

## A CROSS-SECTIONAL STUDY TO EVALUATE THE FUNCTIONING AND INFRASTRUCTURE OF MOBILE HEALTH TEAMS AND DEIC (DISTRICT EARLY INTERVENTION CENTRE) AT KORAPUT DISTRICT OF ODISHA UNDER RASTRIYA BAL SWASTHYA KARYAKRAM (RBSK)

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### ABSTRACT

**Background:** With a child population of over 400 million, India has the largest number of children between the ages of 0-18 years globally. India contributes 20% to global child deaths. Govt. of India introduced several health programmes over years to address country's poor health and survival status Rashitrya Bal Swasthya Karyakram (RBSK) is a newly launched programme under NHM aiming at child health screening, early identification and early intervention for children from birth to 18 years of age to cover 4DS viz. Defects of birth, deficiencies, Diseases, developmental delays including Disabilities, free of cost. **Objective:** To evaluate the functioning and infrastructure of mobile health teams and DEIC (District Early Intervention Centre) at Koraput District in Odisha under Rashitrya Bal Swasthya Karyakram (RBSK). **Materials and Methods:** It is a retrospective cross-sectional study for a period of 4 years i.e. form 2014-15 to 2017-18. Different data regarding the activities of MHTs and DEIC were collected from RBSK Manager and Data Entry Operator of DEIC. After compilation of 4 years data, functioning and infrastructure of DEIC was evaluated. **Result:** DEIC and MHTs under RBSK, Koraput is deficient in both human resources and infrastructure. 87% of 0-18 year children were screened by MHTs out of which 8% of children with 4Ds were referred to DEIC. Out of all referred cases 52% of Birth defects, 43% of developmental Delays including disabilities, were treated and supported by DEIC. 66% of children with various diseases and 70% of children suffering from deficiencies were treated at CHCs by MHTs and also at DEIC. Newborn screening at DPs was 82%. 61% of newborns discharged from SNCU were screened at DEIC. Total achievement of RBSK Programme includes 254 cases of clubfoot correction, 157 cases of clef lip and clef palate repair, 76 cases of congenital cataract surgery, 36 cases of CHD management, distribution of hearing aids to 387 children, distribution of spectacles to 1538 school children with refractory error and referral of 530 SAM children to different NRCs. **Conclusion:** RBSK Programme provided an effective platform for early screening of 0-18 year children for 4Ds. Deficiency of staffs need to be filled up to make still more effective. Infrastructure should also be strengthened. Referral system should be strengthened for early intervention for congenital heart diseases and NTDs. Capacity building and awareness of health care providers at DPs should be undertaken for screening of birth defects. SNCU staffs need orientation for referring all newborn babies discharged from SNCU to attend DEIC for screening and follow up. Each baby discharged from SNCU should be tracked for regular follow up.

**KEYWORDS:** RBSK, DEIC, 4Ds, Birth Defect, Developmental Delay and Disabilities.

### INTRODUCTION

With a child population of over 400 million, India has the largest number of children between the ages of 0-18 years globally. India contributes 20% to global child death.<sup>[1]</sup> India's child health indicators continues to be alarming. The Govt. of India has introduced several initiatives and programmes over the years to address the country's poor child health and survival status. Rashtriya

Bal Swasthya Karyamram (RBSK) launched in 2013, is a new initiative aiming at child health screening, early identification and early intervention for children from birth to 18 years to cover 4D's viz. defects at birth, deficiencies, Diseases and developmental delays including disabilities.<sup>[2]</sup> RBSK is one of the unique programmes in the world aimed at early screening of and early intervention for 4Ds among children to minimize disability. It shifts away from survival to healthy

survival.<sup>[1]</sup> It is expected that these services will reach and benefit about 27 crores of children in the age group of 0-18 years.<sup>[3]</sup>

