our finding, other conditions like bed wetting etc. which was seen in 54 (47.78%) children. Worldwide, the developmental potential of 200 million children is not realized within the first five years due to

factors such as poverty, inadequate health care, malnutrition, and insufficient early stimulation.<sup>[13,14]</sup> Early childhood stunting prevalence and the extent of absolute poverty serve as proxy indicators for assessing the development of children under the age of five. These indicators are strongly linked to subpar cognitive and educational outcomes in children, hindering them from reaching their full development.<sup>[15]</sup> According to NFHS-5 data, poverty and lack of awareness are identified as the primary factors contributing to undiagnosed cases and poor health outcomes.<sup>[16]</sup>

In this mass screening, we used the novel e-portal for RBSK and collected all the data in that portal understanding its usage and efficiency. There were various challenges of the routine system of RBSK and how this e-portal can be of advantage to the proper implementation of this programme.

## CONCLUSION

Amongst the 4 D's screened in the Anganwadi children (0-6 years), there was presence of various birth Defects in 33 (0.12%) children, Deficiencies in 151 (0.55%) children, Diseases in 116 (0.42%) children and Developmental delays in 51 (0.12%) children. Among the children and adolescents of age group 6-18 years screened, there was presence of various Defects in 105 (0.07%), Deficiencies in 1108 (0.71%) , Diseases in 2360 (1.52%) and Developmental delays in 770 (0.49%) children.

With the Government of India's push for digital governance and with the implementation of Ayushman Bharat Digital Mission (ABDM), this digital school health records would be an easy task. This digital school health record portal can be integrated with other national health programmes/ immunization programme/ HMIS at DEIC. This can also help our field level functionaries to monitor the referrals etc. The UT of DNH&DD initiative of Digital School Health Records (e-RBSK) can be replicated elsewhere in India. The digital school health records would help in the longitudinal records of the health and growth parameters of the individuals over a period of time. This might help in reaching the long term goal of reducing malnutrition, early correction of deficiencies, defects, developmental delays, etc. Also, this might help in assessing the gaps in our health schemes and required interventions can also be targeted for the right persons at the right time.

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