



## Prevalence of 4Ds among Population of below 18 years Screened under RBSK in Districts of Western Madhya Pradesh

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### Abstract

RBSK (Rashtriya Bal Swasthya Karyakram) provides the Child Health Screening and Early Intervention Services under National Rural Health Mission. RBSK was started for early detection and management of the 4Ds (Defects at birth, Diseases in Children, Deficiency conditions and Developmental Delays including Disabilities) prevalent in children aged below 18 years. This study was carried out to find out the prevalence of 4Ds in RBSK screened children in western Madhya Pradesh. Western Madhya Pradesh comprises of almost 14 districts, out of which 2 districts Indore and Ujjain were selected randomly. Secondary data from RBSK programme manager of both the district was collected for analysis. Also semi structured interview was organised with the programme managers to assess the current services, strategies and outcomes of the programme. Children screened for 4Ds in the age group of 0-18 years were 66.19% and 61.5% of the total children in Indore and Ujjain districts respectively. The prevalence of birth defects among children screened was 2.48 and 1.56 per thousand in Indore and Ujjain districts respectively. The prevalence of deficiency disorders, childhood diseases and developmental delays and disabilities in Indore was 20.49, 28.92 and 34.13 per thousand respectively. Similarly in Ujjain it was 26.0, 44.76 and 9.89 per thousand respectively. Thus in spite high prevalence of childhood diseases, deficiency disorders and developmental delays almost 35% to 40% children left unscreened. This leads higher childhood morbidity and mortality and undue sufferings and delays in treatment and care to sufferers.

**Keywords:** disease, defects, deficiency, disability.

### Introduction

RBSK (Rashtriya Bal Swasthya Karyakram) has been started under the aegis of national rural health mission in 2013 under ministry of health and family welfare. India which is lacking in child care services, securing lower position in the list of human development index (HDI) and one of the

worse country in list of hunger index. The major component of these indices is based upon child mortality/ infant mortality rates and malnutrition in under five children. Also Madhya Pradesh is the state with highest infant mortality rates (SRS 2017). Being developed in the science and technology, space and economics comes to little

value when we are not able to take care of our child population. Limitation of health care providers, doctors and child specialists at block and district level limits the screening and management of different childhood diseases, congenital defects, deficiency disorders and developmental delays and disabilities. These four disorders have gross effects on children's physical and mental growth, education and productivity at adulthood. RBSK which has large penetration into the rural population is based upon the equitable distribution and utilization health services has been help many poor children to get early screening and intervention for the prevailing health problems. NRHM started in 2005 had revolutionised the basic health care services in the country through introductions of ASHAs (Accredited Social health Activists). A significant reduction in neonatal, infant and maternal mortality has been achieved with the trinity of ASHA, Institutional delivery and JSY (Janani suraksha Yojna). But the prevalence of 4Ds (i.e. Defects at birth, Diseases in Children, Deficiency conditions and Developmental Delays including Disabilities) needed a specialised programme for Child Health Screening and Early Intervention Services. Health screening of children is a known intervention under the School Health Programme. It is now being expanded to cover all children from birth to 18 years of age. As for as the 4Ds are concern In India Out of every 100 babies born in this country annually, 6 to 7 have a birth defect. Various nutritional deficiencies affecting the preschool children range from 4 % to 70 %. Developmental delays are common in early childhood affecting at least 10% of the children. These delays, if not intervened timely, may lead to permanent disabilities with regard to cognition, hearing and vision.

There are also groups of diseases which are very common in children e.g., dental caries, otitis media, rheumatic heart disease and reactive airways diseases which can be cured if detected early. The 'Child Health Screening and Early Intervention Services' started under RBSK helped

to Sarve Shiksha and School Chalo Abhiyan of government by increasing school enrollement, school attendance and reduction in hospitalization stay of school going children. the programme has helped a lot to poor families who were unable to take care of birth defects like congenital heart diseases of their wards due to financial constraints. The programme indirectly provides an authentic data to supplement the vital statistical data of child population of country.

It has been almost more than 15 years the programme has been running in Madhya Pradesh and its penetration in the community, inclusions, exclusions, coverage and impact in community needs timely evaluation. With this aim the study has been conducted in two districts of western Madhya Pradesh.