In India, out of 100 babies born, 6 to 7 have birth defects, with a large birth cohort of almost 26 million per year, India would account for the largest share of birth defects in the world. In Indian context this amounts to 1.7 million birth defects annually and would account for 9.6% of all newborn deaths.<sup>[3,4]</sup> 64.3 infants per 1000 live births are born annually with birth defects. Of these 7.9 have cardiovascular defects, 4.7 have neural tube defect, 1.2 have some form of haemoglobinopathy, 1.6 have down syndrome and 2.4 have G6PD deficiency.<sup>[3,4]</sup>

Various nutritional deficiencies affecting the preschool children range from 4% to 70%. Evidence also suggests that 48% children <5 years are chronically malnourished. Nearly 47 million of these children i.e. 38.4% are stunted, 35.7% underweight, 21% are wasted, 7.5% children suffer from SAM, anaemia present is estimated to be 58.5% in children below 5 years of age (NHF54, 2015-16).<sup>[7,8]</sup>

The prevalence of dental carries varies between 50-60% among Indian school children. Rheumatic heart disease is reported at 1.5 per thousand among school children 5-9 years and 0.13 to 1.1 per thousand (10-14 years). The median prevalence of reactive airway disease including asthma in children is reported to be 4.75%.<sup>[3]</sup>

Globally 200 million children do not reach their developmental potential in the first 5 years of life due to poverty, poor health, nutrition and lack of early stimulation.<sup>[5]</sup> In India developmental delays are common in early childhood affecting at least 10% of children. Further, SNCU technical reports have reported that approximately 20% of the babies discharged from the health facilities are found to suffer from developmental delays or disabilities at a later stage.<sup>[6]</sup> These delays if not intervened timely may lead to permanent disabilities with regard to cognition, hearing and vision.

#### **Health conditions identified for screening<sup>[3]</sup>**

RBSK programme under NHM envisages to cover 38 identified health conditions for early detection and free treatment and management. This includes 4Ds and Adolescent health problems and congenital hypothyroidism, sickle cell anaemia and beta thalassemia.

#### **Implementation Mechanism**

The following mechanism is adopted to reach all the target groups of children for health screening.

- 1. For Newborn:** Facility based newborn screening at public health facilities by existing health manpower. Community based newborn screening at home through ASHAs for newborns till 6 weeks of age during home visits.

- 2. For children 6 weeks to 6 years:** Anganwadi Centre based screening by the dedicated Mobile Health Teams (MHTs).
- 3. For children 6 years to 18 years:** Govt and Govt. aided school based screening by dedicated mobile health teams.

#### **Mobile Health team (MHT)**

The mobile health team consists of 4 members - Two Ayush Doctors (1 male, 1 female), one ANM/ Staff Nurse, one pharmacist with proficiency in computer for data management.

In order to facilitate implementation of the health screening process, vehicles are hired for movement of the MHTs to Anganwadi centres and schools. A tool kit with essential equipment for screening of children is also provide to the MHTs.

#### **District Early Intervention Centre (DEIC)**

DEICs are established at each of the District headquarters Hospitals. The purpose of DEIC is to provide referral support to children detected with health conditions during health screening.

#### **Composition of Team at DEIC<sup>[3]</sup>**

The team consists of one Paediatrician, one medical officer, one dental surgeon, psychotherapist, audiologist and speech therapist, psychologist, optometrist, early interventionist-cum-special educator-cum-social worker, Lab. Technician, dental technician, Manager and data entry operator one each.

#### **Role of DEIC**

The purpose of DEIC is to provide referral support of children detected with health conditions (4Ds) during health screening. Children and students presumptively diagnosed to have a disease / deficiency / disability / Defect and who require confirmatory tests or further examination will be referred to the designated tertiary level public sector health facilities through the DEIC.

The DEIC would promptly respond to and manage all issues related to developmental delays, hearing defects, vision impairment, neuromotor diseases, speech and languages delay, autism and cognitive impairment. Besides this the team will also be involved in new-born screening at the district level. DEIC has basic facilities to conduct tests for hearing, vision, neurological tests and behaviour assessment. The idea behind child health screening is to detect early and intervene early and minimise disability. Once the disability is already established then the intervention would include enhancement of child development for child to reach the highest potential for the child possible and prevent progression to handicap that may arise from activity limitation. DEIC is established with the aim to have more accessible health facilities with infrastructure and resources for interdisciplinary evaluation and intervention to be delivered under one roof.<sup>[9]</sup> Mostly,

disease and deficiency related cases are managed at CHC and defects at birth and developmental delays are referred to DHH / DEIC for management. All the cases are treated free of cost. DEIC makes linkage with NPCB, RSBY, BKKY, OSTF and DDRC for management of different referral cases free of cost. If needed RBSK fund is utilized for this purpose.<sup>[10]</sup>

With this background, the present study was conducted with the aim to evaluate the functioning and infrastructure of DEIC and the achievement under RBSK programme so far and explore the problems and to recommend remedial measures

## RESULTS

**Table 1: Basic Information.**

Date of functioning of RBSK Programme in Koraput	: 2014-15
Date of functioning of DEIC at DDH, Koraput	: 24.04.2015
Total population of Koraput District	: 13.8 Lakhs
No. of children (0-18 Years)	: 435876
Total No. of Blocks	: 14 Nos.
Total No. of MHTS	: 28
Total No. of vehicles hired	: 28

**Table 2: Staff position of RBSK Programme.**

Category	Sanctioned	In Position	Vacant
Ayush Medical Officer (M)	28	17	11
Ayush Medical Officer (F)	28	9	19
A.N.Ms	28	18	10
Pharmacist	28	17	11
Total	112	61	51

**Table 3: Staff Position of DEIC, DHH, Koraput.**

Name of the Post	Sanctioned	In Position	Vacant
Paediatric Specialist	1	0	1
Medical Officer (MBBS)	1	0	1
Dental Doctor	1	1	0
RBSK Manager	1	1	0
Physiotherapist	1	1	0
Audiologist-cum-Speech Therapist	1	1	0
Psychologist	1	1	0
Optometrist	1	0	1
Dental Technicians	1	0	1
EI-cum-Special Educator	1	1	0
Social Worker	1	1	0
Staff Nurse	1	0	1
Laboratory Technicians	1	0	1
Data Entry Operator	1	1	0
Total	14	8	6

**Table 4: Equipments supplied to each MHT.**



**Table 5: List of Equipment at DEIC.**

Audiology: Audiometer, OAE, BOA, Tympanometry, ABR Screener, Otoscope & BERA

Physiotherapy: Therapy balls, Trampoline, Static cycle, Therapy mat, Bean bag & CP chair.

Dental Unit: Dental X-ray

Vision: Indirect Ophthalmoscope with 20& 30D lens, Streak Retinoscope, Auto Refractometer, Hand held slit lamp

Psychologist: DASSI, Sanguine Form Board, INCLEAN ADHD assessment tool, (ESSA) Autism assessment tool

Sl. No.	Name of the Equipment
1	Ball Pool with multi-colour small Balls
2	Tunnel
3	Ramp & step (Plywood) for sensory integration
4	Chart paper, pencil, gum, crayon, gripper, eraser, scissor, note books, duster, scale, measuring tape, slate, chalk, sharpener, cup & plate, comb, mirror, tooth paste, brush, tongue cleaner, nail cutter, Story book, pillow, Mathematical symbols & numbers etc.
5	Flash Cards (Alphabets, numbers, colours, shapes, body parts, size, animals and fruits etc.)
6	Different types of toys and playing materials viz. Ludu, Carom, Bat & Ball, puzzles, blocks
7	Tube Swing
8	Activity table (wooden)
9	Tricycle for baby
10	Rocking Horse
11	Walker for baby
12	Colour LED Bulbs for sensory integration
13	Swing
14	Baby Bi-cycle
15	Money Bank