### Materials and Methods

This is a cross sectional observational study conducted in districts of western Madhya Pradesh. Out of 14 districts of western Madhya Pradesh, two districts were selected randomly for the study which came out to be Indore and Ujjain. Semi structured interview schedule were organised with programme manager of both the districts. Data of all the children screened under RBSK screening programme was collected from district early intervention centre. The monthly data of last one year was analysed using excel spread sheets and SPSS software version 20.

### Results

The total population of children in age group below 18 years was 217540 in Indore and 405934 in Ujjain. Out of this 143994 (66.19%) in Indore and 249956 (61.5%) in Ujjain children were Screened under RBSK programme in one year. The children were screened for 4Ds (Defects at birth, Diseases in Children, Deficiency conditions and Developmental Delays including Disabilities). The total prevalence of various birth defects (Neural Tube Defect, Down's Syndrome, Cleft Lip & Palate, Congenital Heart Diseases etc) among children screened in Indore and Ujjain

districts was 2.48 and 1.56 per thousand respectively. The most common birth defect was congenital heart disease in both the districts with prevalence of 0.54-0.65 per thousand populations of children. The prevalence of congenital birth defects among the screened population was significantly higher in Indore than in Ujjain districts (Chi-square with Yates's correction = 40.846,  $P < 0.001$  degree of freedom 8). Table 1

As for as the prevalence of various deficiency disorders among screened children is concerned; Ujjain has higher prevalence than Indore. Severe acute malnutrition and Anaemia were the most common deficiency disorders in both the districts. Overall combined prevalence of screened deficiency disorders was 20.49 and 26.00 per thousand in indore and Ujjain respectively. Prevalence of anaemia, and severe acute malnutrition was higher in indore whereas prevalence of vitamin A , vitamin D deficiency and goitre was higher in Ujjain district and this difference was significant (Chi-square with Yates's correction = 118.096,  $P < 0.001$  degree of freedom 4). Table 2

The prevalence of various childhood diseases like Rheumatic heart disease, fungal infections of skin, otitis media, dental caries and convulsive disorders was 28.92 and 44.76 per thousand in Indore and Ujjain respectively. Dental caries, skin infections and otitis media were the top 3 prevalent childhood diseases in both the districts. Prevalence of all screened diseases except convulsive and reactive airway disease was higher in Ujjain and the difference was significant. (Chi-square with Yates's correction = 611.519,  $P < 0.001$  degree of freedom 5). Table 3

The prevalence of various developmental delays and disabilities among the screened population in Indore and Ujjain district was 34.13 and 9.89 per thousand respectively. Visual impairment and language delay were the most common disability and developmental delay. Visual and hearing impairment, cognitive and language delays and behaviour, learning and attention deficit disorders were more prevalent in Indore and the difference was significant. (Chi-square with Yates's correction = 504.077,  $P < 0.001$  degree of freedom 8). Table 4

**Table- 1** Number of Children found positive for various Birth Defects during screening in the year April 2014- March 2015

S. No.	Defects at Birth	Indore		Ujjain	
		No. of Cases Identified in a year	Prevalence in per 1000 population screened	No. of Cases Identified in a year	Prevalence in per 1000 population screened
1.	Neural Tube Defect	8	0.0555579	1	0.0040007
2.	Down's Syndrome	34	0.2361209	36	0.14402535
3.	Cleft Lip & Palate / Cleft Palate alone	21	0.1458394	47	0.18803309
4.	Talipes (club foot)	63	0.4375182	59	0.23604154
5.	Developmental Dysplasia of the Hip	10	0.0694473	17	0.06801197
6.	Congenital Cataract	12	0.0833368	16	0.06401127
7.	Congenital Deafness	23	0.1597289	72	0.2880507
8.	Congenital Heart Diseases	95	0.6597497	137	0.54809646
9.	Retinopathy of Prematurity	92	0.6389155	5	0.02000352
	Total no. of children having Birth Defects	358	2.4862147	390	1.56027461

Chi-square with Yates's correction = 40.846,  $P < 0.001$

**Table- 2** Number of Children found positive for various Deficiencies during screening in the year April 201-4- March 2015

S. No.	Deficiencies	Indore		Ujjain	
		No. of Cases Identified in a year.	Prevalence in per 1000 population screened	No. of Cases Identified in a year	Prevalence in per 1000 population screened
1.	Anemia	792	5.50022918	2069	8.27745683
2.	Vitamin A Deficiency (Bitot spot)	323	2.24314902	386	1.54427179
3.	Vitamin D Deficiency (Rickets)	443	3.07651708	272	1.08819152
4.	Severe Acute Malnutrition	1269	8.8128672	3771	15.0866553
5.	Goitre	124	0.86114699	1	0.0040007
	Total no. of children having Deficiencies	2951	20.4939095	6499	26.0005761