**Table 6: Year-wise Performance under RBSK (2014-18).**

Year	Target children for screening	Children screened	Children referred	No. of children availing higher level of care
2014-15	336736	222352 (66%)	28968 (13%)	0
2015-16	387951	291043 (75%)	41515 (14%)	134
2016-17	387951	310987 (80%)	35052 (11%)	127
2017-18	425008	368910 (87%)	29409 (8%)	180

**Table 7: Status of Year-wise management of 4D's at DEIC.**

Year	Birth defect	Disease	Deficiency	Developmental Delay
2014-15	90	366	43	169
2015-16	189	828	438	1069
2016-17	437	1379	365	2236
2017-18	328	2159	310	2252
Total	1044	4732	1165	5726

**Table 8: Status of Birth defect Management (from 2014-15 to 2017-18).**

Birth Defect	Total No. Detected	Total No. Treated	Outcome
Neural Tube Defect	84	5	5.9%
Cleft lip, cleft palate	260	157	60%
Club Foot	428	254	59.3%
Developmental Dysplasia of hip	143	44	30.7%
Congenital Heart Disease	131	28	21.3%
Down Syndrome	132	93	70.4%
Congenital Cataract	267	76	28.4%
Congenital Deafness	744	387	52%
Retinopathy of Prematurity	0	0	0%
Total	2207	1044	47%

**Table 9: Status of Developmental Delay & Disabilities Management.**

Developmental Delay & Disabilities	No. of children Identified	No. of Children Treated	Outcome
Vision Impairment	6632	1587	23%
Hearing Impairment	1173	750	63.9%
Neuromotor Impairment	501	476	95%
Motor Delay	456	171	37.5%
Cognitive Delay	554	554	100%
Language Delay	1348	1165	86.4%
Behaviour Disorder (Autism)	272	94	34.5%
Learning Disorder	512	31	6%
ADHD	186	186	100%
Total	11634	5014	43%

**Table 10: Diseases Identified and Managed by RBSK.**

Disease	No. of identified	Service Provided	
		No.	Percentage
Skin conditions	59165	47871	80.9%
Otitis Media	8887	7838	88.1%
Rheumatic Heart Disease	139	2	1.4%
Reactive Airway Disease	77503	59446	76.7%
Dental Condition	83737	35423	42.3%
Convulsive Disorder	930	615	66.1%
Total	230361	151195	65.6%

**Table 11: Deficiencies Identified and Managed.**

Deficiency	No. of identified	Service Provided	
		No.	Percentage
Severe Anaemia	2660	1602	60.2%
Vit. A deficiency	2505	2129	84.9%
Vit. D deficiency	689	465	67.4%
SAM	4603	3164	68.7%
Goitre	112	37	33.0%
Total	10569	7397	69.98%

**Table 12: Empanelled Hospitals for Tertiary Care.**

1. Apollo Hospital for Heart Surgery
2. Narayan Hrudalaya, NIMH Bangalore & Howrah for Heart Surgery
3. SBM Hostial, Plastic Surgery Department, Cuttack for cleft lip and cleft palate
4. SVNIRTAR, Olatpur, Cuttack for club foot
5. LVPEI, Bhubaneswar for eye cases
6. AIIMS, Bhubaneswar
7. All Govt. Medical Colleges, Odisha.

**Table 13: Newborn Screening at delivery Points for Birth Defects.**

Year	No. of Live Births	No. of Babies Screened at DP	Percentage
2014-15	28373	1755	06
2015-16	27196	10376	38
2016-17	24948	17082	68
2017-18	24106	19712	82

**Table 14: Achievement of RBSK, Koraput (2014-15 to 2017-18).**

Sl. No.	Particulars of Treatment	Achievement
1.	No. of club foot surgery	254
2.	No. of cleft lip and Palate surgery	157
3.	Distribution of Hearing Aids	387
4.	CHD Medical & Surgical treatment	36
5.	Congenital cataract surgery and other eye cases managed	235
6.	Refractory Errors managed	2171
7.	Distribution of Spectacles	1538
8.	No. of tertiary level referrals	436
9.	SAM cases referred by RBSK to NRCs	530
10.	4D cases identified and initiated therapy by DEIC staff	3576