Chi-square with Yates's correction = 118.096,  $P < 0.001$

**Table-3** Number of Children Found Positive for Childhood Diseases during screening in the year April 201-4- March 2015

S. No.	Childhood Diseases	Indore		Ujjain	
		No. of Cases Identified in a year	Prevalence in per 1000 population screened	No. of Cases Identified in a year	Prevalence in per 1000 population screened
1.	Skin conditions (Scabies, Fungal Infection and Eczema)	975	6.771115463	2632	10.5298533
2.	Otitis Media	525	3.645985249	1048	4.19273792
3.	Rheumatic Heart Disease	59	0.409739295	17	0.06801197
4.	Reactive Airway Disease	378	2.62510938	165	0.66011618
5.	Dental Caries	2070	14.37559898	7223	28.8970859
6.	Convulsive Disorders	158	1.097267942	104	0.41607323
	Total no. of children having Childhood Diseases	4165	28.92481631	11189	44.7638784

Chi-square with Yates's correction = 611.519,  $P < 0.001$

**Table- 4** Number of Children Found Positive for Developmental Delays and Disabilities during screening in the year April 2014- March 2015

S. No.	Developmental Delays and Disabilities	Indore		Ujjain	
		No. of Cases Identified in a year	Prevalence in per 1000 population screened	No. of Cases Identified in a year	Prevalence in per 1000 population screened
1.	Vision Impairment	3147	21.8550773	1031	4.124725952
2.	Hearing Impairment	112	0.77781019	99	0.396069708
3.	Neuro-Motor Impairment	131	0.90976013	326	1.304229544
4.	Motor Delay	77	0.5347445	187	0.748131671
5.	Cognitive Delay	232	1.61117824	113	0.452079566
6.	Language Delay	476	3.30569329	355	1.420249964
7.	Behavior Disorder (Autism)	132	0.91670486	138	0.552097169
8.	Learning Disorder	357	2.47926997	164	0.656115476
9.	Attention Deficit Hyperactivity Disorder	251	1.74312819	60	0.240042247
	Total no. of children having Developmental Delays and Disabilities	4915	34.1333667	2473	9.893741298

Chi-square with Yates's correction = 504.077,  $P < 0.001$

## Discussion

The prevalence of children found positive for 4Ds out of total population screened was 89/1000 and 99.4 /1000 at Indore and Ujjain District respectively. A statistically significant difference was observed between the children found positive for 4Ds in both the districts ( $P < 0.001$ ). The overall prevalence of birth defects observed is in Indore district was 2.4/1000 in population screened, while in Ujjain district was 1.56 per 1000 population screened. A statistically significant difference was observed between the children found positive for birth defects between Indore and Ujjain districts. The findings however are very low compared to findings of March of Dimes a global report on birth defect 2006 which reported a prevalence of 64.3 per 1000 live births in India.<sup>[1]</sup>

The Prevalence of Neural tube defect was 0.05/1000 in population screened at Indore while .004 per 1000 population screened at Ujjain district. This was again lower than the findings of Agarwal SS et al who reported NTD incidence in India which varied from 0.5 to 11/1000 births in the year 1999.<sup>[2]</sup> This may be due improved folic acid supplementation to women in reproductive age groups over years. The Prevalence of Down's syndrome was 0.2/1000 in population screened at Indore while 0.14/1000 at Ujjain district, which is lesser than the reported prevalence of Down's syndrome (0.88 per 1000 (1 out of 1139) to 1.09 per 1000 (1 out of 916)) in various studies across India.<sup>[3] -[5]</sup> So this may be a reason for the low prevalence observed in the study. The prevalence of Cleft Lip & Palate / Cleft Palate was 0.14/1000 in population screened at Indore and 0.18/1000 in population screened at Ujjain district which is quite low as compared to a study done by Mossey P et al in a year 2009 states that in India alone the number of infants born every year with CLP is 28,600.<sup>[6]</sup>