**Table 15: Prevalence Rate of Congenital Defects under RBSK Koraput from 2014-15 to 2017-18.**

4D	Name of the Health Condition	Prevalence (followed form RBSK Resource material)	Total No. of children screened	Total No. of cases confirmed and Line listed	Prevalence per 1000 live Birth
Birth defect	Neural tube condition	4.2 per 1000 live births	104623	84	0.80
	Down's Syndrome	1.09 per 1000 live births	104623	132	1.26
	Cleft Lip & Palate	0.93 for every 1000 live births	104623	260	2.49
	Club Foot	1-2 per 1000 live birth	104623	428	4.09
	Developmental dysplasia of the hip	1 in 1000 children birth	104623	148	1.37
	Congenital cataract	1-1.5/10,000 children	104623	76	0.73
	Congenital deafness	5.6 to 10/1000 live births	104623	744	3.70
	Congenital heart diseases	8-10/1000 live births	104623	131	1.25
	Retinopathy of Prematurity	20-22% of premature children		--	--

## RESULT

RBSK programme was launched in Koraput during 2014-15 and the District Early Intervention Centre (DEIC) started functioning since 24.04.2015. Koraput district has a population of 13.8 Lakhs and 14 Blocks with 28 MHTs (Mobile Health Teams), with 5,42,794 numbers of 0-18 years children. 28 numbers of vehicles are hired for the 28 MHTs (Table-1). There were 17 male Ayush Doctors, 9 female Ayush doctors, 18 ANMs and 17 Pharmacists (against a sanctioned strength of 28 each). Total human resource is 61 against sanctioned 112 pots (54%) for MHTs (Table-2). DEIC functioned with 1 Dental doctor, 1 RBSK Manager, 1 Physiotherapist, 1

Audiologist, 1 Psychologist, 1 Physical Educator, 1 Social Worker and 1 Data Entry Operator, Post of Pediatric Specialist, Medical Officer, Optometrist, Dental Technician, Staff Nurse and Dental Technician was laying vacant. So, there is constraint of human resource at DEIC i.e. 8 against sanctioned 14 posts (57%) (Table-3). All the equipment are supplied to all MHTs as per the norms of RBSk programme for screening of 4Ds in children 0-18 years (Table-4). Also, almost all the equipment needed for DEIC was supplied as per RBSK guidelines (Table-5). Target children for screening was fixed as per the availability of MHT teams and vehicles. In 2014-15, 222352 (66%) children were

screened against a target of 336736, of which 28968 (13%) children were referred to DEIC and no child could be referred for tertiary care. Screening and referral gradually increased from 66% in 2014-15 to 75% in 2015-16, 80% in 2016-17 and 87% in 2017-18. Number of children availing higher level of tertiary care was 134 in 2015-16, 127 in 2016-17 and 180 in 2017-18 (Table-6). Total number of 4Ds treated at DEIC were 1044 birth defects, 4732 diseases, 1165 deficiencies and 5726 developmental delay cases (Table-7). Out of total 1998 Birth defects 1044 cases (52%) are treated, while other 954 (48%) cases are line listed for treatment after wards (Table-8). Out of 11634 cases of different types of developmental delays and disabilities, 5014 (43%) cases were treated at DEIC while others are line listed for treatment (Table-9). Out of 230361 children suffering from different types of diseases, 151195 (66%) children were successfully treated at CHCs by RBSK MHT teams (Table-10). Out of 10569 children identified with various deficiencies, 7397 (70%) were treated by MHTs (Table-11). Out of all cases referred to DEIC by MHTs, 436 cases were referred to different tertiary care hospitals empanelled for RBSK programme by Govt. of Odisha (Table-12). Newborn screening at delivery points also done by different health care provides at DPs. Percentage of newborn babies screened at delivery points gradually increased form 6% in 2014-15 to 38% in 2015-16, 68% in 2016-17 and 82% in 2017-18 (Table-13). During 2017-18, 1398 babies were cured and discharged from SNCU, Koraput, out of which only 848 (61%) newborns were screened at DEIC. Achievement of RBSK programme in Koraput till 2017-18 since the functioning (2014-15) includes 254 cases of club foot correction, 157 cases of cleft lip and palate repair, 76 cases of congenital cataract surgery, 36 cases of congenital heart disease management, distribution of hearing aids to 387 children, distribution of spectacles to 1538 school students with refractory error and referral of 530 SAM children to different NRCs of the District (Table 14).