The prevalence of Congenital Heart Diseases was 0.7/1000 in population screened at Indore while 0.54/1000 in population screened at Ujjain district which is very low in comparison to various

studies done in India and worldwide. According to Flyer DC et al Congenital heart defects (CHDs) are a common variety of birth defects, with an overall prevalence of 8-10/1000 births according to various series from different parts of world. Abdulla R in year 1997 stated that it is believed that this incidence has remained constant worldwide<sup>[7],[8]</sup> According to Khalil A. et al, in a hospital based study in year 1995 stated that the incidence of CHD 3.9/1000 live births, the same study shows that the incidence of CHD among preterm infant is i.e. 22.86/1000 live births significantly higher than term infant i.e. 2.36/1000 live births.<sup>[9]</sup>

The prevalence of Retinopathy of Prematurity was 0.63/1000 in population screened at Indore while 0.02/1000 in population screened at Ujjain district which is quite low because the incidence of ROP is on the increase due to improved survival of low birth weight babies. Screening of lowbirth babies is essential to detect ROP. Palmer has recommended screening examination at 7 to 9 weeks of age.<sup>[10]</sup>

The prevalence of various Deficiencies was 20.4/1000 and 23.1/1000 in population screened at Indore and Ujjain District respectively. There was a significant difference observed in the proportion of children found positive for deficiency diseases among the screened population between Indore and Ujjain districts ( $P < 0.001$ ). The prevalence of Anemia was 5.5/1000 in population screened at Indore while 8.2/1000 in population screened at Ujjain district, According to the latest national representative survey of India, 70% children are anemic in the age group of 6–59 months, including 3% severely anemic, 40% moderately anemic, and 26% mildly anemic Almost half of children in Uttar Pradesh, Bihar, Chhattisgarh, Andhra Pradesh, Madhya Pradesh, Rajasthan, and Haryana are moderately or severely anemic. (NFHS 3, 2005-06).<sup>[11]</sup> Anemia is the most predominant factor for morbidity and child mortality, and hence, it is a critical health issue for preschool children in India also shown by B. J.



Brabin et al in year 2001 and N. B. Jain, et al in year 2005.<sup>[12]-[16]</sup>

The prevalence of Vitamin A deficiency was 2.2/1000 in population screened at Indore while 8.2/1000 in population screened at Ujjain district. The prevalence of Vitamin D deficiency (Rickets) was 3/1000 in population screened at Indore while 01/1000 in population screened at Ujjain district. The prevalence of Severe Acute Malnutrition 8.8/1000 in population screened at Indore while 12/1000 in population screened at Ujjain district, a national prevalence of severe wasting of 6.8%, or approximately 8.4 million children, India is home to about half the total. According to National Family Health Survey (NFHS-3), 2005- 2006 . The prevalence of malnutrition varies across states with Madhya Pradesh recording the highest rates (55%) and Kerala among the lowest (27%). SAM is an important contributor of under-five mortality. This was very low as compared to national standards.<sup>[11]</sup>

The prevalence of various Childhood Diseases was 28.9/1000 and 44.8/1000 in population screened at Indore and Ujjain District respectively. There was a significant difference observed in the proportion of children found positive for childhood diseases among the screened population between Indore and Ujjain districts ( $P < 0.001$ ). The prevalence of Otitis Media was 3.6/1000 in population screened at Indore while 4.1/1000 in population screened at Ujjain district. The prevalence of Rheumatic Heart Disease was 0.4/1000 in population screened at Indore while 0.06/1000 in population screened at Ujjain district which is low in Ujjain district as compared to a study done Jose VJ in year 2003 stated that "In the largest school survey conducted to date in India, we report the prevalence of rheumatic heart disease to be 0.68 per 1000 children".<sup>[17]</sup>

The prevalence of various developmental delays and disabilities which was 34.1 /1000 and 9.8 /1000 in population screened at Indore and Ujjain Districts respectively. In India, Nair M et al in year 2004 have found prevalence of 1.5-2.5% of

developmental delay in children under 2 years of age which is continued to be same as shown by another study done by Nair M et al in year 2009.<sup>[18]-[19]</sup>

### Conclusions

As per the findings of our study a large no of children suffer from one or other type of defect, deficiency, disease and developmental delays and disorders. RBSK programme has been able to search, identify, report and assist in the proper management of these 4Ds. In our study the districts were divisional head quarters and developed cities. The coverage of screening programme was lagging upto 30% - 40% even in these developed districts. Madhya Pradesh is one of the poorest performers in cases of child health indicators. So it is the dire need of time to extend the RBSK screening coverage close to 100 %, so that not even a single with any of the 4Ds left behind from access to health services.

### Source of Support: nil

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