## DISCUSSION

RBSK programme is a new imitative of GOI aiming at child health screening, early identification and early intervention for children from birth till 18 years of age. DEIC established at District Headquarters acts as an effective platform for management of referred cases free of cost. With limited human resource of 54% of MHTs and 57% at DEIC, the staff tried to render maximum possible service to the 0-18 years child population of 4,34,169. Among all children screened by MHTs, 13% of children in 2014-15, 14% in 2015-16, 11% in 2016-17 and 8% in 2017-18, were referred to DEIC. In other study done by Parmar *et al.*, percentage of referral to DEIC was 5.2% in Indore and 6.015 in Ujjain. No. of 4Ds identified by MHTs and DEIC were, birth defects 1998 (0.5%). Developmental Delay and disabilities 11634 (2.4%), diseases 230361 (52%) and various deficiencies - 10569 (2.4%). Prevalence rate of different congenital defects per 1000 live births in this study was NTD (0.8%), cleft lip and cleft palate (2.49), club foot

(4.09), DDH (1.37), congenital cataract (0.73), congenital deafness (3.7), congenital heart disease (1.25) and down syndrome (1.26). As per March of Dimes, Global Report on Birth defects and RBSK Resource Manual, these figures are 4.2, 0.93, 1-2, 1, 1-1.25, 5.6, 8-10 and 1.09 respectively (Table 15). Out of all referred children with birth defects, 525 of children were supported and managed by DEIC, whereas it was only 2.51% in Indore and 8.25% in Ujjain DEIC.

Out of all referred children with developmental delay and disabilities 43% of them were supported and managed by DEIC, whereas it was only 0.89% in Indore and 2.625 in DEIC Ujjain. 66% of children suffering from various diseases (Table-10) and 70% children suffering from different deficiencies (Table-11) were managed by MHTs and DEIC. In case of SAM, out of all detected cases, 3164 (68.7%) children were managed in community and 530 (11.5%) cases of SAM with complication were referred to NRCs.

Newborn screening at DPs gradually improved from 6% in 2014-15 upto 82% in 2017-18. Percentage of screening of SNCU graduate newborns during 2017-18 is only 61%.

## CONCLUSION

RBSK Programme provided an effective platform for early screening of 0-18 year children for various health problems by MHTs and a good referral support and management by staff of DEIC to children identified and referred to them. There was a deficiency of staff both of MHTs and DEIC. These need to be filled up to make still more effective implementation of the programme. Retinopathy of prematurity could not be screened due to non-availability of trained optometrist / ophthalmologist. Screening for sickle cell disease and thalassemia could not be done due to non-availability of blood testing facility for Hb electrophoresis. These gaps should be filled up for a better outcome of the programme. Referral services to tertiary care centers should be more streamlined and accelerated for an early intervention especially for congenital heart diseases and NTDs. Newborn screening at delivery points and referral of SNCU graduate babies to DEIC need further strengthening and capacity building of healthcare provides. Each baby discharged form SNCU should be line listed and tracked in the community for regular follow up for an early screening of health conditions and early intervention for an effective outcome. This tracking can be done through available health care facilities i.e. AWW, ASHA, Health Worker, MCTS (mother and child tracking system) and through SMS in mobile phones.

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